A RANDOMIZED CONTROLLED TRIAL OF THE EFFECTIVENESS OF A VILLAGE HEALTH COMMITTEE APPROACH IN IMPROVING THE HEALTH STATUS OF RURAL COMMUNITIES IN SIERRA LEONE

by

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ABSTRACT

The issues in providing adequate health care for rural populations in developing countries and Sierra Leone in particular are discussed - showing the need for a community-based health care programme to counteract the problems not being addressed by institutionalized health care services.

The literature has been reviewed to assess the methods whereby community health programmes using village workers or village groups have been used around the world.

A randomized controlled trial has been designed to test the effectiveness of one particular health status of rural people in Sierra Leone. It is hoped that the results of this study will enable the Sierra Leone government to decide on a national primary health care programme for use in Sierra Leone.
ACKNOWLEDGEMENTS

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CHAPTER 1
INTRODUCTION

Primary Health Care was defined by the World Health Organization to mean "a health approach which integrates at the community level all the elements necessary to make an impact upon the health status of the people." It is recommended that such an approach would be integrated into a country's national health care system. It would be in response to the fundamental human needs of how a person "can know of and be assisted in the actions required to live a healthy life, and where a person can go if he/she needs relief from pain or suffering." It is also recommended that a response to such needs would involve a series of simple and effective measures in terms of cost, technique, and organization, which are easily accessible to people in need, and which assist in improving the living conditions of individuals, families and communities. These include preventive, promotive, curative and rehabilitative health measures and community development activities. (113)

However, the term "primary care" in English
usage goes back to Lord Dawson's 1920 Report in England, which was concerned with the provision of primary health centres and the issue of first contact medical care. Since 1960 many of these centres have been developed in Britain under the National Health Services. They include general practitioners, public health nurses, visiting consultants, and additional facilities for health promotion activities. (47)

Since 1962 the term has been used to refer to general practice in Great Britain and has since achieved wide prominence in this connection (White 1963-1964). However, the use of the term by the World Health Organization is much broader than this. Current usage by WHO emphasizes community participation and promotional and organizational activities. This contrasts with existing public health services by its emphasis on the periphery rather than central planning and organization of the so-called "vertical services" which have also been known as "institutional health services."

The limitations of many existing institutionalized health services around the world are seen to be their failure to enlist community participation and the fact that they work in isolation -- not linking themselves to other services such as education, social planning or economic development. Existing curative
or primary care services are mainly urban-based with quite inadequate rural coverage. This is as true for Great Britain, United States and Canada as it is for most parts of the developing countries. However, it means that in countries where most of the population is rural, 65 to 80 per cent of the people may not be covered by health services at all. Despite the fact that greater urbanization is taking place in developing countries, often three-quarters of the people suffer from inadequate coverage.

The new concept of health care places great emphasis on the village health worker as being most likely able to provide a nearly complete coverage of the population. Institutionalized services are expected to support primary health care at the community level by providing training of primary health care workers, supportive supervision and technical guidance for health measures such as immunizations, sanitation, family health and family planning. In effect, the village health worker is the link between the community and the health services. This village worker links the health services to the local people.

These new concepts are clearly almost revolutionary in their thinking. They have been greatly influenced by the Chinese "grass roots" emphasis on
community participation out of which the "bare foot doctor" idea evolved. Such a dynamic new concept should preferably be identified with a new term instead of the used term "primary health care", which because of its history has a limited meaning. For this reason the term "community health care" will be used instead -- the use of the term 'community' reminds us that the approach is community based. This contrasts sharply with the presentation of the sick person (isolated from family and environment) which is the unit of service for the health professional and the institutionalized health services.

The World Health Organization proposed health for all by the year 2000 through recommending the introduction of primary health care into all national health programmes. Many health agencies (i.e. government and non-governmental bodies) have accepted this challenge. Several countries across the world have developed programmes characterized by community participation and local village health workers in response to their need in their geographic location. Because this approach is so new, there are few guidelines or strategies which can be given.

Community health care is only in its infancy when it comes to development and methodology. Therefore, there is a need for those running community health
programmes to assess and monitor their progress in answering the basic health needs of the community. Community health care is designed to meet community problems, but these problems must be defined by the collection of data regarding health and disease, sociological information on attitudes, environment and lifestyle.

Epidemiology is conventionally defined as the study of the distribution and determinants of disease in populations. It is particularly concerned with rates which include both numerator and denominator. For a problem to be defined, the denominator is essential.(47) For example, data on attendances at a health facility can only become meaningful in community terms if a rate can be given. The new dynamism in health care arises because of the recognition that, although existing services may be well attended, less than half the total population may be covered, and this often includes those most in need of care.

Hetzel proposed a model which describes very well the social process linking epidemiology to community health care.(47)
Health improvement requires a continuous input of epidemiological data, (as shown in the above diagram). Depending upon the problem being examined, data may be concerned with:

(1) demography - e.g. educational level and income of the population;

(2) mortality data - especially in relation to the under-five age group in the community who have such high mortality rates due to infectious disease and malnutrition;

(3) morbidity data - concerning parasitic infections, nutritional status, prevalence of infectious diseases, etc.;

(4) environmental data - water supply, food supply, housing, etc.;

(5) health service data - utilization and satisfaction of patients.
It is apparent that this kind of epidemiological data is necessary for:

1. Defining health problems so that not only the planners but the community knows the facts about their health situation.

2. Monitoring progress over a period of time - which is an educational process for all involved and helps motivate planners and participants to know where they are going in terms of progress, and what changes are indicated.

3. Evaluating new measures: With the introduction of new programmes - e.g. health education, epidemiological data helps to judge the effectiveness of these programmes.

The purpose of this study is to design a method for evaluating a community health programme for rural people in Sierra Leone, West Africa. The question posed by this thesis is: Are health committees effective in changing the health practices of rural people in Sierra Leone and ultimately their health needs? The answer to this question is important for three reasons:

(1) To enable planners and community workers to objectively assess the progress of the programme.

(2) To educate the local community.

(3) To indicate changes which may be needed for future improvement.
CHAPTER 2

BACKGROUND

2.1 Geography

Sierra Leone is situated on the west coast of Africa between 10 and 13 degrees west, and 7 and 10 degrees north. The land area covers 27,925 square miles. The southern coastal area is low lying mangrove swamps. The northern area rises to a high plateau. Six large rivers transect the country flowing from northeast to southwest. The climate is tropical with two seasons -- wet season between May and October, and dry season from November to April. There is a mean rainfall of 153 inches which falls entirely in the wet season.

2.2 Demography

The population of Sierra Leone according to the 1974 census was approximately 3 million people, with about 75% of them living in rural areas. Approximately 16% of the population are under 5 years, and there are 40.6% under 15 years (27) - counting a large number of non-producing consumers. The birth rate is 47 per 1000 and there are extremely high infant and childhood mortalities, estimated at more than 200 deaths under five years per 1000 live births (Dow and Benjamin 1975,
Wilkinson 1965, Gamble 1961). The population growth rate is 2.6% annually. The average male and female life expectancies at birth have been estimated at 41.9 years and 45.1 years respectively. (27)

2.3 **Lifestyle**

It is estimated that only 20% of the population are literate. In 1971, 26% of children 5 - 14 years were enlisted in primary schools and 13% of children 15 - 19 years were in secondary schools. The high drop out from schools indicates that even of those who have the opportunity of becoming literate, many return to illiteracy after a few years in school. This could suggest an insufficient amount of training and support in their learning to read and write.

Largely illiterate, the rural people live mainly in mud and wattle houses, located in villages of between 500 and 3000 inhabitants. There is no water supply or electricity in the vast majority of these villages. Communication is poor between villages and towns. The main method of livelihood is subsistence farming. Environmental sanitation is poor to non-existent in almost all villages and towns. Traditional beliefs are very strong, particularly in the rural areas. Islam is the predominant religion which has a different code of ethics from the official law of the country which is based on the British
legal system.

2.4 Administration

The government of the country is centralised in Freetown, the Capital City. The country is divided into three provinces: Northern, Southern and Eastern, and the Western Area which contains the capital. The capital and surroundings were originally a British colony.

The provinces are divided into a total of 12 districts. The provinces are of unequal size. The largest is the Northern Province. It covers nearly half the country and about 42% of the population. The provincial headquarters are situated in the largest towns in each province: Bo (Southern Province), Kenema (Eastern) and Makeni (Northern Province).

The average size of a district is approximately 2,300 square miles and has an average population of 220,000. However, the ranges in size and population of each is not great. The largest district is more than 3 or 4 times the smallest district. Districts in the Northern Province tend to be more extensive than elsewhere, particularly Koinadugu, Bombali and Tonkolili. This province also has the smallest district, Kambia.

There are about 18 different tribes in Sierra Leone - while districts are not indigenous groupings, the three main tribes are more intensely situated as
follows: Creoles are in Freetown area, the Mendes are in the South and East, while the Temnes live mainly in the North.

The districts are divided into several chiefdoms which in turn consist of several villages. Most districts are named after the main town in the area which is often the most accessible centre and has the biggest population. Some villages are very isolated from the administrative headquarters. In many places efforts are being made to improve the situation through feeder roads.

2.5 Chiefdom

The traditional local unit of local government in Sierra Leone is the chiefdom with a paramount chief as the traditional ruler. In earlier times the paramount chief executed a considerable amount of authority and power over his subjects through personal contact. In modern times, the chieftaincy has experienced important changes by central government so that the power of chiefs has been reduced through the control of some native customs and fragmentation of some chiefdoms which were considered too large or because of internal strife. 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 and often advanced in age. (38)
The chiefdoms vary in size. In general, the chiefdoms in the North are larger. The largest chiefdom in Sierra Leone is Tambakla. It is in the Bombali district and has an area of 970 square miles. The smallest chiefdom is the Fanja Krim chiefdom, in Pujehun district, with an area of only 20 square miles. The average populations of chiefdoms vary from 30,000 in Bo District to less than 8,000 in Pujehun and Bonthe districts.

Chiefdom headquarters are usually situated in places of some local importance and the largest settlement. Some paramount chiefs, however, move the chiefdom headquarters to places of their personal choice, e.g. their own home town.

2.6 **Economy**

Sierra Leone is classified as one of the less developed countries of the world. The gross national per capita is less than U.S. $200. While it is rich in certain minerals, it is heavily dependent upon mineral extraction for foreign exchange - especially diamonds and bauxite. The country is also rich and luscious in growth, agriculture potential being its greatest asset. However, agricultural development presupposes certain requirements, e.g. roads to move produce, mechanics to operate and maintain machinery, a new land tenure system and food marketing prospects. All of these involve a synchronization of so many variables
that economic development is expectably slow. A United Nations Development Programme survey of 1974 estimated the average monthly income per head of household in the Bo District of the Southern Province as U.S. $3.75.\(^\text{(101)}\)

As most of the rural population are in subsistence farming which involves hard and laborious methods with problems like pest control, crop rotation, good seeds, etc. such a low monthly income is not too surprising. However, the method whereby monthly income was measured was left unexplained........

2.7 **Health Services**

Health services in Sierra Leone are patterned largely after the hospital/health centre model. Each of the twelve districts in the country has a hospital with a varying number of attached health posts. The district hospitals ideally feed into a provincial hospital which offers specialist services. However, this only reaches the people who fall ill in towns. The government operates the hospital based at provincial and district headquarters. But a district may be served by a second hospital built and run by non-governmental agencies, e.g. mission or mining company. There are a total of 31 hospitals, 30 health centres, 37 maternal and child health centres and 109 other treatment centres and dispensaries - of these services, church-related
institutions make a considerable contribution, e.g. in 1972, 32.1% of all hospital beds. (71)

There are 250 physicians in the country. (22) 200 live in the Western Area (which includes the capital Freetown) where only 11% of the population reside (1974 Population Census). The doctor-population ratio for the total population of the country is 1 to 12,000 people - but outside of the Western Area for the Provinces the situation is worse, there is only 1 doctor per 54,000 people.

At present preventive and promotive services are inadequate, though the Ministry of Health is determined to have an extensive pattern of Primary Health Care by the year 2000. In the National Development Plan, 1974-75/1978-79, the government states its intention to provide at least one appropriate health unit to serve the inhabitants of each chiefdom. This was defined on the basis of 1 Health Centre per 10 - 20 thousand, and 1 Dispensary or treatment centre to serve 5 - 10 thousand people.

Despite the government's concern for the situation, there are about 30 out of 145 chiefdoms without any medical facility whatsoever. In chiefdoms with medical units, large proportions of the population are not being served by these facilities partly because of 1) long distances from the unit; 2) the fact that staff are based
in the unit and do not go out into the community, and
3) lack of credibility in the eyes of the people.

In summary, there are vast areas not covered by
the health services. Medical facilities are unevenly
distributed with a great majority located in large towns.
The rural section of the population comprising 75% of all
people of Sierra Leone remains either unserved or under-
served.

2.8 Health Status

Information on health data for the country can be
deficient especially in rural areas - though in the past
five years there have been house to house studies per-
taining to specific topics in certain areas. Many of the
statistics used by the United Nations in relation to
Sierra Leone refer to the figures available in the hos-
pitals and health centres of the capital. These,
therefore, are not representative of the pattern of dis-
ease morbidity and mortality in the Provinces. However,
they have served as a rough guide to health status of the
population in the past.

Available data\(^{(65)}\) from Freetown and the Western
Area with its better health facilities and administration
indicate that the leading causes of death in children 1 to
4 years old are communicable, parasitic diseases, and mal-
nutrition. Table 1 lists the diseases which are the
leading causes of mortality among children in the Western Area for 1975-76. The official figures given for Infant Mortality Rates state that 130 deaths per 1,000 live births for Freetown and Western Area while the rural areas have between 150 to 170 deaths per live births. However, in a more recent study carried out by Herbert Kandeh in 1978(53) in Bo district, the Provincial capital Bo had a rate of 186 per 1,000 while the other large towns had 245 per 1,000. The average Infant Mortality Rate for the larger villages/towns of Bumpe chiefdom in Bo district was 399 per 1,000(4) The Infant Mortality Rate is considered to be a sensitive indicator of health status in developing countries. The above figures for Sierra Leone indicate grave health problems especially in the rural areas. Table 2 shows a comparison between birth and mortality rates for poor and affluent countries of the world and indicates Sierra Leone's position very clearly.

Table 1 reminds us that over 50% of the causes of mortality may be due to diseases related to nutrition disorders, e.g. measles, enteritis, avitaminosis and anemia. Figures for nutritional status of under-five children indicate that malnutrition is a problem. In 1977-79 a National Nutrition Survey was carried out in conjunction with the University of California, Los
**TABLE 1**

LEADING CAUSES OF MORTALITY AMONG CHILDREN IN THE WESTERN AREA OF SIERRA LEONE - 1975/76

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Measles</td>
</tr>
<tr>
<td>2</td>
<td>Enteritis and other diarrheal diseases</td>
</tr>
<tr>
<td>3</td>
<td>Avitaminosis and other nutritional deficiency</td>
</tr>
<tr>
<td>4</td>
<td>Malaria</td>
</tr>
<tr>
<td>5</td>
<td>Whooping Cough</td>
</tr>
<tr>
<td>6</td>
<td>Anaemia</td>
</tr>
<tr>
<td>7</td>
<td>Others</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
</tr>
</tbody>
</table>

(Source: Ministry of Health, Sierra Leone)
<table>
<thead>
<tr>
<th></th>
<th>Birth Rate Per 1,000</th>
<th>Infant Mortality Per 1,000 Live Births</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affluent Countries:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Sweden</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Japan</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td><strong>Poor Countries:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>47</td>
<td>200*</td>
</tr>
<tr>
<td>Chad</td>
<td>44</td>
<td>160</td>
</tr>
<tr>
<td>India</td>
<td>35</td>
<td>139</td>
</tr>
<tr>
<td>Guatemala</td>
<td>43</td>
<td>79</td>
</tr>
</tbody>
</table>

*Average of above-mentioned figures for Urban and Rural Sierra Leone.

Angeles. (72) Their overall conclusions were that almost one-quarter of all Sierra Leonian children up to five years of age had sufficiently poor growth to indicate a long term lack of calories and/or protein available to the body tissues. Almost one-third of the children were underweight. Childhood mortality rates are higher in those families that have an undernourished child.

The life expectancy rates for adults in Sierra Leone is 41.5 years for males and 45 years for females. These are projections from United Nations for 1970 to 1975. These rates are lower than those given for West Africa as a whole or the rest of the developing world. (71) The male death rate is 22 per 1000. Half of all registered and certified deaths in the Western Area were due to infections and parasitic diseases for 1969-71. There are indications that in the Provinces the percentage is much higher. The rates for women 15 - 45 years are not available. Nearly a third of female deaths in this age group are due to complications in pregnancy and child birth. Anemia, obstructed labour and hemorrhage are the main problems. It is assumed by the National Development Plan that 20% of all deliveries are complicated and require hospitalization and treatment. (71) If true, this would represent at least 24,000 complicated deliveries per annum. Table 3 summarizes the main demographic features of Sierra Leone.
<table>
<thead>
<tr>
<th></th>
<th>MAIN DEMOGRAPHIC FEATURES OF SIERRA LEONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Population 3,000,000 75% rural and mostly illiterate</td>
</tr>
<tr>
<td>2</td>
<td>Life Expectancy Males, 41 years Females, 45 years</td>
</tr>
<tr>
<td>3</td>
<td>Annual Birth Rate 47/1,000</td>
</tr>
<tr>
<td>4</td>
<td>Annual Crude Death Rate 22/1,000 population</td>
</tr>
<tr>
<td>5</td>
<td>Infant Mortality Rate Freetown, 130/1,000 live births Rural areas, 150-170/1,000 live births</td>
</tr>
<tr>
<td>6</td>
<td>Number of Doctors 250</td>
</tr>
<tr>
<td>7</td>
<td>Doctor - Patient Ratio 1/12,000</td>
</tr>
<tr>
<td>8</td>
<td>Per Capita Income $U.S. 180 per annum</td>
</tr>
<tr>
<td>9</td>
<td>Children Under 5 years 17% of population</td>
</tr>
</tbody>
</table>

Source: National Development Plan, Sierra Leone 1974/75 - 1978/79
CHAPTER 3

THE STATE OF HEALTH IN DEVELOPING COUNTRIES:
PROBLEMS IN HEALTH CARE IN THE SIERRA LEONE CONTEXT

Sierra Leone belongs to the group of poorer countries of the world known as "developing", "less developed" or "Third World." In this chapter we shall analyze the health problems of the rich and poor countries of the world, the development and allocation of health resources in these countries with particular reference to the Sierra Leone situation.

Figure 1 is a map of the world depicting a rough grouping of the world's nations into "poor" and "affluent" countries. The developing, poor countries are located largely in the tropical areas of the world (in Africa, Asia and Latin America between the Tropics of Cancer and Capricorn). The more affluent countries are to be found in North America, Europe (including Russia) and countries such as Japan, Australia, New Zealand, Israel and the Republic of South Africa.

While many of the developing countries show a certain level of industrialization, a majority of their population are involved in traditional subsistence farming. Most of the affluent countries are highly industrialized,
Approximate location of poor countries.

Affluent countries.
technological states and some have a significant amount of mechanised agriculture.

What distinguishes a country as being 'rich' or 'poor'? Unfortunately, there are few widely acceptable criteria but there are rough descriptions which reveal the differences. Of course, the most widely used measures of comparisons are economic. Gross National Product per capita (per capital GNP) is the most frequently used measure on a national basis and refers to the goods and services produced annually by a country divided by the population. As an indication it is not very satisfactory because it may be based on inaccurate data, shifting international exchange rates (especially in countries where much of the population are living on subsistence farming) and difficulty in estimating or evaluating "non-cash" factors. Since all countries have a small wealthy segment of the population, the per capita GNP cannot be considered a true reflection of the average individual income of most people in the country. Even when the differences between rich and poor nations are defined by the use of purely economic terms -- the validity of the economic indication GNP per capita for a country is diminished by the marked discrepancies within that country (e.g. the Western Area and the rest of Sierra Leone). While it is true that some countries are predominantly rich
and others predominantly poor, there are underprivileged population groups everywhere. Table 4 demonstrates this concept very clearly when it illustrates the percentage share of National Income distributed among populations of nine different countries. (11) There is objection to the use of purely economic measures for "development". It is felt that increased economic productivity is usually achieved through further deterioration of the environment, migration on a larger scale from rural to urban areas, leaving vast rural areas neglected and creating greater poverty at urban as well as rural levels. Other areas of improvement are also being considered as measures such as education, health, sciences, the arts as well as infrastructure in the private and governmental sectors, etc. - in an attempt to reflect more nearly "development."

Table 5 illustrates some economic and social indicators used to compare poor, newly rich and affluent countries. (103) It will be noted that the newly rich countries present a combination of characteristics from both the rich and poor countries. While having recently acquired great wealth through the export of Petroleum they lag behind in technological and other parameters of development.

Whatever we define as the "quality of life" of a population, health must be a key factor. From the defin-
<table>
<thead>
<tr>
<th>IN</th>
<th>PER CAPITA GNP U.S.$</th>
<th>LOWEST 40% OF POPULATION</th>
<th>MIDDLE 40% OF POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines '71</td>
<td>239</td>
<td>11.6</td>
<td>34.6</td>
</tr>
<tr>
<td>Gabon '68</td>
<td>487</td>
<td>8.8</td>
<td>23.7</td>
</tr>
<tr>
<td>Venezuela '70</td>
<td>1,004</td>
<td>7.9</td>
<td>27.1</td>
</tr>
<tr>
<td>Tanzania '67</td>
<td>89</td>
<td>13.0</td>
<td>26.0</td>
</tr>
<tr>
<td>Dominican Republic  '69</td>
<td>323</td>
<td>12.2</td>
<td>30.3</td>
</tr>
<tr>
<td>Argentina '70</td>
<td>1,079</td>
<td>16.5</td>
<td>36.1</td>
</tr>
<tr>
<td>Thailand '70</td>
<td>180</td>
<td>17.0</td>
<td>37.5</td>
</tr>
<tr>
<td>Yugoslavia '67</td>
<td>529</td>
<td>18.5</td>
<td>40.0</td>
</tr>
<tr>
<td>U.S.A. '70</td>
<td>4,850</td>
<td>19.7</td>
<td>41.5</td>
</tr>
</tbody>
</table>

### TABLE 5

**ECONOMIC AND SOCIAL INDICATORS—SELECTED COUNTRIES 1970-75 (VARIOUS YEARS)**

<table>
<thead>
<tr>
<th>Poor Countries</th>
<th>Annual Per Cap. (GNP-U.S.$)</th>
<th>Literacy (% Population)</th>
<th>Annual Births per 1000 pop.</th>
<th>Annual Deaths per 1000 pop.</th>
<th>Infant Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>70</td>
<td>22</td>
<td>50</td>
<td>28</td>
<td>132</td>
</tr>
<tr>
<td>Haiti</td>
<td>130</td>
<td>10</td>
<td>36</td>
<td>17</td>
<td>150</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>180</td>
<td>20</td>
<td>47</td>
<td>22</td>
<td>200</td>
</tr>
<tr>
<td>Thailand</td>
<td>220</td>
<td>68</td>
<td>43</td>
<td>11</td>
<td>65</td>
</tr>
<tr>
<td>Guatemala</td>
<td>420</td>
<td>18</td>
<td>43</td>
<td>14</td>
<td>79</td>
</tr>
<tr>
<td>Newly Rich Countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>130</td>
<td>25</td>
<td>50</td>
<td>23</td>
<td>180</td>
</tr>
<tr>
<td>Saudia Arabia</td>
<td>550</td>
<td>15</td>
<td>50</td>
<td>20</td>
<td>152</td>
</tr>
<tr>
<td>Libyan Arab Rep.</td>
<td>1,830</td>
<td>27</td>
<td>45</td>
<td>15</td>
<td>130</td>
</tr>
<tr>
<td>Kuwait</td>
<td>4,090</td>
<td>47</td>
<td>47</td>
<td>5</td>
<td>44</td>
</tr>
<tr>
<td>Affluent Countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>810</td>
<td>80</td>
<td>18</td>
<td>9</td>
<td>43</td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>1,530</td>
<td>99</td>
<td>10</td>
<td>8</td>
<td>26</td>
</tr>
<tr>
<td>U.K.</td>
<td>2,600</td>
<td>99</td>
<td>16</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>M.S.A.</td>
<td>5,590</td>
<td>98</td>
<td>16</td>
<td>9</td>
<td>18</td>
</tr>
</tbody>
</table>

ition of health put forth by the World Health Organization that "health is a state of optimal physical, mental and social well-being, and not merely the absence of disease or infirmity" it is clear it is synonymous with "quality of life." However, this definition is very difficult to use in practice especially in establishing indicators for measuring health status of populations. This definition does emphasize the interaction of many biological and non-biological factors such as social, political, economic, educational, cultural and religious factors. Health professionals on the other hand, have learned a great deal about the biological factors, but many often remain ignorant of those non-biological factors which influence health. Problems of contaminated water, sewage systems, malnutrition, overpopulation, poor housing as well as the major health problems of affluent countries intimately related to life-style (e.g. accidents, alcohol, tobacco, drug abuse, etc.) are obvious proof of the non-biological as well as biological factors having a serious impact on the health of individuals and communities.

Accurate assessment of health is needed in order to act upon these noted health factors. An assessment is required. It may be possible to assess the health status of an individual. It is far more difficult to provide
measures which accurately reflect the health status of groups and entire populations. Developing Countries experience great problems in establishing accurate indicators of health because

(1) resources are limited - personnel and equipment are in short supply;

(2) information at the level of the community is usually non-existent or totally inadequate;

(3) a large percentage of the population may not be covered by the health service so information collected at the static health service is limited and unrepresentative of the total local population in the service area;

(4) some areas may be very isolated so that little or no data is collected on the people from there.

However, despite the difficulties in assessing health status for populations of developing countries, some attempts have to be made at collecting the necessary information if health problems are to be defined and priorities set by interested health agencies. (121) To describe the health problems and health resources of a country the following kinds of data are needed. Those relating to health problems should include:
3.1 **Mortality Rates** - deaths by age and cause if possible; infant mortality is generally the most sensitive indicator of health level; and the five (to ten) leading causes of death should be assessed.

3.2 **Morbidity Rates** - are also needed. Illness in terms of days lost from usual activity, working years lost from disease by cause if available; a list of the important endemic diseases typical of the country.

Demographic measures are also important. Birth rates combined with death rates determine the natural increase of the population to be saved. Life expectancy is also a desirable measure - but depends upon accurate registration of deaths at all ages and so is subject to more error than infant mortality.

Health resources need to be determined by physical resources (such as ambulatory facilities, hospitals, etc.) and human resources (e.g. number and distribution of physicians, nurses and other health professionals.)

Data relating to environmental factors are also necessary. These include information on exposure to damaging biological (e.g. bacterial and parasitic contamination of water), chemical (e.g. pollution) and physical agents.
The following information indicates that when all the factors are collected and compared, an overview of the health situation in a country is possible as well. Following are many of the factors — mainly non-biological which face any social development or health care service in a developing country. (57,34,20)

3.3 Very limited financial resources — as already illustrated in Table 5.

3.4 Small numbers of trained health personnel — at all levels of service, but particularly at the local rural level. Tables 6 and 7 show the distribution of health services, doctors and hospital beds in different countries. In addition to scarcity of personnel, there is often marked maldistribution of health care resources between favoured urban and relatively neglected rural areas and between privileged and under-privileged population groups. This is not only true for developing countries but is also very obviously true for parts of affluent countries as well. This is clearly pointed out by Thomas Heller (1976) in his comparison of resource distribution between teaching hospital areas and non-teaching hospital areas in England. See Table 8. (44)

3.5 A high level of illiteracy predominates in practically all developing countries. This makes for great
TABLE 6
HEALTH SERVICES (DOCTORS, HOSPITAL BEDS, GOVERNMENT EXPENDITURES) IN 4 COUNTRIES, 1965

<table>
<thead>
<tr>
<th></th>
<th>INDIA</th>
<th>BRAZIL</th>
<th>KENYA</th>
<th>U.S.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (Millions)</td>
<td>469</td>
<td>81</td>
<td>9</td>
<td>195</td>
</tr>
<tr>
<td>% pop. Urbanised</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Cities of 100,000 or more)</td>
<td>9</td>
<td>30</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td>Physicians/100,000 pop.</td>
<td>21</td>
<td>42</td>
<td>8</td>
<td>148</td>
</tr>
<tr>
<td>Hospital Beds/100,000 pop.</td>
<td>59</td>
<td>283</td>
<td>129</td>
<td>875</td>
</tr>
<tr>
<td>Government Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenditure (U.S. $ per person per year)</td>
<td>0.5</td>
<td>1.5</td>
<td>1.3</td>
<td>51</td>
</tr>
</tbody>
</table>

### TABLE 7

**DISTRIBUTION OF DOCTORS & HOSPITAL BEDS IN CAPITAL CITY & NATIONWIDE, 3 COUNTRIES - (1964)**

<table>
<thead>
<tr>
<th></th>
<th>Population per Doctor</th>
<th>Population per Hospital Bed</th>
<th>Hospital Beds per Doctor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jamaica:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nation</td>
<td>2,200</td>
<td>240</td>
<td>9.5</td>
</tr>
<tr>
<td>Capital City</td>
<td>840</td>
<td>90</td>
<td>8.3</td>
</tr>
<tr>
<td>Rest of Nation</td>
<td>5,510</td>
<td>540</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Senegal:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nation</td>
<td>19,100</td>
<td>700</td>
<td>27.5</td>
</tr>
<tr>
<td>Capital City</td>
<td>4,270</td>
<td>280</td>
<td>15.2</td>
</tr>
<tr>
<td>Rest of Nation</td>
<td>44,300</td>
<td>920</td>
<td>48.0</td>
</tr>
<tr>
<td><strong>Thailand:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nation</td>
<td>6,900</td>
<td>1,200</td>
<td>4.5</td>
</tr>
<tr>
<td>Capital City</td>
<td>940</td>
<td>370</td>
<td>2.6</td>
</tr>
<tr>
<td>Rest of Nation</td>
<td>15,900</td>
<td>1,640</td>
<td>9.4</td>
</tr>
</tbody>
</table>

*Source: Adapted from J. Byrant, "Health and The Developing World" Cornell University Press, 1969.*
### TABLE 8

**RESOURCE DISTRIBUTION BETWEEN TEACHING AND NON-TEACHING AREAS IN U.K.**

**Hospital Expenditure per Capita (1971/1972)**

(\% difference from National mean*)

<table>
<thead>
<tr>
<th>Regional Health Authority</th>
<th>Teaching Area</th>
<th>Non-Teaching Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mersey</td>
<td>Liverpool</td>
<td>+62</td>
</tr>
<tr>
<td>South - Western</td>
<td>Avon</td>
<td>+14</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>Leeds</td>
<td>+2</td>
</tr>
<tr>
<td>West Midlands</td>
<td>Birmingham</td>
<td>+10</td>
</tr>
</tbody>
</table>

*The mean is the arithmetic mid-point between the highest and lowest figure.

Source: Buxton, M.J. (1975)
"Distribution of Hospital Resources"
difficulties in communicating new knowledge. Literate persons have learned through the medium of reading and writing and therefore tend to use these as a method of communicating ideas. However, other more appropriate media such as that used by the illiterate population, e.g. drama, folklore, need to be used if real change of attitude is to take place. (30)

3.6 High Fertility Rates - most developing countries have a high birth rate in comparison with affluent countries as Table 9 illustrates. This is due, in part to the fact that parents produce several children to ensure that at least one survives. However, the high frequency of pregnancy exhausts the mother and has its effect in turn on both the unborn and newborn child. (38)

3.7 High Mortality Rates - are also a feature of developing countries as shown in Table 9.

3.8 Traditional Beliefs and Practices - in many parts of the Third World, explanations for death and disease are quite different from the scientific approach. For example, the rural Sierra Leonean may ask "Who caused my illness?" not "What caused it?" So there is a lot of health care education needed if morbidity and mortality rates are to be reduced. Traditional health practices
### TABLE 9

<table>
<thead>
<tr>
<th>Poor Countries:</th>
<th>Birth Rate* Per 1000 live Births</th>
<th>Death Rate* (Per 1000)</th>
<th>Infant* Mortality per 1000 live Births</th>
<th>Growth** Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>50</td>
<td>28</td>
<td>132</td>
<td>3.0</td>
</tr>
<tr>
<td>Upper Volta</td>
<td>49</td>
<td>26</td>
<td>162</td>
<td>2.3</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>47</td>
<td>22</td>
<td>200</td>
<td>2.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Affluent Countries:</th>
<th>Birth Rate* Per 1000 live Births</th>
<th>Death Rate* (Per 1000)</th>
<th>Infant* Mortality per 1000 live Births</th>
<th>Growth** Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>14</td>
<td>11</td>
<td>10</td>
<td>.2</td>
</tr>
<tr>
<td>France</td>
<td>17</td>
<td>11</td>
<td>16</td>
<td>.8</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>16</td>
<td>9</td>
<td>18</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Sources:** *U.S. and World Development: Agenda for Action 1975, Overseas Development Council.*

**World Population Estimates, prepared by The Environmental Fund, 1975.*
are also prevalent as can be seen in the use of Traditional Birth Attendants and native medicine men in Sierra Leone today.

The conflicting philosophies and ideologies which exist between traditional health care and Western type health care result in great confusion. Traditional health care is centred on the person and his relationships - to his community, to God, to the earth and to his ancestors. Whereas Western medicine is much more objective - a sick person is isolated from his home and family and put into hospital where he is shifted from one set of operations to another. Zaire theologian Ma Mpolo Masambe remarks: "You Western doctors treat things and our African medicine treats people." (59)

3.9 Poor Communications - Bad roads or the absence of roads entirely, plus poor mail, transport, technological and telephone systems are factors which add to the difficulties in communication between locations in the developing countries. This problem can be particularly grave in times of emergencies or crises.

3.10 Predominantly Rural Population - Often as much as 80% of the total population in developing countries live in rural areas and are involved in subsistence farming. This makes it more difficult for health services to give
adequate coverage. Just as in the case of distribution of National Income (Table 4) so also those people not living in the capital or large urban areas (Tables 6 and 7) do not receive their fair share of services.

3.11 A common epidemiological pattern of disease prevails in all developing countries. These consist of malnutrition, undernutrition and communicable diseases. This disease pattern predominantly affects the young resulting in high childhood morbidity and mortality. Added to this are the health problems related to frequent childbearing and undernourishment in women (15 - 44) years. In Sierra Leone 6% of all mothers are undernourished, and 12% of pregnant women are also.\(^{72}\) The infant mortality rate is also affected by the fact that the older the mother the more likely she is to produce more offspring and the less chance there is of survival of the unborn or newborn.\(^{81}\) Another problem which has come to light recently in developing countries is the alarmingly high rates of infertility in some women (15 - 44) years. For example, in the Southern Province of Sierra Leone infertility is as high as 20% in women of childbearing age.\(^{76}\)

Table 10 gives a synopsis of the main economic, population and health characteristics in affluent
<table>
<thead>
<tr>
<th>CHARACTERISTICS OF AFFLUENT AND POOR COUNTRIES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td><strong>I ECONOMIC CHARACTERISTICS</strong></td>
</tr>
<tr>
<td>High per capita gross national product.</td>
</tr>
<tr>
<td>Countries grouped as: over $1000/yr.</td>
</tr>
<tr>
<td>(problem with comparisons to Socialist</td>
</tr>
<tr>
<td>countries)</td>
</tr>
<tr>
<td>High per capita health expenditure $30-$400/yr.</td>
</tr>
<tr>
<td>Longer history as independent nation</td>
</tr>
<tr>
<td>states</td>
</tr>
<tr>
<td>In temperate zones of</td>
</tr>
<tr>
<td>North America, Europe, plus Japan, Australia,</td>
</tr>
<tr>
<td>New Zealand, Israel, South Africa</td>
</tr>
<tr>
<td>Highly Urbanised</td>
</tr>
<tr>
<td>Decline of traditional village &amp; extended family organizational pattern. Isolation &amp; independence.</td>
</tr>
<tr>
<td>Older population</td>
</tr>
<tr>
<td>Low fertility &amp; birth rates; some countries having 'zero population growth.'</td>
</tr>
</tbody>
</table>
### TABLE 10 (cont'd)

**CHARACTERISTICS OF AFFLUENT AND POOR COUNTRIES**

<table>
<thead>
<tr>
<th>Affluent Countries</th>
<th>Poor Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low crude death rates (7-10/1000 pop./year) and relatively long life expectancy at birth (70+ years)</td>
<td>High crude death rates (up to 30/1000 pop./yr.) and relatively short life expectancy at birth (as low as 30-40 years)</td>
</tr>
<tr>
<td>Low Infant Mortality (as low as 10/1000 live births)</td>
<td>High Infant Mortality rates (up to 200/1000 live births)</td>
</tr>
<tr>
<td>Low Childhood Mortality rates (as low as approx. 20/1000 births)</td>
<td>High under five Mortality rates (up to 350/1000 live births)</td>
</tr>
<tr>
<td>Low Maternal Mortality rates (as low as 2/10,000)</td>
<td>High Maternal Mortality rates (up to 50/10,000)</td>
</tr>
<tr>
<td>Mortality &amp; Morbidity patterns emphasize: Disease related to aging, chronic disease in older populations. Health problems related to environmental decay &amp; pollution, accidents &amp; trauma related to industrialization</td>
<td>Mortality &amp; Morbidity patterns emphasize: Infant and young children, infectious and parasitic diseases, malnutrition in early childhood &amp; its synergy with infectious diseases</td>
</tr>
<tr>
<td>Relative wealth of trained manpower &amp; other health resources though often major geographic and specialty malnutrition</td>
<td>Marked scarcity of trained manpower and other health resources</td>
</tr>
</tbody>
</table>

**Note:** These comparative statements are useful for descriptive purposes, but there are many exceptions when one compares individual countries.

and poor countries. It should be borne in mind that these comparative statements are helpful for descriptive purposes when applied broadly to developed and developing countries, but if applied to individual countries there are exceptions.(52)

3.12 Implications for Health Care Delivery

Policy and Practice

With the population data that is available on Sierra Leone - limited though it may be - if we were to apply it to Gideon's scheme for community diagnosis it would probably need something resembling the following:

<table>
<thead>
<tr>
<th>OBSERVATIONS</th>
<th>DIAGNOSIS</th>
<th>PROGRAMME INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Population under 5 years is the largest group - approximately 17%</td>
<td>Population with high birth rate</td>
<td>Family planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maternal care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Problems associated with frequent childbirth</td>
</tr>
<tr>
<td>2. Population under 15 years - 40% of population</td>
<td>High number of dependents, resulting in drain on caring members indicating poor economic status</td>
<td>Consideration of ways and means to increase economic situation (improving technology of existing occupation &amp; trade to increase productivity); introducing other crafts/training that may be feasible</td>
</tr>
<tr>
<td>3. As population gets older the numbers per age group from 15 to 60 decrease rapidly</td>
<td>High death rates</td>
<td>Need to determine causes of morbidity and mortality. Need for primary medical care and referral care</td>
</tr>
</tbody>
</table>
4. Population 15-60 approximately 55%  

OBSERVATIONS  

4. Population 15-60 approximately 55%  

Large fertile age group  

DIAGNOSIS  

If in 1000 population the biological state of women in age group 15-44 is: 22% pregnant at any one time; 27% in post-partum amenorrhea; 53% menstruating - then it is important to plan for antenatal and post-natal care and family planning advice  

PROGRAMME INDICATION  

5. Population 60 years + is small  

Small number of old people  

Programmes in geriatrics problems not a priority  

This scheme in itself gives a broad outline of the problems and challenges facing health agencies in Sierra Leone. The present distribution of resources of the Ministry of Health suggests a different implemented strategy.

As already mentioned, 75% of the population of Sierra Leone live in the rural areas yet most of the health services are situated in urban areas where 100% of the doctors live, and approximately 80% of the rest of health personnel. This in turn means that most of government spending on health care is in the urban areas. This is not only true for health but in all other fields as well in developing countries. Capital and recurrent expenditures continue to be made in urban areas (with the exception of Tanzania and People's Republic of China).
The population structure in Sierra Leone with its high dependency rate has different needs from those which an inappropriate European style service can answer. Children make up over 40% of the population and probably half the deaths are in this age group -- child health care is a major priority.

Today, most developing countries have very limited resources to spend on health. In Sierra Leone the percentage of the national budget spent on health has been decreasing since the 1960's. Table 11 indicates that while the actual per capita spent on health care may increase by the year 2000 - it remains minimal in comparison with that spent on health care in the developed countries. Capital investment in large medical establishments involves large recurrent expenditure - nowadays running costs are estimated at a quarter of the initial costs. So developing countries have to face an important option in whether to spend money on large teaching hospitals or on small hospitals and many health centres. Unfortunately, almost all developing countries (Sierra Leone included) assumed the need for large hospitals and are now saddled with the ever-increasing cost of trying to run them. Part of the problem with these large institutions is the expectation that they would produce doctors and nurses who would serve farmers and production workers -
### TABLE 11

**GROSS NATIONAL PRODUCT (GNP) AND HEALTH EXPENDITURE PER CAPITA ($) IN 1970 AND 2000**

<table>
<thead>
<tr>
<th></th>
<th>GNP/Capita</th>
<th>Health Expenditure/Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>More developed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>countries</td>
<td>2,200</td>
<td>5,800</td>
</tr>
<tr>
<td>Less developed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>countries</td>
<td>160</td>
<td>325</td>
</tr>
</tbody>
</table>

Source: "The Part-Time Health Worker in the Delivery of Health Care": Morley, David.
an expectation which has not been realized. Few experiments in alternative expenditure have been made in developing countries. Gish (1973) has attempted such calculations for Tanzania (Table 12). The expenditure through health centres would provide care for a much larger population and manage adequately the common conditions of the population.

If we were to look at some of the communicable diseases and their control - there are at least three very successful programmes which are nearly universal. The eradication of smallpox through the widespread and correct use of vaccination is possibly one of the most successful programmes ever initiated by man. The reduction of yaws in Africa is another example of successful control. Malaria control in Asia some years ago would be considered a third example. What led to the success of these programmes? Wray (1974) suggested that it might be related to the change of behaviour involved. Smallpox vaccination or the spraying of one's house are procedures requiring little behavioural change. These are in sharp contrast to others such as family planning, applied nutrition programme or efforts to reduce cigarette smoking - see Figure 2.
<table>
<thead>
<tr>
<th>Capital Cost</th>
<th>Running Costs</th>
<th>Admissions</th>
<th>Outpatients</th>
<th>Population Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(millions of shillings)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Hospital</td>
<td>6</td>
<td>2.0</td>
<td>9,000</td>
<td>400,000</td>
</tr>
<tr>
<td>15 Health Centres</td>
<td>6</td>
<td>2.0</td>
<td>15,000</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>

Figure 2 - Success: Work done by health workers
(EASY TO CONTROL)

Less Success: Health workers fail to get people to co-operate
(DIFFICULT)

Wray takes this a step further in the argument and holds that the success of behavioural change will depend upon the degree of involvement of the health worker with the patient, and this will be so whether the procedure is curative or not -- and even more when it is preventive (Figure 3).
Figure 3 - The success of many programmes will relate closely to communication between the health worker and his/her community.

Therefore, as long as a health worker comes from a different class, a different background and are not involved in the daily life patterns of the patient, they cannot really appreciate their problems. Hence, the communication of ideas and attitudes which will lead to behavioural change are unlikely to meet with success.

In conclusion, if Sierra Leone is to face the challenge of answering the health needs of its people as indicated by our community diagnosis (on page 40) it needs to employ health workers who are:
- Chosen by the community to work in, and with the community.

- Trained appropriately for problems of the community — with minimum disruption of their lives.

- They are remunerated as much as possible by the community. Different countries have coped with this through various means.

- They receive supportive supervision and continuous training from the nearby "interested" and committed health service centre. This assures exchange of ideas and problems.

Sierra Leone has responded through various methods of primary health care introduced by different health agencies within the country — as we shall see in the following pages.
CHAPTER 4

PRIMARY HEALTH CARE AT PRESENT IN SIERRA LEONE

4.1 Primary Health Care at present in Sierra Leone

No official policy on primary health care has been developed in Sierra Leone. However, there are three areas in the country where health agencies have evolved programmes to meet the health needs at community level in their areas. These programmes are based on one of two approaches: (1) the use of village health committees in educating villagers on health promotion practices and activities and/or (2) the use of village health workers - acting as a link between the community and static health services. The major differences between these two approaches are: a) the committee members are volunteers while the village worker is paid a salary; b) committees are trained within the village setting where they usually function and face problems -- while the village worker is trained out of the regular community environment. Unfortunately, neither of these approaches has been adequately evaluated.

The Ministry of Health is now at the point of developing a primary health care policy for the nation. It favours the village health committee approach because
of its integration approach, its similarity to the traditional method of solving problems and also because of its success in improving certain village health practices in Bumpe chiefdom in the Southern Province. (84, 36)

4.2 The Concept of Comprehensive Primary Health Care

The previous chapters have specified the poor distribution of health services and the inadequate coverage of rural populations in developing countries in general and Sierra Leone in particular. The loss of life due to malnutrition, parasitic and infectious diseases is extensive especially in young children and infants. Because of the uneven distribution of services there are large areas where people have little or no access to health care. This is particularly true in the rural population. Those services that are available are scant - working in isolation from other relevant areas of health such as agriculture, communication, environmental sanitation and education. (38) This in turn means that there appears to be little if any improvements in the health status of people.

The concept of comprehensive primary health care developed in response to the need for an integrative approach in improving the health of rural people in developing countries. This approach involves making essential health care universally accessible to individuals and
families in the community in an acceptable and affordable way and with their full participation. (117, 116) Comprehensive primary health care seeks to meet the total health needs of the community and not just the care of individual patients.

As clearly indicated in earlier discussions it has come to be recognized by health professionals and other experts that health status is influenced not only by the provision of health services but by numerous other factors of which poverty and underdevelopment are at the root of the problem.

The Africa Region of the World Health Organization (116) proposed the general principles for the primary health care approach:
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 other sectors of the community development (agriculture, education, public works, housing, communications, etc.)
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 assist in an integrated complex of preventive
health, promotive, curative medicine and rehabilitative 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 unison in every case.

10. To co-operate with the traditional system and make positive efforts to ensure integration and/or collaboration.

4.3 Implications

The implications for any government to face the challenge of establishing a comprehensive primary health care system at national level are vast indeed. Areas such as training, finance, administration and politics are inclusive in this approach.

As indicated in an earlier reference to the Alma Ata Conference -- primary health care should be an integral part of the national health system. The support of other levels of the health system is necessary to ensure that people receive the benefits of valid and useful technical knowledge when they need it (as it is too costly and complex to offer at the primary care level). Community health workers must be able to rely on more skilled people for guidance, training and support. This assures effective referral systems, consultation services and
reliable supportive supervision.

Health cannot be attained through provision of a health care system alone. Health and human development are dependent on factors such as education, food production, safe water, sanitation etc. Comprehensive primary health care is an integral part of the health system and its overall development will of necessity then require the appropriate co-ordination of all levels of administration (local, regional, provincial and central) between health and the other sectors concerned.

As the World Health Organization (116) indicated - political commitment by governments is essential if the primary health care approach is to succeed in a country. Because health does not head the list of priorities for governments in most developing countries (38) - Sierra Leone included - a firm commitment which would include re-orientation of ideas and national development plans is needed. This would imply, therefore, a transfer of funds and resources to health and health related factors/sectors which would benefit the underserved majority of the population (38).

4.4. Operational Aspects of Comprehensive Primary Health Care

Comprehensive primary health care has as its main goal an acceptable level of health care available to all
people so as to contribute to their development. Therefore, an effective primary health care programme 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. Examples of this interdependence might be:\(38\)

- the control of communicable disease e.g. schistosomiasis, onchocerciasis, tuberculosis, could open up new areas of economic and settlement development.

- proper and adequate nutrition could lead to the reduction of morbidity in the community and so increase productivity as a result.

- reduction in infant mortality could eventually lead to reduced family size and therefore, greater opportunity for providing family members with the emotional and economic security needed for personal growth and development.

In order to enable this process of interrelatedness to grow, communication between the health sectors and others should take place at every level from first level contact in the community right up to central administration for each sector of development. This communication should result in planning and providing the necessary components from each sector to enable the
primary health care approach to function successfully.

Even though the primary health care programme will vary from country to country and community to community - the following should be considered essential activities: (116)

- Promotion of proper nutrition and an adequate supply of safe water.
- Basic sanitation.
- Maternal and child care, including family planning.
- Immunization against the major infectious diseases.
- Prevention and control of locally endemic diseases.
- Health Education.
- Appropriate curative care for common diseases and injuries.
- A system of referral so that those in need of secondary and tertiary level care can receive it.

The First International Conference on Primary Health Care reported the way in which the national health system should be organized to develop, operate and support primary health care (117) and is summarized as follows:

4.5 Planning

As already indicated, planning for primary health care needs to be carried out not just at the community level but at all other levels as well. Ministries of
Health and all other national health agencies which may be involved in planning for health care, need to make planning a function of the highest level of decision-making. This is essential so as to facilitate 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 which they serve. The report further states that since the planning of primary health care involves political, social and economic factors, multi-disciplinary planning teams are needed, especially at the central level, including among others, people with a knowledge of economics, political science and other social services. An important aim of central planning is to enable communities to plan primary health care activities to answer their own needs and to provide any essential information that is not available in the community.

Those participating in the implementation of the programmes should also be involved in the planning process where possible.

4.6 Organization in the Community

Prior to setting up a primary health care programme at the community level, there is need to assess all the requirements needed - technologic, resources, support
services and method of organization required to function as a coherent system. Whatever the method used in the programme - agreement on responsibilities should be reached so that all concerned know who is responsible for the overall planning, management, supervision and assessment areas of the programme. Real community participation is essential in relation to priority setting, methods needed and techniques to be employed.

4.7 Coverage and Accessibility

The aim of primary health care is to provide essential health care for the entire population. In order to facilitate this accessibility by all, a strong support system for supplies, transport, staff and guidance is required. Assessment of accessibility involves not only evaluation at the community or first level of primary care but that of the way in which more complex health problems are handled such as appropriate referrals and solving of referral problems as soon as possible.

4.8 Community Workers

In the introductory chapter the priority of community health workers as essential to primary health care was discussed. The choice of worker and his role in the programme will vary according to the country and community as well as resources and conditions prevailing. However,
workers are usually members of the local community and receive basic health training to enable them to function as health workers at community level.

Many primary health care programmes have involved traditional birth attendants and/or medical practitioners in their programmes - either as collaborators with, or directly involved in community health care. Traditional health workers have already gained the confidence and respect of local rural communities and so it is valuable and worthwhile to engage their support at the primary health care level.

4.9 Evaluation

Primary health care has been proposed theoretically as a method for overcoming many problems which would make effective health care accessible to the total population. However, local needs and responsiveness to programmes vary from place to place and community to community. Therefore, evaluation of each programme is essential - not only to give direction to the programme planners, but to encourage the community and the workers. Of course, assessments should not be confined to the local level only, but repercussions at regional and national levels should also be considered.
CHAPTER 5

LITERATURE REVIEW

Community health as defined in the introductory
chapter has only developed in the past ten to fifteen
years. The WHO/UNICEF conference at Alma Ata at which the
concept of primary health care was developed was held in
September 1978. Many countries in the Third World had
developed by then or have since developed primary health
care programmes to respond to their specific community
health needs. Scarcely any of these programmes include an
evaluative component, so most of the reports on primary
health care in the literature are retrospective studies.
The following section is a review of some of these pro-
grames and the methodological problems involved.

5.1 Philippines\(^{(31)}\)

In the 1970's the government of the Philippines
wished to extend the health service so that there would be
greater coverage for both rural and urban populations.
The report on the further development of health services
stated one of the important research questions was "Does
the primary care clinic staffed by re-trained midwives
improve the health services at the primary level?"
Several outcome measures were chosen which were deemed
relevant to answer this question. These outcomes included daily attendance at clinic, cost per attendance, cost per condition modified, proportions of conditions modified in comparison with those which were modifiable. Unfortunately, the criteria and methods for assessing modifiable conditions were not given. The result of a comparison of rates on each of the foregoing measures before and after the intervention - showed an overall improvement.

However, methodological problems to do with the source of data, the method of collection, and the testing for reliability and validity means that one could question whether the improvement was actually due to the intervention. Confounders such as socio-economic advancement or better education on the use of facilities may have been contributing factors.

5.2 Vietnam (28)

Djukanovic attempts to assess the health care service of Vietnam asking "does the health system set-up at the various levels of village, district, provincial and central meet the basic needs of the masses?" He chooses several indicators as measurements of health, such as general mortality rates, infant mortality rate, maternal mortality rate, birth rate, incidence of infectious diseases, environmental sanitation facilities, etc.

Then he compares them for the years 1938 and 1975. In the
period between, the country had become a republic (1946) and set up its own health policy in 1954 which had a strong element of preventive health as well as community participation and self-reliance. There is no doubt at all about the phenomenal change in health of the Vietnam population - despite the fact that all this data was retrospective with no comparison group and thus, far from the ideal method for assessing an intervention.

5.3 **Iran** (93)

An attempt was made in Iran to employ non-physicians for providing health services. In 1972 a programme was set up to train auxiliary health workers who would then provide basic curative and preventive health services to villages. The task of the auxiliaries was to carry out practical sanitation work, maternal and child health clinics, nutrition, first-aid, and treatment of common symptoms. To assess the effectiveness of their work the following variables were used as outcome measures - patient visits to clinic, infant mortality rates, use of contraceptives, number of sanitary facilities, villager satisfaction and knowledge of worker's role. Comparison for infant mortality rates were made with non-study villages, and for the other variables, before and after comparisons were made. Unfortunately, the method for collecting data
or for testing the reliability or validity of instruments were omitted. So the vast increase in the rates and facilities attributed to the intervention use of auxiliaries is not very convincing because of lack of adequate information on the methodological issues.

5.4 **Jamaica** (96)

A similar programme using health auxiliaries was also introduced to Jamaica in 1967. The objective of the programme was to train and motivate health auxiliaries so that (1) they would be willing to work with families in their own communities, and (2) identify problems which would be brought to the notice of trained personnel. The intervention consisted of selecting suitable local people who were then trained in the Community Health Aide Programme - after which they were employed in the community (not necessarily their own community) by various departments in the University. Their jobs varied according to the Department they were with, but they were mainly employed as field workers in research projects in preventive medicine and family planning.

There was no objective method for assessing these workers. Their supervisors wrote up reports on them and the large amounts of work they undertook, etc. so that they received a positive assessment in each case.
However, a critique of the above programme was brought out at a later date - in 1977(15). It questioned whether the community health aide was sufficiently well prepared to detect Protein - Energy - Malnutrition. A young child nutrition programme (YCNP) was designed to reduce the mortality and morbidity of malnutrition using Community Health Aides (CHA's) as primary directors of health care. The author, Bollag, assessed the work of the CHA's by (1) measuring the height of the malnourished children in one field clinic of the YCNP, and (2) measured the height and weight of children attending three child welfare clinics in another area run by the CHA's.

Measurements were carried out in a consistent and accurate way by the author himself thus reducing the possibility of variation. The results were as follows:

(1) In the YCNP field clinic, out of the 65 'malnourished' children (as defined previous to the assessment) three-quarters were underweight and also below height for age. However, they failed to show a significant deficit in weight for height. A child can be considered as recovered and ready for discharge when he reaches the normal weight for his height.(78) None of the children showed visible signs of malnutrition, though some exhibited fine patterning of a dry skin on the shins, suspicious of previous nutritional
deficiency.

(2) Of the 68 children measured at random in the three child welfare clinics, half of the children were overweight for height and age. This is allowing for inaccuracy in height measurements and adding one inch for safety. This trend of overfeeding was more distinct in the infants from 0 - 6 months than thereafter.

These results certainly question the capability and education of community health aides to carry out this kind of responsibility. The study, however, would have been of much greater value if a control group were chosen and if the study was carried out prospectively. As it is, standardization of criteria for malnourished and well babies was obviously different for the author and the CHA's. The methods and criteria taught the CHA's in their training would ideally be the intervention to study and to assess related outcomes.

5.5. **Nigeria**

The main objective of the Lardie Gabas Rural Health Programme is to assist the rural population of north eastern Nigeria, in raising the level of its health by preventing disease, by training and utilizing their own people in simple medical care, and by providing the message
of health through the form of parables told in the local dialect. One aspect of the programme was to see if village health workers are effective in changing health and nutrition status of the people - as well as changing the knowledge, attitudes and practices of people. The intervention at village level consisted of a Village Health Committee and village health workers who had certain tasks in health to carry out. A baseline survey to establish the health and nutrition status of the people was carried out at the beginning of the programme. In addition, a knowledge, attitude and practice study was made. Methods and measurement details, unfortunately, are not available on these surveys. An evaluation survey was to be carried out at a later date in the programme but has not been made available as yet, though villagers in the participating 38 villages have shown enthusiasm and interested participation.

5.6 **Cameroon** (48)

The purpose of the Village Health Committees Project was to enable rural people to see through their own experience what they could achieve with their own resources in the way of solving health problems, as a first step toward development. The intervention consisted of two stages (1) the training of itinerant agents who would help organize the village health committees, and
(2) the establishment and training of the village health committees. Assessment of the success of the intervention was made in terms of the number of committees organized, the number of latrines built and used, the number of water springs protected, the number of garbage pits and animal enclosures, the number of committee work plans completed in the community. Results of this retrospective study showed positive progress on all measures used. While a "spill over" effect of the committee into other activities outside of health was of real interest to the planners this was not measured - possible evidence of this, however, was observed in one particular village - related to land tenure.

5.7 **Sierra Leone**\(^{84}\)

This project began in 1975 with a baseline survey of all villages within a 5 mile radius of the Serabu Mission Hospital.\(^{84}\) Three pilot villages were chosen for the intervention - which was the establishment of village health committees in training and educating their local communities for better health status.

A prospective study is underway to assess the effects of the village health committee on health status of the people. Intermediate outcome measures are assessed annually such as environmental sanitation facilities; immunization and nutritional status of under five children;
attendance at under five and antenatal clinics, etc.
The endpoints of this six year study are changes in health
status as measured by hemoglobin, height, weight, para-
sitic disease, urinary tract infection, etc. Measurements
are done through annual physical examinations each year in
the three villages.

Methodological problems with the endpoint measure-
ments arise in terms of the variation and validity of in-
struments, variation in assessors and subjects from year
to year, while the intermediate outcomes are much more ob-
jective and reliable.

This project has also been assessed for change in
practices and perceptions after three years' exposure to
the village health committees in the pilot villages\textsuperscript{(36)}. Control villages were chosen to offset the effects of the
intervention. These control villages were in the origin-
al baseline study and were similar in their practices and
beliefs to the pilot villages. The results revealed sig-
nificant differences in some areas of health beliefs and
practice such as prevention of disease, use of clinic,
value of environmental sanitation. Methodological prob-
lems with the lack of reliability and validity testing of
interview schedules jeopardizes the results of this study.
Its generalizability to the rest of Sierra Leone is also
not justified because of the size of villages chosen
(800 population between the 3 villages), the homogeneity of the population and the uniqueness of the health facility run by the R.C. mission with a community health department and a school of nursing attached.

5.8 **Haiti** (12)

The study on a primary health care programme in Haiti is probably the best up to date one from a methodological viewpoint. Its purpose was to reduce the mortality rates of eight specific diseases according to age group, in the study populations. The intervention consisted of offering eight categories of preventive service to the population which was delivered at quarterly health rallies held at strategically located posts. Outcome measures chosen prior to the study were Age Specific Mortality Rates, Deaths Averted, Years of Expected Life Saved. The source of data was the census tract used prospectively 1968 - 1972. The reliability and validity of the census tract was not addressed, unfortunately. The results of the study showed strong associations in time, age group, place and specific disease categories between the provision of services and the decline of mortality rates.

5.9 **Conclusion of Literature Review**

All of the above-mentioned studies in the area of basic primary health care using village health workers
and/or health committees suffer from methodological problems of one kind or another. However, it would be hard to explain away the weighted evidence on the side of primary health care programmes completely by methodological problems. The studies directly related to the topic of interest for our proposal, i.e. use of village health committees are inconclusive although leaning in the positive direction. Therefore, further testing of the effectiveness of this method will be required.

5.10 Justification For Trial

5.10.1 Standard Health Care in Sierra Leone

In previous chapters, the magnitude of the health problems in terms of morbidity and mortality in rural Sierra Leone has been discussed. The extremely high rates for Infant Mortality varying from 300 (Pujeahun District) to 150 (Freetown city) per 1000 live births in the mid 1970's after 40 years of conventional health care (which is based on the Western system) indicate the need for a more effective, integrative approach to health care.

5.10.2 Problems with Standard Health Care in Sierra Leone

These problems have been discussed in detail already but can be summarized as follows:

(1) One-third of adult deaths and two-thirds of infant deaths are caused by infectious disease. It has been
estimated that 60% of disease in infants could be prevented by effective immunization programmes. There are immunization programmes available under the present health care system. These, however, have experienced several difficulties which render them considerably ineffective to the majority of under five children. These problems are related to insufficient supplies, inadequate cold chain, poor communication and transportation, ignorance of the real value of immunizations and ineffective administration of them to the patient.

(2) Other kinds of infectious diseases such as malaria, tuberculosis, parasites, schistosomiasis and onchocerciasis require other measures of prevention. An integrated approach involving other sectors of development such as agriculture and environmental sanitation would be needed to effectively reduce and ultimately eliminate those diseases. The approach of the Ministry at present in Sierra Leone is very fragmented with conflicts arising between workers at chiefdom level and central administration.

(3) One-third of deaths in women are related to problems in childbirth. Tetanus is one of the causes which could be eliminated through effective immunization schedules and also the use of aseptic methods by local
midwives at the delivery. Other problems are the non-referral or too-late referral patterns of the local midwives. A simple education schedule on the signs and symptoms of high risk cases and the referral of same to antenatal clinic and hospital for delivery has reduced the maternal death rate considerably in many developing countries.

Some attempts have been made to re-educate local midwives under the present health system in Sierra Leone. However, the training takes place in a hospital or health centre which is far removed from the real circumstances under which local midwives function. Continuous supportive supervision is lacking so that newly learned techniques can be assessed. Thus even the most enthusiastic and conscientious midwives become discouraged and quickly lapse into the old familiar and traditional ways.

These are the main problems which face the health care system in Sierra Leone. There have been little changes in the problems over the years except in the Freetown area where the socio-economic level and level of education of the average person together with easy access to services has enabled persons to avail themselves of services more readily. The need for an integrated approach at community level with widespread health education and appropriate optimum use of health personnel and
services are imperative if real impact on mortality and morbidity rates are to be made.

5.10.3 Alternatives to Village Health Committee Approach

There are at least two other alternatives which might be investigated for reducing the present morbidity and mortality rates in rural Sierra Leone.

(1) The first alternative is the extension of basic health facilities so that the majority of people in Sierra Leone are within easy reach of a health centre or facility. In this way most people would have access to curative services for common illnesses and immunizations for young children - as is the case in most western countries. However, the provision of such an extensive service would require vast amounts of resources in terms of funds, personnel, materials and equipment. A poor nation like Sierra Leone does not have access to these kinds of resources. Should the Sierra Leone government, by some fortunate circumstances receive a vast increase in its budget the health sector might not benefit from it, as health is not usually a priority with developing country governments. Aside from resource problems - if this programme was to be really effective, health education and high compliance rates would be needed. Therefore,
this plan cannot be considered as a feasible alternative to health care problems in rural Sierra Leone. (2) A second possible alternative to the standard health care system in rural Sierra Leone is the comprehensive primary health care project at Bombali district in the Northern Province. This project functions at the chiefdom level providing health units, and at village level with village health workers. However, its effectiveness in terms of improved health status of the local communities has not been evaluated. There are problems at the community level and also some resource problems which jeopardizes its feasibility as a national community health programme. Provision, maintenance and staffing of health units has proven very costly. At village level the community is not satisfied with paying a health worker who is not from the local area. This person is trained in basic community health - but at a central training place - not within the community to be served. Another major setback is the premature establishment of health units - before the community is educated as to the real need, appropriate use and benefit of such a service in the community. This limitation goes counter to the basic principles of prevention and promotion of health in community health care.
The need for an efficacious alternative to standard health care so as to reduce the present mortality rates in Sierra Leone has been established. Comprehensive primary health care - the most promising of the three approaches for the most immediate reduction of mortality rates has been discussed. A proposed primary health care programme will be discussed in the next and later sections. This programme has been recommended to the Ministry of Health by the Working Committee on National Primary Health Care for Sierra Leone because of its partial success in Bumpe chiefdom with the Mende people. This programme, however, has not been adequately assessed for efficacy in other rural communities of Sierra Leone generally. The resultant problem is clearly expressed by Sir Austin Bradford Hill as follows: \(^{(16)}\)

"It is certainly not always recognized that it may be unethical to introduce into general use a drug (or programme) that has been poorly or inadequately tested. The ethical question is, indeed, not solely one of human experimentation, it can also be one of refraining from human experimentation."

5.11 Justification for a Specified Comprehensive Primary Health Care Programme

Because of the high morbidity and mortality rates in Sierra Leone - the Ministry of Health is anxious to adopt a comprehensive primary health care approach at
village level which would involve the use of village volunteers (e.g. village health committees). Comprehensive primary health care has been shown to be effective in improving the health status of rural populations in developing countries. (20,12,48) This approach using the village health committees has been used in one area of Sierra Leone and has been demonstrated to reduce infant mortality rates as well as changing health practices and perceptions. (29,84)

The opportunity for rigorous and controlled investigation of the village health committee approach at national level has presented itself in Sierra Leone. As Sierra Leone has several tribes located in different parts of the country - a programme therefore, which is effective in one area may not succeed in another because of the differences in culture, language, organization and religion. The initiation of a national primary health care approach should commence with a randomized control trial to test the effectiveness of the programme for use nationwide in rural Sierra Leone.
 CHAPTER 6

RESEARCH PROPOSAL

6.1 Objective of The Study

This trial is designed to assess the effectiveness of the village health committee in improving the health status of village communities. It will enable one to make generalizations about an effective community health programme for rural communities throughout Sierra Leone.

The proposal is a randomized controlled trial to determine the effectiveness of village health committees in improving health practices and reducing mortality rates at village level in rural Sierra Leone. The village health committee is to be tested against the standard health care at village level. (See Figure 4, p. 77)

Village health committees consist of a group of influential and interested persons from the village who take responsibility for certain areas of health in their locality. They are trained by community health nurses (S.E.C.H.N.'s) and they in turn educate and exhort the villagers toward health practices and beliefs in their own homes and compounds. From studies in social change (9,8) it appears that change will only be introduced in a strong traditional belief system through the
FIGURE 4

ARCHITECTURE OF STUDY DESIGN

1) $\text{TIME}_0$ (Prior to Study):

EXPERIMENTAL GROUP
(11 Villages with
health committees)

CONTROL GROUP
(11 Villages without
health committees)

SAMPLE
(22 Villages i.e. approximately 22,000 people)

2) $\text{TIME}_1$ (After 2 years Exposure):

ANALYSIS OF PRIMARY OUTCOMES:

(1) Crude Mortality Rate
(2) Infant Mortality Rate

ANALYSIS OF SECONDARY OUTCOMES:

(1) Immunization Rates (0-5) yrs.
(2) Nutritional Status (0-5) yrs.
(3) Tetanus Immunization Rates
   - Females (14-45) years
(4) Environmental Facilities and
gardens per 1,000 population
(5) Referrals of Villagers to
Clinic and/or Hospital

3) $\text{TIME}_2$ (After 4 years Exposure):

ANALYSIS OF ALL OUTCOMES (as specified in $\text{TIME}_1$)
education of influential people such as village leaders and elders who are respected. Workers who have been trained outside the village scene in the past have been exposed to other values and possibilities and often do not return to their home place. [20, 84, 69, 36] Those who do return have tried to introduce foreign solutions to local problems which have not succeeded. The worker himself and the community have become disheartened and disillusioned. Village health committees have been shown to have potential for getting villagers to participate in environmental sanitation projects, safe water use and supplies, increased immunization rates in under five children [84] and reduction in infant mortality rates have been experienced. [29] This proposal seeks to find out if the health committee approach would be equally effective in other parts of rural Sierra Leone.

6.2 Research Questions

6.2.1 Primary Research Questions

When compared with standard health care at village level in rural Sierra Leone, is infant mortality rate reduced by 50% and crude mortality rate reduced by 25% in villages where the village health committee approach is implemented?

6.2.2 Secondary Research Questions

1) Are immunization rates for under five children increased by 50% in villages with the village
health committees?

2) Is the nutritional status of under five children improved by 50% in villages with the village health committee?

3) Are 75% of pregnant women appropriately immunized against tetanus in villages with village health committees?

4) How many and how well maintained are latrines, wells, vegetable gardens, in villages with health committees?

5) Are referrals of sick villagers and high risk pregnant women appropriate in villages with health committees?

6.2.3 Choice of Study Design

Because there is no conclusive evidence to hold that the village health committee approach will improve the health status of rural communities in Sierra Leone - a randomized control trial has been chosen as the most appropriate design to test this hypothesis. The use of randomization in the allocation of the manoeuvre gives the villages eligible for the study an equal chance of being assigned to the new health care approach.

The study will be phased in two stages over a period of four years. This will enable testing for:

(1) early changes in outcomes due to the initial impact
of the manoeuvre and (2) trends in rates of interest after the establishment of the health committee. It is felt that four years is the most appropriate time period. It is the maximum length of time one could feasibly run this type of community study in a developing country. It is also the minimum period required to adequately assess a) the functioning of the health committee, and (b) its real impact on health status—based on the Bumpe experience\(^{84,29}\)

6.3 **Experimental Unit**

Traditionally the unit for allocation in randomized control trials has been the patient or individual subject. However, in more recent studies the community has been chosen as the experimental unit.\(^{32}\) There are several reasons why a community instead of the individual would be more suitable to randomize the intervention to and these are outlined briefly as follows:

1. There are many times when factors affecting a disease extend beyond the individual sick person. Therefore, in order to control such diseases (particularly in preventive programmes) it may be at the level of the patient's environment, family or lifestyle that a manoeuvre needs to be introduced. It is in situations similar to these that the use of the community as the unit of allocation would
be most appropriate. If one were to choose the individual instead of his community - problems of contamination from environmental factors would possibly interfere with his response to the intervention under study.

In our proposal it is evident that we will be dealing with diseases which are infectious and communicable. Therefore, any control of these requires intervention at the level of the community as a whole - not some individuals residing there (who return to conditions exposing them to possible further infection and so in some cases they become re-infected again).

(2) According to social learning theory\(^9,8\) it is predicted that where interventions require change in lifestyle (in particular) learning will be most effective in a community-based programme. The reasons for this are two-fold: a) enhanced opportunities for exchange of information in the community; b) there is the required social support which is needed for maintenance of change at the community level.

In our proposed study, change in health practices and beliefs at community level is required if any real positive impact is to be made on the health status of that community.
(3) Another benefit of the community-based study is its value in testing the generalizability of the intervention of interest. Campbell and Stanley refer to this as testing the 'external validity' of the manoeuvre. Community-based studies avoid the problems of biased sampling such as those of volunteer subjects, under-representation of the high risk (or low risk) patients, etc. which can arise in clinic based studies.

(4) Cost reduction is yet another pertinent feature of community-based studies. It is normally groups rather than individuals who are the recipients of educational programmes. Therefore, ascertainment of costs in terms of endpoints using community resources will usually be relatively lower if new resources have to be issued to each individual in the programme. This is another aspect of the intervention in our proposed trial which has determined the use of a community-based study.

There are also some limitations in using community-based trials and these are addressed in the following section:
(1) Blinding on the part of the receivers of the programme, the administrators of the programme, and the researchers are obviously impossible. This is undoubtedly a disadvantage (leading to possible bias) especially for those collecting the required data. However, blindness by assessors in the analysis stage of the endpoints can and will be maintained in our proposed study. In this way we will be controlling for sources of several possible biases such as diagnostic suspicions, exposure suspicions and expectation bias for instance.

(2) Community-based studies are inherently better suited to test multifactor interventions than just single factors. This is very suitable for our proposed study where lifestyles are connected through behavioural links in the village community.

(3) Possibly one of the major limitations of community-based studies is due to resource and logistical constraints. For example, it would be really difficult for a single research institution to study more than three to five communities at a time. This is taken in light of the fact that Sherwin (92) has suggested if one is to maintain statistical power (at the 0.01 level) then when
cities or communities are used as the allocation unit at least sixteen are required in the study sample. These problems might be major for our proposal if taken on by one institution alone in one part of Sierra Leone. However, one of the advantages of this proposed study is that it would be run on a national level by a central research body from the Ministry of Health. This body would function through the District Medical Offices in the selected areas for the study, thus enabling the close supervision of the study at district level by research personnel while they will also collaborate at central level on a regular basis. This means that resources already available in the community such as transport, and office facilities as well as certain carefully selected personnel will be used in the study.

Therefore, for the proposed study it has been decided that the most efficient experimental unit is the village. The manoeuvre under study is a village-based programme for the community. Consequently, outcomes of the programme will be measured at village level. All administration, assessment and training pertaining immediately to the programme will take place in the village.
CHAPTER 7
THE POPULATION

7.1 Sampling

7.1.1 Representativeness and Generalisability

The target or reference population is that population about which an investigator wishes to draw a conclusion. (25) The results of this study are intended to yield information useful for selection of a comprehensive community health programme for rural Sierra Leone. The target population is the rural community living in average size villages (e.g. 500 to 1500 people) of Sierra Leone (79) and the study group should be a representative sample of that target population. The optimal procedure for meeting the requirement of representativeness is the drawing of a random sample of the total rural population in all villages (500 to 1500 in size), this would then be a sample from the target population where all members have an equal probability of being selected.

This method of sampling while ideal, is not feasible in Sierra Leone. There are several considerations which must be remembered while selecting the sample for this study.

1) The manoeuvre requires certain conditions in
order to function, such as a health facility at chiefdom level.

2) The Western Area which contains the capital, Freetown, and is therefore mainly an urban area will be excluded as it does not obviously reach the criteria of rurality required by the study.

3) Areas which have existing primary health care programmes will be omitted from the study to avoid problems of contamination and co-intervention with the introduction of a new programme.

7.1.2 Inclusion Criteria for Study Sample

1) Rural population - therefore only the three Provinces will be included in the study.

2) Standard Health Care - only chiefdoms with an existing health facility will be included.

3) Village Size - Villages with populations of between 500 and 1500 people will be included.

4) Distance from Health Facility - only villages within a 10 mile radius from the health facility in the chiefdom will be included.

7.1.3 Exclusion Criteria

1) Urban Areas - Freetown and the surrounds known as the Western Area, and Sherbro urban area will be excluded.
2) Existing Community Health Programmes - All chiefdoms with existing community health programmes will be excluded.

3) Village Population - Hamlets of less than 500 people and towns of more than 1500 will be omitted from the study.

4) Villages with Health Facility - All towns with health facilities (these are usually the chiefdom towns) will be excluded.

5) Villages found to have, on pretest, a crude mortality rate greater than 50% outside of the mean of all pretest rates will be excluded from the study.

7.2 Selection of Study Communities

A method of multi-stage random sampling will be used to select the communities for this study as shown in Figure 5.

This procedure will start with the application of the above-mentioned inclusion/exclusion criteria at each stage prior to random selection. Census data (1974) of Sierra Leone will be used in the selection process - to determine population size and structure for each area of the country. Information on the location of primary
FIGURE 5

MULTI-STAGE SAMPLING PROCEDURE

STAGE I - 1. Population: All Districts

Sample of 11 Districts

STAGE II - 2. Population: All chiefdoms in each
of 11 districts

Random Sample of 1 chiefdom per
District (11 chiefdoms)

STAGE III - 3. Population: All villages (500-1500)
in 11 chiefdoms

Random Sample of 2 villages per chiefdom (22 villages)
health care programmes and health care facilities at chiefdom level will be sought from the Ministry of Health. Tables of random numbers will be employed to randomly select samples at each stage of the sampling procedure.

The sample chosen for this study will therefore be a multi-stage random sample of all rural villages (500 - 1500 in size) in chiefdoms with a health facility in Sierra Leone.

7.3 Stratified Randomization

Having carried out the multi-stage sampling procedure, the chiefdom will now be used as a stratum and random allocation of villages will occur (using tables of random numbers) within each stratum. Stratified randomization is chosen because it has the advantage of assuring balance between the experimental and control groups. (25,33) Chiefdom or geographic location has been considered an important stratification variable which may influence the outcome of the manoeuvre, because it represents variation in tribal and religious (Muslim and Christian) differences in rural Sierra Leone.
7.4 The Size of Study Population

If we were using individual subjects as the unit of randomization then the sample size for our study would be determined by the use of a comparison of two proportions for independent samples formula (Colton(25)) based on the binomial theorem. However, our unit of randomization is the village community (500 - 1500 in size). We have already determined that there will be eleven such villages chosen per study group. The choice of eleven is based on the fact that each district of Sierra Leone will therefore be represented in the sample - an important consideration for this nationwide study.

Another concern is the possibility of variation in the distribution of the rates of interest across chiefdoms (e.g. Infant Mortality Rates for Sierra Leone vary from 150 to 300 per 1000 live births). This variation will be assessed in the baseline data prior to the study. Then the standard deviation will be assessed for outcomes and the effects these will have on sample size and power.

The following tables explore the effects of changes in standard deviations and changes in effectiveness levels (with an alpha level of .05 and beta level of .05) on the number of villages required for the study for the various outcome measures.
TABLE 13

NUMBER OF VILLAGES REQUIRED PER GROUP FOR INFANT MORTALITY RATE AS AN OUTCOME

\((\alpha = .05, \quad \beta = .05)\)

<table>
<thead>
<tr>
<th>(\sigma)</th>
<th>50%</th>
<th>40%</th>
<th>30%</th>
<th>20%</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>.5</td>
<td>.8</td>
<td>1.5</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>13</td>
<td>53</td>
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<td>120</td>
<td>12</td>
<td>19</td>
<td>34</td>
<td>77</td>
<td>310</td>
</tr>
</tbody>
</table>

TABLE 14

NUMBER OF VILLAGES REQUIRED PER GROUP FOR CRUDE MORTALITY RATE AS AN OUTCOME

\((\alpha = .05, \quad \beta = .05)\)

<table>
<thead>
<tr>
<th>(\sigma)</th>
<th>25%</th>
<th>20%</th>
<th>15%</th>
<th>10%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>17</td>
<td>30</td>
<td>68</td>
<td>272</td>
</tr>
<tr>
<td>7.5</td>
<td>6</td>
<td>9</td>
<td>17</td>
<td>38</td>
<td>153</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>18</td>
<td>68</td>
</tr>
<tr>
<td>2.5</td>
<td>.6</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>17</td>
</tr>
</tbody>
</table>
### TABLE 15

**NUMBER OF VILLAGES REQUIRED PER GROUP – FOR**

**NUTRITIONAL STATUS AS AN OUTCOME**

Decrease in Undernutrition by:

<table>
<thead>
<tr>
<th>$\sigma$</th>
<th>50%</th>
<th>40%</th>
<th>30%</th>
<th>20%</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>7.5</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>14</td>
<td>56</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

The Formula used to test for sample size in these tables is as follows:

$$n = \left( \frac{(Z_\alpha - Z_\beta) \sigma}{\delta} \right)^2$$

where:

- $Z_\alpha$ = the cut off point or critical ratio required to prevent a Type I error. A Type I error refers to the rejection of the null hypothesis when it is true.
- $Z_\beta$ = the cut off point or critical ratio required or chosen to prevent a Type II error. A Type II error refers to failure to reject the null hypothesis when it is false.
- $\sigma$ = refers to the standard deviation from the mean.
- $\delta$ = is the chosen difference between the pre-test measure and Post-test measure in the outcome measure of interest.
CHAPTER 8

THE MANOEUVRE

8.1 Brief Description of the Manoeuvre

The manoeuvre for this study can be briefly described as the training, establishment, and monitoring of village health committees at village level. The stages involved in the procedure are several and vary between the experimental and control groups. Therefore, the following sections describe the steps of the manoeuvre for each group.

8.2 The Control Villages

STEP I  -  The enrollment and support of the village chief and elders.

STEP II -  The assignment of registration of births and deaths to an influential literate adult in the village.

STEP III -  Monitoring of above registrations by State Enrolled Community Health Nurse - every 3 months (while on Immunization Campaign).

8.3 The Experimental Villages

STEP I  -  The enrollment and support of the village chief and elders.

-  The education of the villagers in the role
of Health Committee members (in response to health needs as indicated by results of baseline survey).

**STEP II** - Election of Health Committee members by villagers.
- Intensive education of individual health committee members on their roles.

**STEP III** - Health Committee members educate villagers.
- Health Committee members participate in home visits, immunization programmes, sanitation projects, etc.

**STEP IV** - Monitoring of Committee meeting attendances, work in village, registration of births and deaths by State Enrolled Community Health Nurse.

### 8.4 Implementation of the Manoeuvre

As indicated earlier, only chiefdoms which have standard health care (in the form of a health unit, health dispensary or hospital) will be selected for the study. These services are static (i.e. immobile) at present only serving those people who come to them with ailments. Since 1979 a new cadre of nurses—called State Enrolled Community Health Nurses (S.E.C.H.N.)—replacing the former State Enrolled Nurse (S.E.N.) have been trained with the purpose
of employing these in either the static or community setting. These are practical nurses with eighteen months of general nurse training and six to nine months of community health work (which includes experience in community assessments, home visits, etc.). The setting up of this study will require the employment of these S.E.C.H.N.'s in the selected chiefdoms where they will work in both the community and the chiefdom health service unit. This in turn will mean that they will be the community workers working with and training the health committees in the experimental villages. Their involvement with control villages will be in the running of immunizations once every three months in those villages presently involved in the Expanded Immunization Campaign and the monitoring of registration of births and deaths. Therefore, one S.E.C.H.N. will be attached to each health service centre.

8.4.1 Strategy

The main strategy for the delivery of this primary health care programme requires an integrated approach involving:

1) Ministry of Health
2) Other sections of government
3) Voluntary Agencies
4) The Community
5) Supportive Supervision
8.4.2 Ministry of Health

The Ministry of Health (M.O.H.) will be responsible for the training and overall supervision of the primary health care programme. Drugs, vaccines, materials and facilities directly needed for the health care of patients will be provided by the Ministry of Health. Employment of the necessary staff (S.E.C.H.N.'s) and recruiting the involvement of the other sectors in the Ministry of Health will also be their responsibility.

8.4.3 Other Sectors of Government

At community level the village health committee will be working together with workers in agriculture, public works, social welfare, etc. Therefore, the Ministries of Agriculture, Public Works, Education, Social Welfare etc. will be co-ordinated in such a way they are involved and geared towards an overall improvement in the health and socio-economic welfare of the community. Regular meetings to facilitate co-ordination with representatives from each sector involved in the primary health care (P.H.C.) activities. The main purpose of these meetings will be to open channels of communication - so that supervisors of field workers in the different sectors can be aware of the P.H.C. programmes planned for the villages and encourage their workers to work in co-operation with other field workers.
and the community for health instead of working in an isolated and fragmented fashion as has developed over the years.

This integrated approach using the services, facilities and resources of other sectors has been used in Bumpe chiefdom, and the response of the health administration at Provincial as well as at top Ministry levels have shown great interest, enthusiasm and commitment to such an approach.

8.4.4 Voluntary Agencies

There are several non-governmental agencies involved in development work in Sierra Leone both mission groups, and international organizations such as Catholic Relief Service, Canadian University Services Overseas etc. Many of them are already involved in various areas and so will be invited to participate in this integrative approach to health care in rural Sierra Leone.

8.4.5 The Community

Since the concept of Comprehensive Primary Health Care is based on community participation (see Chapter 3) it is essential that the community be educated as to the extent of their community health problems and some realistic ways of tackling these. A real sense of social awareness and a desire for self-reliance is necessary for the success
of an integrative approach. Community participation for this programme requires that individuals and families assume responsibility for their own health and welfare as well as that of the community. This new approach requires a lot of re-education because for so long the health profession have given the impression that it was their responsibility to take care of the community. From experience with similar programmes it appears that there are three essential features required for successful community participation. (36, 84, 29)

8.4.6 Decision Making

Having been exposed to the results of the baseline survey, the village leaders (chiefs and elders) will be involved in the setting of realistic priorities in conjunction with the community health nurse under the guidance and monitoring of his supervisor. The community worker will then be responsible for the execution of activities to fulfill these priorities on a monthly basis. The community worker will initially be very involved in training the leaders and villagers in the process of reaching decisions, accountability and evaluation of their work.

However, it is essential that the community leaders be involved in the decision making process of the programme each step of the way. Therefore, the worker will take his pace from them and work in with them - not trying
to impose his ways. Part of his work with the leaders is setting a schedule wherein the whole process of the work plan is worked out. This will be closely monitored in conjunction with the S.E.C.H.N. supervisor. However, time in terms of weeks and months is a difficult concept for village people who function on a season basis not on our Western way of clocks and monthly calendars. So all this will have to be taken into consideration by the community health worker.

8.4.7 Implementation

A schedule is of little use if it is not put into practice. This implementation functions at two levels - prior to starting at the village level it is necessary that the regular meetings held with the Health and other sectors not only take place, but that suggestions be implemented through the various workers on the one hand, and any actions already carried out be reported back to the meeting. A committee will be set up at national and district level to enable this implementation. In the village, work schedules set up at their regular monthly meetings by the village health committee with the community health worker will be assessed by the worker. In fact, the committee members should be encouraged to develop a sense of accountability to the committee and village so that in turn the villagers
will seek help from, and use the members as role models.

8.4.8 Integration

While at village level the committee may function in a highly integrated way over time—unless this integration takes place at administrative level also, it is useless. For example, to educate local village workers to refer patients on time is pointless if they are left unattended at the second or third level of health service. Another important integrating force is the supportive supervision which should be given to the community health nurse and all other field workers (in agriculture, environmental sanitation, etc.)

Any activities that workers have done in the village should be assessed regularly on the spot (in the village). Supervisors from one department should show interest in the work carried out by other sectors, as well as those of the health committee as a whole. The district committee on primary health care will facilitate this integrative approach by field workers from different departments.

It is anticipated that some problems in integration across levels of administration and services will be experienced. These will be discussed immediately through the channels already opened up (e.g. committee, supervisor
etc.). When there are persistent problems such as neglect or delay in caring for high risk village patients at the hospital, this is material worthy of note and will be monitored and presented to higher authorities in the Ministry of Health.

8.5 Activities of the Health Committee

The Committee will consist of seven members who will be responsible for the following areas of health in the village.

8.5.1 Chairman of the Committee

The Chairman is the co-ordinator of the committee meetings - he may often be the chief of the village or the chief's representative.

8.5.2 Person for Under Five Children

This person will be a young woman who has children of her own. She will give the lead in encouraging children's immunizations, use of nutritional diet, hygiene practices with small babies, use and method for making rehydration fluids for children with diarrhea, etc. She will join the community nurse on her/his visits to homes with young children, be involved in organizing the three-monthly immunization clinics, etc.

This lady's training will consist of a simple programme of basic health education related to health care of
young children in the village. She will receive practical experience through being involved in home visits with the S.E.C.H.N. and help with the immunization campaign in the village. The S.E.C.H.N. will monitor her progress on tasks from month to month e.g. preparation of rehydration fluid for a child with diarrhea, advice given to mother in case of a child with fever etc. The direct outcome of her work will be assessed annually through assessing changes in Infant Mortality Rates, Nutritional Status, and Immunization Rates in under five children.

8.5.3 Midwife

This lady will usually be functioning as a midwife in the villages already and so has the respect and confidence of the women. She will be trained in aseptic techniques for delivery - using her usual methods and circumstances but in a more sanitary way. She will be responsible for seeing that all pregnant women will attend Antenatal clinic for 3 tetanus immunizations, and high risk women will be referred on time to hospital. Those women she delivers herself she will ensure that they bring the newborn to health unit or hospital for care of the cord wound as soon as possible. As with the other members of the Committee the midwife may have helpers in her work. In fact, the community nurse will usually educate not just
this lady but as many midwives and "grannies" involved in deliveries as possible.

A programme of basic lessons on aseptic techniques on delivery, recognition of 'high risk' cases and other matters related to antenatal and post-natal care will be taught her on a monthly basis by the Maternal and Child Health Aide (M.C.H.A.) (based at the Health Unit) in conjunction with the S.E.C.H.N. Monitoring of midwife's work will be done through checking on referrals of high risk care, advice given to pregnant women on diet and clinic visits by S.E.C.H.N. and M.C.H.A. through direct observation and enquiries of pregnant women.

The proportion of fully immunized pregnant women as well as the assessment of referrals will be the outcomes evaluated annually.

8.5.4 First Aid Man

This man may already have been involved in native medicine. He will be educated about first aid - emergencies such as burns, snake bites, severe falls need immediate and proper attention if they are to be cured. He will be educated on the symptoms of common fever and supplied with Chloroquin and Aspirin for these, which he shall sell to patients for a small fee. It is his responsibility to ensure that he has a constant supply of the above-mentioned
drugs. He is also responsible for referring patients to the hospitals or health unit by sending a note with the person. There are several other lessons he is taught, e.g. cure for constipation, the recognition of signs which indicate immediate referral etc. A programme of basic lessons in First Aid shall be taught this man by the S.E.C.H.N. His work will also be monitored from month to month by enquiries from sick villages by the S.E.C.H.N. The assessment of his referrals will be the direct outcome evaluated annually for his work.

8.5.5 Registrar

This man is literate - because he needs to be able to read and write for his job on the committee. His main task is to record the minutes of meetings for the health committee and to record all births and deaths in the village. He will need constant supervision initially, particularly to draw up a consistent method to enquire for deaths and births which may have taken place outside of the village. The importance of accurate reporting and a method to check for deaths and births at village level will be taught this member of the Committee by the S.E.C.H.N. and his counterpart in the control villages. Practical demonstrations of the procedure to check for (through home visits) and extract the most accurate information on births
and deaths will be given him by the S.E.C.H.N. Of course
the data to compile death rates annually will be the direct
result of his work.
8.5.6. Environmental Sanitation Person

This man may or may not be already involved in
environmental sanitation as several chiefdoms have person-
nel working in this area. However, it has been a very up-
hill battle with lack of co-operation at all levels and
conflict between chiefdom interests and those of central
government. It is very likely that a man elected for this
role by the villagers will have some knowledge of this area.
His responsibility will be to educate villagers on the im-
portance of sanitary conditions in their homes and com-
pounds and the ill-effects on health of no latrines, or
badly maintained latrines, dirty water and the sources
which breed mosquitoes and other flies. Planning and intro-
duction of latrines and wells or water sources according to
the rules specified by the Department of Health are his re-
sponsibility in the village. He must be a role model in
this for other villagers by starting with the education of
his own family.

A training programme in basic environmental san-
tation and its relation to health care will be drawn up
using material from existing programs of the Ministry of
Health to enable the S.E.C.H.N., in conjunction with the local sanitary inspector to train and monitor this member of the committee. The outcomes of his work, construction and maintenance of wells, and latrines will be observed and assessed monthly and annually.

8.5.7 Agriculture

One of the main problems among young children at village level in Sierra Leone is malnutrition. Part of this disease is related to feeding patterns of the children which are based on traditional beliefs and taboos. This results in a large proportion of carbohydrates and little protein in foods. However, crops grown in Sierra Leone are very nutritious and can easily be grown - such as groundnuts, beans and greens. Therefore, the person responsible for agriculture on the committee will encourage all families to grow vegetables appropriate and adequate for their own intake. He will also be responsible for educating teachers and school children on the importance of nutritious food for growth.

The S.E.C.H.N. will be responsible for carrying out the training and monitoring of this person in conjunction with the agriculture advisor of the chiefdom using a programme of basic lessons in agriculture and nutritious food. Progress will be monitored through direct
observation of crops and gardens, and through checking villagers' knowledge of the value of these items for better health by enquiry at home visits. Agricultural projects will be assessed each year.

8.6 The Community Health Worker

It is the role of the community health nurse to emphasize the promotion, prevention and early diagnosis of health in all his/her dealings with the village health committee and community. The community nurse will be a State Enrolled Community Health Nurse. These are the only health personnel in Sierra Leone trained to work with the community. While they have two and a half years training they are not overly qualified for their job in the community -- an important consideration. Otherwise frustration and dissatisfaction quickly set in, as is the case with the State Registered Nurses and dispensers of the past.

The role of the S.E.C.H.N. is important in training the committee to function in its responsibilities but he is also an important link with the health system as well as being an integrative force between the various personnel in the field of community health care. He can bring credibility to the community on the value of the health service while also reporting to his supervisor at
the health centre on the progress and problems of his work.

The community nurse's time schedule will involve monthly visits - three or four days resident in the village - so as to assess each member's work done, educate the various groups (of midwives, young mothers, sanitation men, etc.) attend the monthly health committee meeting, etc. Most of this work will take place either at night time after the people return from their farms, or early in the morning before they go to their farms. Visits to schools, agriculture workers and also home visits on under five and sick villagers with the appropriate committee workers will take place during the day.

8.7 Other Activities and Facilities

The importance of immunizations in both under five children and pregnant women cannot be advocated unless these facilities are available in the chiefdom. Therefore, the Ministry of Health has to guarantee a constant, safe and sufficient supply of vaccines for immunizations. In some areas of Sierra Leone this service is already underway. By 1984 it is guaranteed to be widespread for the total population. Assuming that the areas of the study will receive priority it is necessary to set up a schedule for regular mass immunization in various
areas of the chiefdom. In the past these centres have been in the section towns which means that all the villages in the study will be included, if this schedule were to be used. These mass immunizations would probably take place every three months as in the past.

While some villages will have water sources which merely need to be designated as such by the villagers, others will need to construct wells. Constructions such as wells and latrines while the responsibility of the villagers may need cement supplies. Funds through various sources such as funding organizations, ministries, etc. must be sought and an acceptable arrangement worked out so that both the community and organization are satisfied - and yet the project is the work and responsibility of the villagers themselves.

Supplies of basic drugs - Chloroquin and Aspirin as well as bandages need to be available on a regular basis for the first aid man. While it is important to educate this person on the responsible use of these - it is also essential that having educated him he is able to get them when his supplies run out. Therefore, if he charges a fee for sale of each, his funds will enable him to buy replacements locally if they are not at the health centre.
8.8 **Supervision**

Supervision of primary health care programmes should be the responsibility of the nearest health centre or facility. In this way that facility is seen in the context of the community and the role it has to play in solving the health problems of the community. At present, however, the supervision of community health field staff and their projects are being done by either the district medical officer (D.M.O.) or a medical officer designated by the Ministry of Health, e.g. from nearby hospitals with community health departments. All health centres (whether hospitals, centres or units) function as static services at present and therefore work only within the facility, expecting patients to come to them when they require treatment. Because our proposal hopes to compare this approach which is the standard health care with the health committee approach, the present method of supervision will be used for the study. Re-orientation and education of health personnel at all levels will need to take place at a later date if the results of the study show the new approach as more effective than the present one. Until then medical officers designated by the Ministry of Health, these usually have community health training (e.g. D.T.P.H.) will be orientated as to their specific functions in relation to the supportive supervision of the S.E.C.H.N.
8.9 Methodological Issues Pertaining to the Manoeuvre

8.9.1 Definition of the Manoeuvre

It is essential that the manoeuvre of the study be clearly and precisely defined so as to enable its consistent application at each site of the study. Therefore, a manual will be drawn up for each S.E.C.H.N. describing the stages of the procedures for the experimental and control groups. This information booklet will contain the roles of the health committee members, the lessons they will be taught, the procedure for monitoring their work etc. (see appendices).

8.9.2 Contamination

Contamination occurs when a subject on one treatment is inadvertently given the other treatment. This problem could occur in our study if people moved between experimental and control groups - such that response rates might be adversely affected in the experimental and enhanced in the control groups depending on the amount of mobility, direction of mobility and length of stay in a village. Mobility between villages has already been assessed in some areas of Sierra Leone and found minimal. (36,84) However, this issue will be addressed through setting up criteria for registration of subjects in the annual assessments at community level. Mobility which takes place equally across
the country wide sample and to and fro equally between experimental and control groups may cause bias that can be ignored because it is equally distributed across both groups.

8.9.3 Co-Intervention

Co-intervention refers to other activities which may be applied in conjunction with the manoeuvre to the subjects in the experimental group. These might take the form of extra attention such as more frequent monitoring, other 'vertical' health programs such as new immunization programs, additional screening etc. in the experimental group. By its very nature, our study could have problems with potential sources of co-intervention. Therefore, the omission of areas which have an existing primary health care programme is an attempt at preventing co-intervention. Another variable which might affect the outcome of the study is the work of traditional medicine men who are based in the villages. The incorporation of these traditional health personnel into the health committee (instead of the committee working in opposition to them) is seen as an attempt to prevent a situation or condition which would have had an adverse effect on the outcome of the manoeuvre. Also, each outcome measure which requires a comparison between the experimental and control groups shall be
monitored and its condition (immunizations) be administered in equal amounts for both groups. Therefore, immunizations shall be administered on a three-monthly basis to both groups, monitoring of births and deaths registration shall be done on a three-monthly basis also, and annual assessments shall be carried out in all study villages.

8.9.4 Co-Morbidity

Co-Morbidity is particularly important in the study of medical treatments or programmes, especially when the endpoint is not cause specific as in general mortality and infant mortality rates. Knowledge of disease or clinical conditions which would effect the outcome of the study trial should be considered in prognostic stratification prior to randomization or adjusted for in the analysis. Therefore, causes of general mortality and infant mortality such as an outbreak of rabies, Lassa fever or other diseases which the village health committee are not expected to influence, will be checked out and adjusted for accordingly in the analysis for differences between experimental and control villages.

8.9.5 Compliance

Compliance is an important issue in all trials and therefore should be monitored throughout the study.
A treatment may be very effective, but if the majority of patients do not comply with it, then this is a feature of the treatment which should be identified. (86.37)

In our study there are two important compliance issues - one pertains to the compliance of the health committee members to their duties in the village. This will be monitored through registering attendances at meetings (from the 'Minutes' book) and monthly assessments by the S.E.C.H.N. of duties carried out by each member through direct observation and random follow up of pre-assigned tasks each month.

Compliance by S.E.C.H.N. with the study protocol (especially in relation to the manoeuvre) is a second important issue. This will be done by the local project supervisor through direct observation at the annual assessments and through frequent unexpected checks in the villages.
CHAPTER 9

MEASUREMENT

This chapter will be divided into four main sections. The first describes the important methodological attributes of the endpoints. The second deals with patient outcome measures; the third with other methods of measurement required for the study, and the fourth with issues related to collecting study data.

9.1 Methodological Attributes of Study Endpoints Relevant to the Choice of Measures of Health Status

The purpose of this study is to assess the effectiveness of a new community health programme on the health of rural communities in Sierra Leone. We therefore need to measure the health of the community. However, as health cannot be observed directly, one can only make inferences about health from fallible indicators. Certain criteria can be put forward which when applied to measures of health status will help to determine their effectiveness as a measure.

9.1.1 Practicality

A major consideration in the choice of measures of health status is the practicality of using the measure. This issue is particularly relevant for developing
countries where limitations in terms of time, money and skills have to be considered. Another important aspect is respondent burden such as refusal rates, rates of missing responses and administration time. Those using health status measures with the community should work with the least complicated instruments and methods possible, so as to ensure their usage with the greatest possible simplicity and ease.\(^{(106, 87)}\)

9.1.2 Reproducibility

Reproducibility is an important issue in the use of any measures.\(^{(87)}\) As health status scores can be made up of many elements, measures should be tested for reliability. There will always exist some random error which is acceptable - but tests of reliability coefficients can indicate the proportion of information, rather than random error which a score contains.\(^{(106)}\) Therefore, a reliability of 0.80 means that the score contains 20% error. A minimum standard of reliability is necessary for the purpose and design of a study. Therefore, all measures used must be checked for reliability in the study to be of real value.

9.1.3 Validity

Validity can be described as the extent to which the measurement instrument measures what it purports to measure. A valid score contains information about the
particular aspect of health status needed for the study. Validity can be studied in several ways. Some, such as concurrent, construct and predictive validity are empirical and very difficult to assess. However, face validity and content validity are less difficult but also valuable and important. In fact, from the literature it would appear that it is mainly information on face and content validity which prevails. Available empirical information about validity is very meagre. (106,50,41)

9.1.4 Objectivity vs. Subjectivity

Objective measures are defined as such by the fact that they measure observable change - e.g. in the area of physical health - objective measures might include the person's ability to dress, bathe, feed himself. Whereas, subjective measures relate to the extent to which inferences must be used to interpret the variable of interest, for example - again in the area of physical health a subjective measure would be the personal rating of the subject of his overall physical condition.

Preference for objective measures are based on validity issues. However, the purpose of the measure depends on which of the two approaches is the more valid. In fact, subjective measures are proving to be more useful in permitting finer discriminations among people through the full range of the health status continuum. (106,107)
9.1.5 Responsiveness to Change

Another criteria which would be helpful in determining the use of a valuable health indicator would be its sensitivity to change. (87) An indicator may meet the above-mentioned criteria very adequately, have face and content validity, be reproducible and measure objectively, but may not be sufficiently sensitive to pick up changes in the social, emotional and physical well-being implied in the World Health Organization definition of health. Indicators, therefore, should be sensitive enough to respond to changes when they occur.

9.2 Proposed Health Indicators for Assessing Patient Outcomes (see Table 16, p. 121)

Ideally when studying general populations one should consider using positively defined health measures. (106, 23) This choice is related to the prevalence rates of disease in the population. With populations like Sierra Leone which are severely ill, measures on the negative end of the health status continuum are the best strategy. Mortality and morbidity have long been traditional measures of health. But with the change of health patterns in highly industrialized countries like the United States and Canada, the value of morbidity and mortality as health indicators has declined considerably. However, in
Sierra Leone and other developing countries where the prevalence of infectious disease is still very high and a major cause of deaths - morbidity and mortality are still sensitive health indicators.

Death is a well defined and well recorded event for all people. This type of "hard" data is required to enable us to achieve the above-mentioned criteria of valid and reliable measurements of health in circumstances where health statistics are totally unreliable, problems relating to lack of skilled personnel, respondents who are from several different cultural and language backgrounds and scarcity of resources prevail.

Morbidity rates at village level in Sierra Leone would prove impossible to assess reliably. Community nurses in the study have minimal training in diagnostic techniques. Confirmation of diagnosis through tests such as laboratory or x-ray would prove unattainable because of the minimal facilities already in existence in hospitals and health centres of rural Sierra Leone. The use of more highly qualified health personnel and the acquisition of diagnostic tests for the field which would be needed to assess morbidity more reliably are neither practical nor feasible. None of the criteria applicable to health indicators are feasible for use of morbidity as an indicator in the rural setting in Sierra Leone at present. Therefore,
mortality (crude and infant) has been chosen as the best possible health indicator for this study. As we will see from the following sections, the criteria for useful health indicators can be applied fairly rigorously to mortality rates.

While mortality rates (crude and infant) have been chosen as the primary endpoint measures in the study - other outcomes which are considered as the direct result of the intervention will be assessed as intermediate or process measures.

9.2.1 Crude Mortality Rate

Mortality rate is defined as the total number of persons dying in the total population per unit of time. The annual death rate given for Sierra Leone is 22 per 1000 people for 1974. This estimate is based on deaths registered in Freetown. Deficiency in health data is a major problem in Sierra Leone because of several problems in reliable reporting of accurate information. When one is made aware of the system of notification and collection of data in Sierra Leone it is obvious where the sources of the deficiency are. The following diagram indicates the method by which the process of collecting health data in Sierra Leone is carried out.
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<th>Data Source</th>
<th>Measurement Instrument</th>
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<td>a) Questionnaire</td>
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<tr>
<td>PROCESS MEASURES</td>
<td>1. Immunization Rates (0 - 5) years</td>
<td>Annual Community (house to house) assessment</td>
<td>a) Under five cards</td>
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<td></td>
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<tr>
<td>Health Indicator</td>
<td>Data Source</td>
<td>Measurement Instrument</td>
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<td>Annual Community assessment</td>
<td>Observation</td>
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<td>e.g. Latrines, water source, vegetable gardens</td>
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<td>a) Registrar's Records</td>
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<tr>
<td></td>
<td>b) Hospital/Clinic Records</td>
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</tbody>
</table>
Births and Deaths Notification:

Native Administration Clerk (Chiefdom level)
\[\text{district registrar} \rightarrow \text{district headquarters}

Senior Registrar (Provincial Headquarters)
\[\text{chief registrar} \rightarrow \text{Ministry of Health: Medical Statistics Unit}

(Note: \(\rightarrow\) = Sends information to)

Notification of Infectious Diseases:

Peripheral Health Units & Hospitals (Chiefdom level)
\[\text{medical officer of health} \rightarrow \text{district level}

Ministry of Health (Medical Statistics Unit)
\[\text{general practitioners and others}

(Note: \(\rightarrow\) = Sends information to)

Some of the real problems in the first of these systems - notification of births and deaths - are experienced at the community level. The native administration (N.A.) clerk is responsible for registering births and
deaths and then reporting them to the District Office. However, the N.A. clerk is employed by local government and therefore, not accountable to central government so he has little or no incentive to take this job seriously. Thus, health data within and from the chiefdom is reported erratically and incompletely.

Notification of disease also has some shortcomings. The list of infectious diseases for Sierra Leone was drawn up in 1960 and were 26 in number. Since then some have been eradicated (smallpox, plague, jaws) while other new ones like Lassa Fever have developed and are not incorporated into this list. This naturally has a negative effect on estimates of the evidence and prevalence of public health inspectors, hospital and rural health unit staff, environmental health workers etc. who are responsible for notifying diseases. However, many do not comply with this law. Data received is often incomplete or inaccurate. Various reasons for the inadequacy are given such as lack of understanding for the need for such a law, costs in terms of postal charges, time, lack of appreciation and of course, problems of diagnosis for the many non-health people who are responsible for this job in the remote areas (e.g. local teacher, or priest).

This brief description of the problems on collecting health data in Sierra Leone must be considered and the
issues addressed in the planning of any evaluatory system. Therefore, for our proposed study, estimates of the mortality rates need to be assessed more objectively and accurately than merely choosing an estimate based on registered deaths in the capital.

In a recent study (1980) carried out in the Magbosi Project Area using 12 enumeration areas - the crude death rate was estimated as 44 per 1000 for 1980.\textsuperscript{(61)} Other studies carried out in Bumpe chieftdom reveal figures higher than those already reported but the samples were small and therefore these results cannot be taken with full confidence.\textsuperscript{(84)} For our pretest estimate of the mortality rate for the Provinces we have chosen 40 per 1000, a conservative estimate based on the studies recently carried out in the Southern and Northern Province.\textsuperscript{(84,61)}

The activities of the health committees are directly related to the health problems of the community. The major causes of deaths in rural Sierra Leone are infectious diseases (which include those related to deaths in childbearing women and those in infants).\textsuperscript{(71,84,61)} Each member of the health committee has responsibility for health education and the development of health practices in specific areas of health in the village. If they are effective in carrying out their duties then prevention of several sources of infection in the community should result.
This in turn will reflect itself in the reduction of mortality rates directly related to infectious disease (e.g. tuberculosis, tetanus, malaria, childhood diseases), and indirectly through improvement in nutritional status, reduction in parasitic disease, etc. This indicates the value of general mortality rate as a sensitive indicator in these circumstances.

Mortality rates have been successfully employed as an outcome measure in Haiti - to test the effectiveness of a primary health care programme in a prospective study.\(^{(12)}\) Other studies referred to earlier have also used mortality rates, but unfortunately it is unclear whether trends in general mortality rates were observed prospectively.\(^{(12,28,63)}\) Based on the evidence from these studies, in particular the one carried out in Haiti, and the present estimates of mortality rates in rural Sierra Leone - we propose a reduction from 40 per 1000 people to 30 per 1000 to be a feasible goal for the post-test measure in the proposed study. This post-test measure is still bigger than the official mortality rates given for Sierra Leone\(^{(71)}\) and all other developing countries reported.\(^{(52)}\) However, these rates for pre and post test measures will be tested in the baseline data and adjusted accordingly.
9.2.2. Collection of Data on Death Rates

From the previous discussion it is obvious that the present erratic system of registering births and deaths in Sierra Leone is inadequate and unreliable. Therefore, data on deaths in all study villages will be collected from two sources. In the annual house to house assessment - deaths for the previous year will be recorded through questioning each family head in the village on the number of deaths per family for that year.

The second source of data will be from the register of deaths kept by an appointed person in each village. This register will carry the name, age, address and cause of death of the deceased. Then each death will be assessed to see if it is entered in both the register and annual household assessment. Those which are missing from one source will be queried and follow up made at the home of the deceased.

The use of both data sources together is an attempt to assess the death rate as accurately as possible in the circumstances. It is extremely unlikely that a death would be recorded which had not occurred. Therefore, the source for potential inaccuracy is on the side of omission. Pretesting of instruments to be used in collecting data on deaths will be discussed later in this chapter.
9.2.3 Methodological Criteria Applied to
Death Rate - Practicality

The choice of mortality rates that are not disease specific as a health indicator in Sierra Leone is probably the most practical of all possible indicators. For example, if we were to consider the use of a disease specific mortality rate, there is the added problem of diagnosis. This would require highly skilled health personnel, expensive diagnostic tests, advanced interviewing techniques etc. Therefore, in comparison with other health indicators, a death rate which is not disease specific is a relatively simple and feasible method which requires recording of simple facts as a result of receiving information, or making a straightforward enquiry from the family.

9.2.4 Reproducibility

Is death rate a reliable health indicator? There has been a lot of problems with the use of death rates in developing countries in the past - especially when those rates have been determined by the national census or medical statistics from the Ministry of Health. However, a number of methods have evolved to investigate death rates since the 1960's using "indirect estimation methods."(13,14,17) These techniques are becoming more and more reliable with testing and usage.(13) However,
they are inappropriate for this study because they require collection of data for several years in order to be checked for reliability.

Another method which has proven increasingly reliable is the "dual recording" scheme in which records of the same vital events are collected by two independent sources. Individual matching of events is then followed by field checks for discrepancies and the numbers of omissions estimated by statistical techniques. This scheme has been used widely and has provided reliable information on mortality trends in several of the heavily populated states of India.\(^{13}\) Therefore, the dual recording scheme for estimating death rate has been chosen for this study because it is the most reliable method available. In addition, when compared with other health indicators we might use in the field - such as morbidity rates - it is probably the most reliable measure because the more complicated procedure required to establish the diagnosis of a disease leaves greater opportunity for errors in recording.

9.2.5 Validity

One of the best values of death rate as an indicator is in its validity. While one may have great difficulties in identifying the nature, type and rate of a disease, death is a cold fact which is imprinted in the minds of
the deceased's relatives. In this study information on death will be picked up within twelve months of the death. Therefore, it is highly unlikely that family members will have forgotten it. Also, the data provided by the prospective source (death register) should help recheck the members dying within the proposed time frame.

The validity of the measuring instrument for death rate will be pretested before the trial.

9.2.6 Objectivity vs. Subjectivity

Death is a fact which can be observed and therefore is very objective. On the health status continuum however, it is the most negative score - the worst outcome possible. As already indicated in an earlier discussion, where populations are severely ill as in Sierra Leone - a negative outcome such as death is an acceptable indicator of health status. (106,23)

9.2.7 Responsiveness to Change

Several of the studies discussed earlier (31,28,27, 96) have used mortality as an indicator of change in health status of the population over time. However, it would appear that retrospective data were used in all of these except the Haiti study. Within a time period of four years remarkable changes in mortality rates were experienced in Haiti. (12) The work of the health committee members is
expected to influence directly change in health practices which will result in reduced rates in morbidity and mortality. Changes in death rate as a result of the work of health committees have been experienced in other parts of Sierra Leone, \(^{29,36}\) but unfortunately the sample was small and therefore cannot be relied on with confidence. There is the potential for missing a disease specific improvement due to (i) the 'noise' or diluting effect of the causes of mortality not influenced by the intervention or (ii) if an epidemic of one of those other causes of mortality not influenced by the intervention counterbalanced the improvement due to the programme. However, there is sufficient evidence to indicate that crude death rate is responsive to changes in health status in comprehensive primary health care programmes.

9.2.8 Infant Mortality Rate

Infant mortality rate is defined as the number of infants dying under one year of age per thousand live births of the population per year. Infant mortality rate has long been regarded as one of the most sensitive indicators of general socio-economic levels of a nation\(^{41,67}\). Observations of long-term trends in infant mortality rates have revealed that they are inversely related to socio-economic levels.\(^{18,52,38}\) This insight is particularly
relevant when studying a developing country where the majority of rural people exist on subsistence level farming, and the infant mortality rate continues to remain particularly high. Whereas countries which have progressed to a mechanised agriculture and highly industrialized society have resulted in higher standards of living and remarkable decreases in infant mortality rates are observed.\(^{(97)}\)

Infant mortality rate could, therefore be regarded as a valid indicator of the socio-economic status of a country.

Numerous studies have also documented that the level of health is positively related to socio-economic status and infant mortality - as already indicated in an earlier chapter - higher socio-economic level is associated with better health status and lower infant mortality rates.\(^{(20, 69,57,52)}\)

Infant mortality rates can be regarded as effectively reflecting health status and general socio-economic levels especially in developing countries and thus can be safely considered a valid and reliable indicator of health status. Comprehensive primary health care activities carried out by the village health committee in our study are geared toward the overall development of these communities. Therefore, these improvements should reflect themselves in changes in infant mortality rates - as experienced already in Bumpe chiefdom, Sierra Leone.\(^{(29,36)}\) Therefore,
Infant Mortality Rate meets our criteria of sensitivity and responsiveness to change for a health indicator.

Infant Mortality Rate has already been validated in previous studies in Sierra Leone by Kandeh (53) and Okoye (76). However, it will be re-validated and tested for reliability in this study through the 'dual' recording scheme already referred to earlier. (109,13) Data on births and deaths will be registered prospectively at village level by a local literate person whose work will be monitored every three months by an S.E.C.H.N. At the annual house-to-house assessments in all study villages (experimental and control) all females (14-45) will be interviewed to assess the new births and deaths of infants under one year the previous year. Both methods together will enable validation of the time period within which infant deaths took place and the number of live births (criteria for same will be drawn up based on the chief medical officer's recommendations). (111)

Is Infant Mortality a reliable health indicator? From the literature already cited it would appear to be consistent in that high rates are always associated with low socio-economic development across the globe. However, it will be tested for reliability in this study through the above-mentioned dual recording method because of the present inaccurate and erratic method of health data
collection at national level in Sierra Leone. Pre-test measures of this study are based on information from several recent local studies carried out in Sierra Leone in the Northern and Southern Provinces \(^{(53,4,29,84,26)}\) - i.e. 300 per 1000 live births - in contrast with the official statistics given for Sierra Leone (200 per 1000 live births) which reflect deaths registered in Freetown, the capital area only. \(^{(71)}\) Post-test measures are based on the Sierra Leone studies already cited - i.e. 165 per 1000 live births. \(^{(53,4,29)}\)

The validity and reliability of the measuring instruments used to collect data on Infant Mortality Rate will be tested prior to the study. The pre-test and post-test measures will be tested in the baseline data and adjusted accordingly.

Both infant and general mortality rates have been selected as the endpoints in this study because of their qualities as appropriate health indicators. The proposed changes in these rates will be expected by the end of the study period - that is after four years.

However, the tasks of the Health Committees members are necessary to achieve the desired changes in our primary outcomes of interest. Therefore, activities of each committee member will also be assessed annually. This evaluation is considered important for workers
themselves, the local communities and health planners.

9.3 Proposed Intermediate or Process Outcomes

9.3.1 Nutritional Status

The National Nutrition Survey of Sierra Leone indicates that 24% of children 1-5 years suffer chronic undernutrition and 30% acute undernutrition.\(^{(72)}\) This is a serious problem at village level and results in children at high risk of death as shown by several prospective studies\(^{(56,95,80,83)}\) as well as leaving others vulnerable to infection.\(^{(89,83,68,105,49)}\) Therefore, nutrition which has been demonstrated to be a problem of sizeable dimensions in rural Sierra Leone\(^{(72,4,29,26)}\) will be tackled by the village health committee through health education, provision of adequate and nutritious food for all. The results of their work will be assessed through evaluating nutritional status.

Anthropometric indices have been chosen to measure the nutritional status of children under five years. These measures are proposed because they are quantifiable, objective, rapid and relatively simple, for use at the community level\(^{(49,83,90,42)}\) in comparison with the other methods of measurement used such as clinical and biochemical. They have been used in several communities in developing countries including Sierra Leone very successfully.\(^{(4,72,29,26)}\)
Protein calorie malnutrition is a nutritional condition which results from deficiency in protein and/or calories utilised by the body. Children with a protein calorie malnutrition have a low weight or height for their age. The use of anthropometric measurements indicate the presence and severity of undernutrition.

Two indices of nutrition will be chosen:
1) Weight-for-height - will be used to detect acute undernutrition. (72, 49)
2) Height-for-age - will be used to detect chronic undernutrition in the community. (72, 49)

Significance of height as a measure of malnutrition has been critically reviewed by Waterlow (1972, 1973, 1978) (109, 110) who is in general agreement with Seoane and Latham (90) that height for age can be regarded as a valid and reliable indicator or predictor of long term previous dietary history as opposed to weight for height which reflects the present nutritional status of the child. Thus the combination of both methods for a community nutritional assessment will enable the valid and reliable detection of both present nutritional status and previous dietary history of all children in the community.

Weight-for-Height: Weight is the body mass whereas height measures the length of the body skeleton. (38)
When a child experiences an acute period of nutritional deficiency there is a reduction of muscle and fat while height remains unaffected - weight is reduced during this period. This, in turn, means that the relationship of weight-to-height has changed. With recovery this ratio of weight to height returns to "normal".\(^{(108, 110)}\) This index is valuable because it is independent of age - an asset when precise age is difficult to determine.\(^{(49)}\) A child weighing less than 80 per cent of standardised weight-for-height (used as a reference in this study will be that of the "National Nutrition Survey"\(^{(72)}\)) will be classified as acutely undernourished.

Height-for-Age: Height-for-age relates to chronic undernourishment.\(^{(49)}\) Prolonged periods of undernourishment will affect a child's height to the extent that he will fail to increase in the normal way. This is the result of undernourishment - an indicator of chronic undernourishment. Height-for-age of the child is compared with the standard height for age of a child with the same of age which is used as reference for the community. This index requires precise estimates of age. Calendars of local events will be used in the absence of Under Five cards in the proposed study to enable precise estimates of age of children. A child measuring less than 90% of the expected height-for-age will be classified as suffering from chronic undernutrition.
Thus the proportion of children in the community who are underweight and underheight give an estimate of the prevalence of acute and chronic undernutrition respectively.

Nutritional Status of under five children will be assessed annually through house to house assessments where all under five children will be weighed and their heights measured by the S.E.C.H.N.'s. These measures will be recorded for each child along with his age. The nutritional status of all children in the community according to their age group will be determined later by the researcher.

S.E.C.H.N.s will be trained to achieve acceptable level of reliability in carrying out the weighing and measuring of children - as well as in assessing the child's age. (90% with observer agreement, Kappa > .65) A local events calendar will be used for assessing age. (See Appendices 6 and 7, pp. 188 and 189.)

9.3.2 Immunization Rates in Children Under Five Years

Communicable diseases contribute a major share of morbidity and mortality in rural areas of Sierra Leone. Measles, neonatal tetanus and whooping cough alone account for over two-thirds of all mortality in children from 1 day to 5 years old. (65,53,29) There are available efficacious vaccines against whooping cough(1,45), polio(45,5),
smallpox\textsuperscript{(45,5,100)}, and tuberculosis\textsuperscript{(45,66,99)} nowadays which when used in an effective and well-organized manner can reduce the incidence of all of these diseases considerably. This in turn will reduce the mortality rates -- especially in young children.

A comprehensive primary health care programme where infectious diseases have such high rates could not function in a truly preventive way unless it involved itself in the use of immunization. Schedules for immunizations per age group have been successfully drawn up already in parts of Sierra Leone as elsewhere in the developing countries so that a mother does not have to return with the child for each individual vaccination. Rather, some vaccinations are given in combination at safe intervals apart.\textsuperscript{(5)}

Therefore, immunization rates of all under five children who have completed the quota of vaccinations available for their age groups in the community will be determined. This should reflect the compliance of mothers to the education taught them by the health committee and will therefore be used as a measure of the results of the health committee's work. It has been used in Sierra Leone already and has been shown to be sensitive to changes in education programmes and availability of vaccines in villages.\textsuperscript{(84,29,26)}
Data on the immunization status of under five children will be collected at the annual house-to-house assessments. All under five children will be assessed by an S.E.C.H.N. through observation for scars of BCG vaccination), history of measles and assessment of under five card where immunizations are recorded. (See Appendix 8) Tests for reliability of these assessments for immunizations by S.E.C.H.N. will be carried out prior to the study.

9.3.3 Tetanus Immunization in Pregnant Women

As already indicated, neonatal tetanus is the cause of one-third of infant deaths in rural Sierra Leone. (53) An efficacious vaccine to prevent tetanus in the newborn has been discovered in several field trials before and after incidence studies (64,11,10) and a randomized control trial (75,74,73), through immunization of the mother prior to delivery. This vaccination against tetanus is available in Sierra Leone in the National Immunization Campaign. The schedule is three tetanus vaccinations for all pregnant women prior to delivery. The local midwife has the role of educating pregnant women on the value of these immunizations and should encourage their compliance.

Therefore, immunization status of pregnant women will be assessed - as an outcome measure of the work of the local midwives. Status will be determined as "appropriate"
when pregnant women have received the required number of vaccinations per trimester of pregnancy.

Data for this measure will be collected by the S.E.C.H.N. in the annual assessment through questionnaire and the use of the Antenatal card. Both methods will be assessed for validity and reliability in the pre-test prior to the study.

9.3.4 Outcome Measures for Environmental Sanitation

Environmental sanitation is considered to be a priority in any community health programme. It has been observed in several studies (mainly retrospective however) that deaths from cholera reduce from 70 to zero per cent \( (119, 7, 112, 19, 94) \), from other diarrheas 5 to zero per cent \( (58, 88, 35) \), from ascaris and other intestinal helminthes 50 to zero percent \( (55, 24) \) and 50 per cent reduction for schistosomiasis \( (51, 55) \) with the installation of water supplies and sanitation (indoor) in developing area \( (105) \). However, the provision of piped water supplies and indoor sanitation would cost millions of dollars and so will not occur in rural Sierra Leone in the immediate future. The alternatives are however, the use of safe and protected water sources and the use of latrines. In the past it has been unfortunate that these facilities were made available in villages in Sierra Leone without involving the local
community in their construction, or educating them as to the real purpose and the proper maintenance of wells and latrines. In many cases these were regarded as prestigious symbols and considered only for use by visitors to the village.

However, the health committee will have the task not only of educating other villagers about the value of a well maintained water source and latrines, but will be expected to give the lead in demonstrating their own belief in these facilities. The work of the health committee in the area of environmental sanitation will be assessed through a simple count and surveillance of maintenance of wells or water sources and latrines in the village. The standards and criteria already drawn up by the Sanitation Department of the Ministry of Health will be used for this assessment.

Included in environmental sanitation will be efforts at malaria control. While many countries have been very successful in eliminating or controlling malaria there are still parts of Asia and Africa where the prevalence of this disease remains. (114) Sierra Leone has a high prevalence of malaria - exact figures are hard to come by. In some areas of the country in a recent malariometric survey (62) the following results were obtained:
Average infant parasite rate: 77%
Average spleen rate (2-9) years: 64%

If these results are accurate then it indicates that malaria is holoendemic in the rural areas of Sierra Leone. An effective programme according to all recent studies in malaria control requires elaborate programmes of spraying and vector control. This is not within the budget of the Ministry of Health at present nor in the near future. Therefore, the only immediate action one can take at village level is to reduce the sources of potential breeding for mosquitoes. This task will be that of the health committee member in sanitation work. The protection of water and construction of latrines with cleaning of compounds should certainly contribute to the reduction of the mosquito population. The positive results of a similar programme has been experienced in the pilot project villages in Bumpe chiefdom by the villagers there, but of course the actual prevalence rate of malaria would require laboratory tests and involve problems of measurement. Otherwise this method would be the best one for measuring the possible reduction of the mosquito population at village level.

Thus the work of the Health Committee in sanitation will be assessed through the number and condition of latrines and wells/water sources constructed per thousand
population. This will be assessed by the S.E.C.H.N.'s annually through direct observation and the use of criteria (based on Ministry of Health standards) for judging the condition of construction. Reliability of S.E.C.H.N.'s judgment using this criteria will be pre-tested.

9.3.5 Referral Patterns

Most deliveries are normal in the rural communities of Sierra Leone. Eighty per cent of deliveries are carried out by traditional midwives or "grannies" as they are called locally. \((61,111)\) However, it is estimated that one-third of deaths in women of childbearing age in Sierra Leone are caused by problems related to childbirth \((71)\). It is further estimated that 20% of deliveries have complications requiring hospitalization. \((71)\) These estimates however are based on statistics recorded in Freetown and the bigger urban areas. Whereas in other rural areas of Sierra Leone a greater majority of pregnant women attending antenatal clinic are perceived as "high risk" as defined by the criteria set up by the Chief Medical Officer's recent publication in maternal and child health care. \((111,61,4)\) Of course, these refer to clinic based patients and cannot be considered as truly representative of the total rural population.
Sierra Leone's high complication rate is similar to that of many developing countries. One method to improve the situation has been proposed by World Health Organization and introduced by several countries\(^{(3,104,77)}\) which involves re-educating the traditional midwives so that they are trained to recognize and refer the high risk pregnancies to the nearest hospital. Few of these interventions have been assessed objectively. In the Bumpe chiefdom of Sierra Leone the pilot villages with health committees did experience an improvement in referral patterns.\(^{(4)}\)

It is the role of the local midwife (who is on the health committee) to educate pregnant women on the value of antenatal clinic visits, that of immunization schedule against tetanus, and the need for hospital deliveries where women are at "high risk." Recognition of "high risk" pregnancies and their early referral to hospital have been considered an essential element in the education of the local midwife in Sierra Leone\(^{(111,29)}\) by primary health care planners. Therefore, assessment of the change in referral patterns of this re-education of the local midwives will be carried out in this study by assessing the referrals of pregnant women.

Data on the referrals of pregnant women by midwives will be collected by S.E.C.H.N. annually. Referral
slips which are duplicated in the village recording book in the experimental group will be used to assess the number of appropriately referred pregnant women. Criteria for judgment of 'appropriate' based on 'high risk' symptoms will be used employing the Chief Medical Officer's criteria for 'high risk.' Referral slips will be collected by the S.E.C.H.N. while the blinded assessment of referrals will be done at the research centre.

9.3.6 First Aid Person

It was observed while working with communities in the pilot project at Bumpe that persons who used the local hospital a) usually arrived at a late stage in their illness which b) in turn meant that they were at much greater risk, and c) their families had costly bills to pay for the extra drugs required, longer hospital stay etc. This late use of hospital has resulted in the loss of young lives due to ruptured hernias (a very common complaint in Sierra Leone) or tuberculosis in its late (and sadly undiagnosed until now) stage. Therefore, it was decided to educate an interested person from the community to recognize signs and symptoms which require immediate medical attention. He was also educated as to the importance and responsibility of persons who were on long term drug therapy to attend clinic regularly.
The method proposed to assess the First Aid Person's performance in his duty as a health committee member will be based on that found to be useful in Bumpe. For this study the performance of this member will be judged on:

a) His method of referring sick villagers to clinic or hospital (i.e. were they sent as soon as they showed certain signs and/or symptoms) based on the criteria drawn up for him.

b) Was the advice he gave appropriate for the different cases e.g. snake bite, burns etc. - these also will be judged on criteria already set up for him.

Data to assess the above measures will be the referral slips made out by the First Aid Man (which are duplicated in the village records) on referral of the villagers to clinic or hospital. These slips will be followed up by the S.E.C.H.N. annually who will report the diagnosis of each patient from the hospital charts. Judgment on the appropriateness of referrals and the advice administered to the villagers will be made (using the pre-determined criteria given the First Aid Man) at the Research Centre. Reliability of S.E.C.H.N.'s extraction of diagnosis from the hospital chart - and the assessment of appropriateness of referrals will be carried out.
9.3.7 Vegetable Gardens

As already referred to the high prevalence of protein calorie malnutrition is of grave concern to health personnel in Sierra Leone.\(^{(72)}\) While it is believed by many prominent specialists in the area of nutrition that malnutrition is often not directly related to lack of food \(^{(49,108)}\) it has been the direct experience of health workers in Sierra Leone that the type of food given children is inappropriate and not sufficient.\(^{(4,91)}\)

Therefore, if one is to ask mothers and families to feed their infants and children certain nutritious foods these must be available in sufficient quantity in the community. From observations of several chiefdoms in Sierra Leone\(^{(4,91,26)}\) there was a shortage of nutritious foods for family consumption.

As a result of this experience a component consisting of agriculture was included in the village health committee concept. The job of the agriculture person on the committee is to advise and encourage villagers to grow their own foods for consumption. The direct outcome of this work should be an increase in the number of vegetable gardens both within the village compound and in the schools. Therefore, the number of these gardens (per population) containing specified crops and vegetables
will be used as a measure of agriculture person's work in the health committee.

9.4 **Issues in Collecting Data**

9.4.1 Bias in Collecting Data

Bias can be defined as a "process at any stage of inference tending to produce results that depart systematically from the true values."\(^{(70)}\) While methodological issues are important to the scientific running of control trials, bias at several levels can interfere with assessment of the truth. The following are some of the major biases in randomized control trials - though there have been at least thirty-five biases identified by Sackett which can arise in sampling and measurement.\(^{(85)}\)

9.4.2 Expectation Bias

Expectation on the part of researcher or subject may influence the-accuracy of reporting results on the part of either to coincide with their prior expectations.\(^{(16)}\) In this study this type of bias might occur if the S.E.C.H.N. working with the health committee was the person to assess any of the outcome measures for the study. He may favour the health committee approach and so his reporting of results might reflect this attitude. Therefore, all assessments on outcome measures will be assessed by
a group of visiting S.E.C.H.N.'s as well as blindly by
an independent assessor of the research team.

9.4.3 Instrument Bias

Instruments which are deficient (even very
slightly) can create systematic error and bias results. Instruments such as questionnaires and interview schedules should therefore, be tested for reliability and validity. All the instruments used to collect data in this study (data forms, questionnaires etc.) will be pre-tested to assess reliability and validity of each.

9.4.4 Treatment Biases

a) Because of personal preferences for a particular treatment or programme, the outcome results may be biased toward the preferred treatment or programme. The danger of this occurring in this study is anticipated by assessing both control and experimental groups with objective and reliable measures using blind assessors in all outcome measures for both groups and monitoring the groups in equal amounts.

b) Large numbers of individuals administering the treatment or manoeuvre may influence the trial results because of large variations between them in adhering to the protocol. This could be a real source of bias in our study because of the problem of eleven S.E.C.H.N.'s
administering the manoeuvre. Therefore, careful training in the steps of the manoeuvre for both experimental and control groups will be given to the community nurses using a detailed manual giving clear, precise instructions. Regular supervision of the S.E.C.H.N. will take place - which will include spot checks on the study site as well as monthly meetings to report progress, feedback on problems, queries, etc.

9.4.5 Collection of Data

Most of the data needed for the proposed study will be collected at village level. This will be done on a house to house basis once a year in all villages (both experimental and control villages. Collection of data in control villages will be done in conjunction with the immunization campaign). Prior to the introduction of the manoeuvre, baseline data consisting of a census with mapping of villages and geographic location of each family and household will be done in all study villages. Each person, their age (using a local events calendar when necessary) and sex will be recorded. Standardized forms will be used (see Appendices) to collect data on

1) Births - for the past year (or two seasons, dry and wet)

2) Deaths - for the past year.
3) Information on Sanitation and Gardening.
4) Immunization status of all under five children.
5) Nutritional status of all under five children.
6) Information on pregnant women.

This information will then be measured each year at
the same time of the year for the next four years.

Staff - Data will be collected at village level by
the State Enrolled Community Nurses who have training in
the methods of collecting such data in the community and
its clue. While one S.E.C.H.N. will be employed by the
Ministry of Health for each chiefdom in the study, the
annual community assessment will be done by a group of
visiting S.E.C.H.N. student nurses. This group will be
from outside the chiefdom area and therefore less likely
to be interested in the study outcomes than the S.E.C.H.N.
locally employed. This procedure has already been tried
out very successfully in other areas of Sierra Leone and
been very reliable. (36,26,105)

Data on referral patterns at hospital and health
centres will be collected by the S.E.C.H.N. employed in
the chiefdom under the training and guidance of the proj-
et director and assessed blindly at the research centre.

9.4.6 Control for Variation

There will be several attempts at different levels
to control for variation in the collection of data as
follows:
1) Seasonal variation - In order to control for seasonal variation in diet patterns, mobility patterns, illness etc. the annual collection of data will take place at the same period of time each year. This period will extend from June to August and all villages for the study will be assessed within this period. This coincides with the rainy season when all people are involved in their farms and so are not as mobile as at other times of the year. It is also the time when there can be food shortages experienced. The incidence of fever is high at this time too due to an increase in the mosquito population which flourishes in the wet and dampness.

One problem which may have to be faced is problems with transportation at this time of the year. However, based on primary health care philosophy just as the patient from the village is expected to make it to the hospital when ill, so also the community health field staff are committed to walking the same distances the average person is prepared to walk for services.

2) Control for Variation in Resident Population - This will be catered for through registering all members of the community who reside for three months or longer in the village. This choice of time period (three months) will cater for visitors who may come to visit the village. It also includes those pregnant women who may return to their
mother's place for their pregnancy and delivery - as is customary.

Registration of new members to the community will be continued throughout the year by a member of the health committee. The S.E.C.H.N. will supervise him in this task - to ensure that the criteria for registration are followed closely.

3) Change in Under five children population throughout the period of the study - All children under five years of age will be registered and then checked for immunizations and nutritional status each year. As new babies are born they will be registered and included in the under five population. However, those children who have reached their fifth year will be excluded from the under five population the next year. The rates will then be based on all under fives for each year of the study.

4) Immunizations will be assessed through criteria drawn up in advance (see Appendix 8 ). The initial assessment will be the most difficult because of lack of standardized sources of data such as under five cards. However, the same criteria will be used in both control and experimental groups so that any discrepancies will be equally distributed across groups.

5) Nutritional status will also be carried out in a standardized fashion for weighing and measuring heights
as already tried and tested in the literature.\(^{49,83,90,42}\) Reference values for the anthropometric indices have already been drawn up for the National Nutrition Survey in Sierra Leone\(^{71}\) using healthy African children from the middle class families in the capital of Sierra Leone. These will be used as reference for the proposed study so that optimal weight and height will be represented by the median values of this population of healthy children. Unlike adults it is believed that young children with different ethnic origins but similar socio-economic backgrounds have similar body measures.\(^{88}\)

Spot checks will be carried out to assess the variation which may occur in instruments used and in the S.E.C.H.N.'s measurements of weights and heights. Even though the assessment of nutritional status is being pre-tested the possibility for variation in measurement in the field is great and should, therefore, be assessed. Pressures such as working late at night, dealing with large groups may cause variation in taking of measurements so regular spot checks are needed to ensure as much control in variation of measurement as possible. In the field the supervisor's measures of children will be used as a gold standard against which the S.E.C.H.N.'s measure will be assessed for observer variation when these random spot checks occur at the annual community assessments.
9.4.7 Pretesting

a) Each data form will be pretested for validity and reliability at village level by the S.E.C.H.N.'s. Villagers already known to the project director(s) will be used as subjects in the pre-test but S.E.C.H.N.'s will be blind to the data on the villagers. Face validity and content validity of the forms will be tested, revised if needed and tested again, in all the languages required for the study areas until a satisfactory level has been reached for all. Observer agreement between interviewers will be required to be above 80% before being acceptable. Agreement of less than 80% (of a Kappa of > 0.65) on any item will require the modification of the corresponding criteria or form. Further training will be done and retesting until the desired level of agreement is reached.

b) Assessment of age will also be pre-tested. The use of a local events calendar will enable the determination of ages in the villages. However, training for and pre-testing of the reliability and validity of this method is necessary. The S.E.C.H.N.'s will therefore be tested in their ability to use this method on a group of villagers whose ages are already known to the research team. As in the case of the data forms, questions will be checked for validity and reliability, changed tested and changed again.
until they are valid and reach the desired level of reliability.

c) Assessment of Immunizations will be done by observing for BCG scar and use of Under Five Cards. Reliability of S.E.C.H.N. in the identification of BCG scar will be assessed. Validity and reliability of under five cards as a data source will be assessed in an area where these are already in use, i.e. Bumpe chiefdom.

d) Pre-testing will also be done on the assessment of nutritional status using height-for-age and weight-for-height. A gold standard will be determined by using the measures of two senior registered nurses. These experienced women will be asked to measure the height and weight of a sample of village children (0-5) years. All measures upon which they agree will be used as the gold standard. The S.E.C.H.N. teams will then be tested taking measures of these same children, so that the inter observer variation can be assessed through checking the variation between S.E.C.H.N.'s on measurements of each child. The intra-observer variation will also be tested for each S.E.C.H.N. by having him measure the same child several times with time intervals in between.

Thus the variation in measurement testing can be assessed for each S.E.C.H.N. team to ensure they are
approximately equal across teams. Otherwise if some teams were to measure consistently lower or higher this could distort the results a lot.

Salter scales will be used to measure the weights of children because of durability, and being easy to carry and one can weigh children of all ages (under five) on them using a hammock. However, they need to be tested for reliability and validity. S.E.C.H.N.'s will be taught how to do this by weighing a child (on them) of known weight and noting any discrepancy and then adjustment will be made in the scales as needed.

e) Illnesses will be determined by the recognition of signs and symptoms by the First Aid Man. Nine common illnesses will be used - their signs and symptoms taught to five local villagers in a pre-test, then their recognition of these when exposed to hospital patients will then be tested for validity and reliability.

f) S.E.C.H.N.'s will be trained and tested for their reliability in extracting the diagnosis of referred villagers from hospital and clinic charts. Both inter and intra observer variation will be tested. The task involved requires the writing of the 'summary' from the chart onto a form. The pre-test for the S.E.C.H.N.'s reliability in doing this will be carried out with the use of hospital and clinic charts similar to those to be used in the study.
CHAPTER 10
ADMINISTRATION

10.1 Administration

Before the initial health survey, the project director with the District Officer will approach the chiefdoms in the study and meet the Paramount Chief for each area. The purpose and procedure of the study will be explained to the Paramount Chiefs and their advisory council. Their full co-operation will be solicited by the District Officer in his capacity as the central government representative. The Paramount Chief will in turn inform the town chiefs of the study villages about the forthcoming project. This procedure usually ensures a smooth execution of projects with active participation and co-operation of all those concerned. No consent forms will be required for enlisting villagers in the study once the required permission from the chiefs is granted.

Table 17 gives a description of the steps involved in the administration procedure of the study from its initiation to its completion. A research team will be engaged by the Ministry of Health who will plan, co-ordinate and monitor the study. This team will require
a principal investigator working closely with three senior public health nurses and an official representative from the Ministry of Health. The nurses will be experienced in both primary health care and field surveys, and they will be the supervisors of the project at provincial level. The representative from the Ministry of Health will handle the financial dealings. The role of the principal investigator will be to hold regular meetings, to plan each stage of the study, assess these stages as they occur with the team, ensure compliance with the protocol and make decisions when problems arise.

A statistician and research assistant will be employed to carry out the analysis of the study. The final report however, will be the responsibility of the principal investigator.
TABLE 17

ADMINISTRATION PROCEDURE AND TIME FRAME

6 Months Prior to Study

**STEP I**  - Decision to carry out proposed study by
              Ministry of Health, Sierra Leone.
              - Employment of Research Director and Team.

**STEP II**  - Hiring of S.E.C.H.N.'s
              - Pre-testing of Measuring Instruments.

**STEP III** - Sampling Procedure - Selection of study villages.

{ Assignment of S.E.C.H.N. to each chiefdom in study.
  Approach District Officer, Paramount Chiefs,
  District Medical Officers etc.

- Collection of Baseline Data in all villages and Analysis of Data.
<table>
<thead>
<tr>
<th>PHASE I</th>
<th>Study Period - Year I and II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year I</strong></td>
<td></td>
</tr>
<tr>
<td><strong>STEP IV</strong> -</td>
<td>Allocation of Manoeuvre to Experimental Villages.</td>
</tr>
<tr>
<td></td>
<td>Approach local Chiefs and Elders.</td>
</tr>
<tr>
<td></td>
<td>Education of local villagers on Health Committee role and function by S.E.C.H.N.</td>
</tr>
<tr>
<td><strong>STEP V</strong> -</td>
<td>Monitoring of Registration (Births and Deaths) in all villages by S.E.C.H.N. - 3 monthly intervals.</td>
</tr>
<tr>
<td></td>
<td>Supervision - (Monthly and spot checks) of S.E.C.H.N.'s</td>
</tr>
<tr>
<td><strong>STEP VI</strong> -</td>
<td>Annual house-to-house assessments by visiting S.E.C.H.N. Team.</td>
</tr>
<tr>
<td></td>
<td>Supervision of above - spot checks.</td>
</tr>
<tr>
<td></td>
<td>Collection of Referral Slips plus Diagnosis from Hospital/Clinic charts by S.E.C.H.N. - under supervision.</td>
</tr>
</tbody>
</table>
TABLE 17 (cont'd)

**Year II**

**STEP V**  - Repeated

**STEP VI**  - Repeated

**STEP VII**  - Analysis of Data on All Outcome Measures - Comparison between groups for Baseline and end of 2 years Exposure.

**PHASE II**  - Study Period - Year III and IV

**STEP V**  - Repeated for both years

**STEP VI**  - Repeated for both years

**STEP VII**  - Analysis of Data on the Outcomes at the End of Four Years for Both Study Groups.

**After Study Period - 6 Months**

**STEP VII**  - Continued

**STEP VIII**  - Conclusions and Final Report.
CHAPTER 11

ANALYSIS

11.1 Baseline Data

Baseline data will be analysed prior to randomization of the intervention to establish the rates of all outcome measures. Villages at chiefdom level will be assessed on all of these rates. It is not expected that there will be great variation between death rates, immunization rates and nutritional status at chiefdom level because of similarity in the health care available, environmental factors and agriculture. An exclusion criteria for selection of villages has been included to ensure that variation in death rates is not unreasonable as judged by the research team.

Analysis for the proposed study will take place on two occasions. The first after two years exposure to the intervention and the second after four years.

11.2 Analysis at the End of Phase I

At the analysis after Phase I we are interested in a comparison of primary outcomes and process outcomes of the experimental with the control groups. The null hypothesis is that there is no difference in the distribution of each rate between experimental and control groups. The
test of choice to test this hypothesis is the students t-test (p. 139, Colton(25)), which compares two independent means.

It is assumed that the distribution of death and (other outcome) rates will approximate a normal distribution. The t-test will be applied for each of the following outcomes - Crude Mortality Rate, Infant Mortality Rate, Nutritional Status, Immunization Rates in (0-5) year olds, Immunization Rates in pregnant women to test differences between experimental and control groups.

The conventional alpha level of 0.05 will be used for the study - this will be appropriately adapted for the five tests in Phase I and Phase II. This adjustment is made by dividing the chosen level by the number of comparisons to be done e.g. .05/5 = .01 so as to maintain the strength of the chosen level for each.(39)

11.2.1 Other Outcomes

Tables and graphs displaying frequency distributions of the number of latrines and gardens per 1000 population, and the condition of these based on pre-test criteria will be drawn up for experimental and control groups.
The number of referrals for (1) pregnant women, and (2) sick villagers will be assessed as appropriate according to predetermined criteria in the experimental villages. These results will be displayed in a Table along with the predetermined criteria.

11.3 Analysis at the End of Phase II

At the end of four years each outcome measure will be analysed again using the same test and methods as in Phase I.

The choice of a two-phase study was primarily to test the effects of time on the outcome measures of the study. Therefore, an Analysis of Variance with repeated measures will be carried out to look at differences in both experimental and control groups.
### TABLE 19

**CRUDE MORTALITY RATES FOR VILLAGES IN EXPERIMENTAL GROUP**

**AT PRE-STUDY TIME - AFTER 2 YEARS - AFTER 4 YEARS**

<table>
<thead>
<tr>
<th>Villages in Experimental Group</th>
<th>Time₀</th>
<th>Time₁</th>
<th>Time₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td>3</td>
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<td>8</td>
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<td>9</td>
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<td>10</td>
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<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 11.4 Interpretation

The presented evaluation design represents a randomized control trial to test the hypothesis regarding the effectiveness of village health communities in improving the health practices and ultimately the health status of rural communities in Sierra Leone.
For this study two groups were identified:

Phase I : Experimental
            Control

Phase II : Experimental
            Control

A clinically and statistically significant result for each outcome measure in the experimental group would indicate associations between that outcome measure and the village health committee's activities. So a clinically important improvement in an outcome measure for the experimental group would indicate a causal relationship between the improvement in the outcome measures and village health committees. Therefore, the achievement of the desired differences (improvements) in rates in the experimental group when compared with the control group would indicate the success of the village health committee approach as an effective method of health care in rural Sierra Leone.

11.5 Ethical Considerations

It is unlikely that this proposed study will meet any major ethical problems since no group is being deprived of health care.

Randomization of the programme is justified and feasible because of the need and timing. The Ministry of
Health are at the point where they wish to plan an effective primary health care system for the whole of Sierra Leone. No village will be included in the study unless there is the required negotiations and permissions achieved beforehand.

Confidentiality is not anticipated to be an ethical problem. Health personnel with access to patient charts will be committed to confidentiality. All other data will be general information on the community.

An economic analysis will be carried out in conjunction with the trial to assess the costs in terms of resources required - should the Ministry of Health decide to adopt this programme nationally.
11.6

**SUMMARY**

The current health problems in Sierra Leone reveal high morbidity and mortality rates. These are caused mainly by diseases which can be prevented. The use of institutionalized health care services does not meet the health needs of the rural population (80% of people) in Sierra Leone.

Several types of primary health care programmes addressing health problems in the community have evolved in different developing countries. Of these, the use of health committees at village level has proved promising in both Sierra Leone and other developing countries. This method is based on the traditional pattern of coping with problems in the rural Sierra Leone village. The evidence has led to the development of a randomized controlled trial designed to test the effectiveness of village health committees in improving the health status of rural communities in Sierra Leone.

Problems related to the use of death rates as health indicators and the accurate recording and collection of data at village level have been addressed. Plans to control for
variation so as to minimize the chance of bias across study groups have been prepared. It is hoped that the results of this study will enable the Ministry of Health to decide on whether to use village health committees as a national primary health care programme for Sierra Leone.
APPENDICES
APPENDIX 2

JOB DESCRIPTION OF THE HEALTH COMMITTEE
MEMBERS - SERABU HOSPITAL COMMUNITY
HEALTH DEPARTMENT

Chief: All matters must be referred to him and his permission sought when necessary.

Chairman: He is responsible for calling the members together for meetings. He chairs these meetings. It is with him, the nurse makes arrangements for extra meetings. He then informs the members of this information.

Clerk: 1) He makes referral notes for any villager going to hospital using a duplicate book, or for any other health business to do with the hospital and village.

2) He records all births and deaths in the village and shows these to the visiting nurse.

3) He records the minutes of the monthly committee meeting.

4) He reports anything of note in the village to the nurse e.g. visitors, new arrivals, families who have left the village permanently.

5) He delivers news of health interest to other villagers.
APPENDIX 2 (cont'd)

JOB DESCRIPTIONS OF THE HEALTH COMMITTEE MEMBERS (cont'd)

Sanitation Man:

1) To initiate and pursue the feasibility of portable water for the village.

2) To look out for help in this from M.O.W., Min. Energy and power, local sanitary men etc.

3) To seek help from the chief, government representatives etc. to ensure that the people have safe drinking water keeping in contact with the visiting nurse, each month and reporting progress.

4) When they are setting up latrines to meet with sanitary officials to decide on position and design of same.

5) To demand a certain amount of work completed e.g. wells, latrines or garbage pits per head of population by the end of each month, and to report on this to the visiting nurse.

6) To see that latrines and wells are used properly and kept clean when erected.

7) To study a set of basic lessons with the aid of the visiting nurse each month.
APPENDIX 2 (cont'd)

JOB DESCRIPTIONS OF THE HEALTH COMMITTEE MEMBERS (cont'd)

Midwife (or Midwives):

1) To know a definite set of lessons on hygiene and proper technique for normal delivery in the village.

2) To attend all deliveries in the village and refer cases when necessary.

3) To gather the pregnant women for A.N.C. and to see they all attend clinic at least three times during their pregnancy and receive Tetanus Toxoid.

Medicine Man:

1) To know basic lessons in First Aid, Hygiene etc.

2) To dispense Nivaquin, dressings, first aid etc. when needed in the village.

3) To be able to screen patients with T.B., Leprosy and Cholera and refer them.

4) To order the necessary Nivaquin and dressings from the visiting nurse when needed.

5) To keep in touch with the visiting nurse monthly and report any problems, difficulties and progress.

Child Care Woman:

1) To know a basic set of lessons.

2) To make home visits in conjunction with the
APPENDIX 2 (cont'd)

JOB DESCRIPTIONS OF THE HEALTH COMMITTEE MEMBERS (cont'd)

visiting nurse and follow up these families
during the month - reporting to the nurse on
progress when she next visits.

3) To get all the mothers to bring their children
to U.F.C. regularly and to attend at the U.F.C.
herself.

4) She is responsible for the Immunization of all
the children under five years.

Agriculture Man:

1) To know a basic set of lessons taught under the
supervision of an agricultural technician.

2) To act as a spokesman for the villagers concern-
ing agricultural problems such as pest control,
the need for fertilizers etc.

3) To explore improved marketing methods with the
assistance of the agricultural technician.

4) To act as a role model for the village by imple-
menting new agricultural techniques under the
guidance of the agricultural technician.

5) In those villages where a school is present, to
encourage the teachers and children in preparing
and maintaining a school garden in the absence of
the agricultural technician.
APPENDIX 3

LIST OF LESSONS TAUGHT TO FIRST AID WORKER

a) About all Medicines
b) Immunizations
c) Malaria-Nivaquine doses
d) Diarrhea and Vomiting
e) Fits
f) Broken Bones
g) Cuts and Ulcers
h) Tainting
i) Bleeding
j) Shock
k) Dog Bite
l) Snake Bite
m) Slings
n) Abdominal Pain
o) Burns
p) Foreign Bodies in Nose and Ears
q) Tuberculosis - Dry Cough
r) Leprosy
s) Constipation
APPENDIX 4

LIST OF LESSONS TAUGHT TO CHILD CARE WORKER

a) Home Visiting  l) Food and the properly
b) Attending Clinic  mixed meal
   c) Under Five Card  m) Fever
   d) Hand Washing  n) Low Blood
e) Boil Baby's water  o) Diarrhea
   f) Breast Feeding  p) Kwashiorkor
g) Cup and Spoon Feeding  q) Marasmus
   h) Constipation  r) Craw-Craw
   i) Hookworm  s) Tuberculosis
   j) Body Building Foods  t) Measles
   k) Feeding Children  u) Vaccinations
APPENDIX 5

SAMPLE OF LESSONS TAUGHT TO MIDWIFE

A) Why go to Antenatal Clinic?
B) When to Deliver in Hospital
C) Fever In Pregnancy
D) How to Prevent Fever
E) What to Do if you get Fever
F) Bleeding During Pregnancy is Dangerous
G) Swollen Feet
H) Low Blood
I) Tetanus
J) Diet in Pregnancy
K) Normal Delivery in Village
L) Preparation for Normal Delivery

A) Why go to Antenatal Clinic?

1. To make sure the mother is healthy.
2. To make sure the baby is healthy.
3. To make sure the baby is lying in the correct position.
4. To make sure that the woman will be able to deliver the baby without harm to herself or the baby.
5. To get tetanus injections - to help prevent tetanus.
B) When To Deliver in Hospital

In most cases a pregnant woman is able to deliver her baby without harm to herself or the baby. The times when she should deliver in hospital are:

1. Any bleeding during pregnancy or when labour starts.
2. Any woman who has had a caesarean section or any difficult delivery before.
3. If she bled a lot after the last delivery.
4. If she had a stillbirth before.
5. All very short women.
6. If baby is not lying in the right position.
7. If the mother's blood is low.
8. If the mother has swollen feet.
9. If possible all mothers having their first baby or a mother who has had more than 5 deliveries should deliver in hospital.
10. If the mother is a whole day in labour and making no progress.

C) Fever in Pregnancy

Fever during pregnancy is always dangerous.

1. Baby may die.
2. Baby may not grow.
3. Mother's blood may become low.
4. Mother may deliver baby before baby is big enough.
D) How to Prevent Fever

1. Come to clinic where fever tablets are given at each visit, or go to the member of your health committee who has fever tablets. (Nivaquine)
2. Make sure compound is tidy and no tins lying around where mosquitoes can live.
3. Cut bush around compound.

E) What to Do If You Get Fever

1. Take a cold bath.
2. Try and get fever medicine (Nivaquine) from health committee, shop, dispensary, or clinic.
3. If fever continues for a couple of days come to hospital.

F) Bleeding During Pregnancy Is Dangerous

If bleeding is only a little - rest, no hard work.
If bleeding continues - go to clinic.
If bleeding starts when the woman begins having labour pains she must be brought to hospital or nearest clinic immediately. She must be carried, and not walk.
So Act Fast - Get relatives - Get transport.
Never do vaginal examination on a woman who is bleeding.
G) Swollen Feet

Some women get swollen feet at evening time when they are pregnant. If this is gone in the morning time it is not serious. But, if the feet continue to be swollen all day this can be serious and the woman should go to clinic.

This woman will have to deliver in hospital.

She will have to rest a lot.

She will have to go often to clinic.

If she is left to deliver at home she may start fitting and 1. The baby may die.

2. She may even die herself.

H) Low Blood

Sometimes a woman may look pale when she is pregnant. She may also have swelly feet if the blood is very low. This may mean that she has not enough blood for herself and the baby.

Try and prevent this by:

1. Eating plenty of greens.

2. Preventing fever.

3. Going often to clinic.

If blood is very low she may need blood.

If not treated — 1. The mother may die.

2. The baby may die or be sickly.
1) Tetanus

Everyone knows what tetanus looks like. We have seen many babies die from this sick. Once a child gets tetanus you must bring him to hospital immediately so we can try to help him.

The best thing we can do for tetanus is to stop it from entering the body. This is why the belly woman should always come to clinic. There she will get injections to prevent her baby from getting tetanus.

When babies are born in the village there are some things the midwife should do to prevent tetanus.
1. Always wash hands very well before delivery.
2. Boil the string and the razor blade for a long time in water.
3. Never put native medicine or charcoal on the cord.
4. Put clean dressing on cord every day.
5. If the mother did not get 2 tetanus injections before delivery, bring the baby immediately to the nearest clinic or hospital.

REMEMBER - Come to clinic for injections.

Wash hands well.

Boil the string and the razor blade.
Tetanus is caused by a small germ that enters the baby's body when the cord is cut. If we keep everything clean and boil the razor blade this cannot happen. It is not caused by a witch or curse.

QUESTIONS
1. What causes tetanus?
2. How can you kill tetanus germs?
3. How can a belly woman get tetanus injections.
4. How should you treat the new baby's cord?
5. Show hoe you wash your hands before delivery.
6. What can you do to the razor blade and string to kill the germs on them?

J) Diet In Pregnancy

It is important that the pregnant woman eats good nourishing food during pregnancy. She must eat enough for herself and the baby who is growing inside her. Foods that are good for the pregnant woman are fish, greens, ground-nuts, and when possible meat, oranges, pawpaw, bananas and all types of fruit are also important for the pregnant woman.

QUESTIONS - 1. What types of food are important for the pregnant woman?
2. Why is it important for the pregnant woman to eat good food?
K) Normal Delivery in Village

As soon as woman arrives ask her:

1. How many children she has delivered.
2. Were they all normal deliveries?
3. How many children are alive?
4. How many stillbirths?

Observe size of woman - in case she is too small to deliver normally.
Observe general condition - especially see if she is anaemic.

L) Preparation for Normal Delivery

1. Make sure room is clean. Open windows to let in fresh air.
2. Keep for delivery only - walls whitewashed. Keep clean.
3. Sprinkle ground with water and sweep well.
4. Boil jar with tight fit lid, put in sun to dry - resting or table or chair not on ground. Wash cloth to use for cord and hang on line to dry in sun. When dry iron it. Wash hands - roll it and put in jar - put lid on, don't open.
5. Keep string and blade in bowl with lid.
6. Iron cloth again and put in jar when woman comes into labour.
7. Lay mat on floor and cover with a clean lappa. Place clean pillow for woman's head.

8. Ask woman to lie down. Do palpation and listen to foetal heart.

9. Wash hands well with plenty of soap. Do vaginal examination. If delivery time is not near allow time to walk around.


11. Have clean pieces ready for baby cord.

12. Have clean lappa ready to wrap baby in.

13. When the pains get strong - ask woman to lie down. Wash hands and repeat vaginal examination.

14. Observe anus - if stretching, woman is ready to push.

15. Make sure hands are well scrubbed with soap and water before doing delivery. Remove all rings etc.

16. Control baby's head coming out. Do not allow it to come too quickly.

17. When baby is delivered - lay on lappa beside mother. Assistant removes cover from container and midwife puts in her hand and takes out one string at a time to tie baby's cord.

1st string ½ inch from baby's skin.
2nd string ½ inch from the first.
3rd string ½ inch from the second.
Remove blade from container and cut cord between
2nd and 3rd string.
18. Bandage cord with clean pieces.
19. Wrap baby in clean lappa and give to assistant.
20. Feel woman's abdomen - if hard ball felt at umbilicus
   placenta is ready to come away.
21. Wash hands.
22. Press on umbilicus with hand and ask woman to push.
23. When placenta is delivered look at it carefully to
   make sure it has all come away.
24. Put in container for disposal. Plant!
25. Press once again on umbilicus to expell clots inside.
   If woman is bleeding rub up abdomen well until a hard
   ball (like orange) is felt. Keep rubbing until bleeding
   stops.
26. Remove soiled lappa from under patient. Place clean
   lappa under her and leave lying flat for one hour.
### APPENDIX 6
### LOCAL CALENDAR FOR CALCULATION OF THE AGES OF INFANTS

<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANUARY</td>
<td>New Year</td>
</tr>
<tr>
<td></td>
<td>Brushing begins</td>
</tr>
<tr>
<td>FEBRUARY</td>
<td>Brushing continues</td>
</tr>
<tr>
<td></td>
<td>Felling begins</td>
</tr>
<tr>
<td>MARCH</td>
<td>Felling continues</td>
</tr>
<tr>
<td></td>
<td>Burning begins</td>
</tr>
<tr>
<td>APRIL</td>
<td>Burning continues, ploughing begins</td>
</tr>
<tr>
<td></td>
<td>Serabu Jubilee</td>
</tr>
<tr>
<td></td>
<td>Death of President Tolbert of Liberia</td>
</tr>
<tr>
<td>MAY</td>
<td>Ploughing continues</td>
</tr>
<tr>
<td></td>
<td>Planting begins</td>
</tr>
<tr>
<td>JUNE</td>
<td>Weeding</td>
</tr>
<tr>
<td>JULY</td>
<td>Organization of African Unity</td>
</tr>
<tr>
<td></td>
<td>Weeding</td>
</tr>
<tr>
<td>AUGUST</td>
<td>Weeding</td>
</tr>
<tr>
<td></td>
<td>Ramadan</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>Fencing</td>
</tr>
<tr>
<td></td>
<td>Late September harvesting begins of early variety of crops</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>Fencing early October</td>
</tr>
<tr>
<td></td>
<td>Pilgrimage to Mecca</td>
</tr>
<tr>
<td></td>
<td>Harvesting</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>Harvesting</td>
</tr>
<tr>
<td></td>
<td>Pilgrimage from Mecca</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>Swamp Harvesting</td>
</tr>
</tbody>
</table>
APPENDIX 7

LOCAL CALENDAR FOR CALCULATION OF THE AGES OF ADULTS

1896 Hut Tax War. Governor Cardew proclaimed protectorate of the colony of Sierra Leone and imposed the hut tax. Karene and Port Loko refused to pay the tax and Bai Bureh was arrested.

1898 Major S. Morris declared Martial Law. War broke out and lasted for 6 months.

1899 Bai Bureh banished to Gold Coast.


1906 Bai Bureh reinstated as Chief of Kasseh Chiefdom.

1909 Bai Bureh died.

1914 1st World War (Kaiser War).

1939 The Great famine.

2nd World War (Hitler War).

1945 Return of soldiers after 2nd World War.

1947 Earth Tremor.

1948 Earth Tremor.

1957 1st general election in Sierra Leone.

1961 Royal visit to Sierra Leone, Queen Elizabeth II

1961 Independence.

1964 Population Census

Currency changed from British Sterling to Leones
and Cents.

1964 Eclipse of the sun.

Death of 1st Prime Minister of Sierra Leone, Sir Milton Margai.

1967 General election


1969 Railway finally abolished.

1970 All Peoples' Congress Government came into power under Siaka Stevens.

1972 1st ceremonial President Justice C.O.E. Cole.

1974 2nd Population Census.

Attempted and failed coup against President Stevens.

1977 Food and Agriculture Organization Conference.

1977 Student demonstrations.

# APPENDIX 8

## DATA FORM FOR FAMILY HOUSEHOLD - ANNUAL COMMUNITY ASSESSMENT

<table>
<thead>
<tr>
<th>Family Head</th>
<th>Head of Household</th>
<th>Date</th>
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</table>

<table>
<thead>
<tr>
<th>Address or Section</th>
<th>Address or Section</th>
<th>Village</th>
</tr>
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<tbody>
<tr>
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</table>

### Women (14-45)

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<tr>
<th>Household Mem. Names</th>
<th>Age</th>
<th>Sex</th>
<th>Pregn.</th>
<th>Ht.</th>
<th>Wt.</th>
<th>BCG</th>
<th>DPT&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>DPT&lt;sup&gt;(2a)&lt;/sup&gt;</th>
<th>DPT&lt;sup&gt;(3)&lt;/sup&gt;</th>
<th>Meas.</th>
<th>Polio</th>
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</table>
DATA FORM FOR FAMILY HOUSEHOLD

b) Interview with Women (14-45) years

No. interviewed - please (✓) per person

1. Did you deliver a live child in the past year? Yes No
   If 'Yes' ☑
   If 'No' go to Q. 3

2. Is the child still alive? Yes No

3. Did a child of your under 1 year of age die in the past year? Yes No

---

c) Interview with Pregnant Women

No. interviewed - please (✓) per person

1. When is your baby due? Jan Feb Mar April May June July Aug Sept Oct Nov Dec

2. Have you attended clinic or hospital since you became pregnant? Yes No
   If 'Yes' ☑

3. Did you receive a card to take home? Yes No
   If 'Yes' ☑

4. Will you get it please?

S.E.C.H.N. Tetanus Vaccination recorded on card? Yes No

5. How many were given? (√ appropriate box) 1 2 3
DATA FORM FOR FAMILY HOUSEHOLD

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Cause Given</th>
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</thead>
<tbody>
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</table>

**d) Deaths in the Past Year**

<table>
<thead>
<tr>
<th>Total Number</th>
</tr>
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<tbody>
<tr>
<td>[ ]</td>
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</tbody>
</table>

**e) Sanitation Assessment**

1. What is your source of drinking water from January to May (dry season)?

<table>
<thead>
<tr>
<th>Well</th>
<th>Spring</th>
<th>Stream/River</th>
<th>Swamp</th>
<th>Pipe borne</th>
<th>Other (specify)</th>
</tr>
</thead>
</table>

2. Using the following headings, describe the source, rate of flow, depth of source and potential pollution.

<table>
<thead>
<tr>
<th>Stagnant</th>
<th>Slow</th>
<th>Rapid</th>
<th>Deep</th>
<th>Shallow</th>
<th>Potential Pollution</th>
</tr>
</thead>
</table>

3. Does your household own a latrine? [ ] Yes  [ ] No

If 'Yes' who uses it?

<table>
<thead>
<tr>
<th>Strangers only</th>
<th>Adults only</th>
<th>Children &lt; 5 only</th>
<th>Everyone in house</th>
<th>Not in use</th>
</tr>
</thead>
</table>
f) Vegetable Garden

1. Do you have a vegetable garden?  
   [ ] Yes  [ ] No

   If 'Yes'

2. What Vegetables do you grow?

<table>
<thead>
<tr>
<th>Potato, Greens</th>
<th>Corn</th>
<th>Pepper</th>
<th>Groundnuts</th>
<th>Ocra</th>
<th>Egg plant</th>
<th>Other (specify)</th>
</tr>
</thead>
</table>

3. What do you do with these vegetables?

<table>
<thead>
<tr>
<th>Family use</th>
<th>Sell them</th>
<th>Both</th>
</tr>
</thead>
</table>
### APPENDIX 9

<table>
<thead>
<tr>
<th>Village</th>
<th>Name of Child</th>
<th>Father's Name</th>
<th>Mother's Name</th>
<th>Date of Birth</th>
<th>Sex</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>VILLAGE</td>
<td>YEAR</td>
<td>NAME OF VILLAGER</td>
<td>SEX</td>
<td>AGE</td>
<td>DATE OF DEATH</td>
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<tr>
<td>For S.E.C.H.N. Use</td>
<td>Hospital/Clinic Diagnosis</td>
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<td>NAME</td>
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<td>VILLAGE</td>
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<tr>
<td>PRESENTING COMPLAINT</td>
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<td>ADVICE GIVEN</td>
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<td>REFERRED BY</td>
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</table>

| MALE |

| FEMALE |

(If appropriate)
REFERENCES


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57. King, M. Medical Care in Developing Countries: A Primer on the Medicine of Poverty and a Symposium from Makere, Nairobi, Kenya. Oxford University Press, 1970.


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