



**LATIN AMERICAN AND CARIBBEAN INSTITUTE  
FOR ECONOMIC AND SOCIAL PLANNING - ILPES**

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**PROJECTS AND INVESTMENT PROGRAMMING DIVISION**

**GUIDELINES FOR THE IDENTIFICATION  
AND FORMULATION OF HEALTH PROJECTS**



# **PROJECTS AND INVESTMENT PROGRAMMING DIVISION**

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## **GUIDELINES FOR THE IDENTIFICATION AND FORMULATION OF HEALTH PROJECTS**



## TABLE OF CONTENTS

ABSTRACT .....	V
PREFACE .....	1
INTRODUCTION .....	3
1 BACKGROUND INFORMATION ON THE HEALTH SECTOR.....	7
1.1 INTRODUCTION .....	7
1.2 HEALTH AND ECONOMIC DEVELOPMENT .....	8
1.3 DESCRIPTION OF THE HEALTH SYSTEM.....	12
1.4 HEALTH SYSTEMS AND THE PROBLEMS THEY FACE .....	13
1.5 HEALTH POLICY .....	15
1.6 THE ROLE OF GOVERNMENT AND THE HEALTH MARKET .....	16
1.7 RESOURCES FOR HEALTH: INVESTING IN PUBLIC HEALTH .....	19
2 GENERAL CONSIDERATIONS .....	23
2.1 THE IMPORTANCE OF PROPER IDENTIFICATION, PREPARATION AND EVALUATION .....	23
2.2 ENSURING EQUITY IN PROJECTS .....	25
2.3 PROJECT CYCLE .....	27
2.4 PROJECT EVALUATION.....	31
2.5 PROJECT DEVELOPMENT IN THE HEALTH SECTOR .....	32
3 IDENTIFYING THE PROJECT .....	35
3.1 TYPOLOGY OF PROBLEMS.....	35
3.2 IMPORTANCE OF IDENTIFYING AND DEFINING THE PROBLEM ACCURATELY .....	35
3.3 TOOLS AND TECHNIQUES FOR IDENTIFYING PROJECTS IN THE HEALTH SECTOR.....	36
3.4 DESCRIPTION OF THE PROBLEM.....	40
3.5 ANTICIPATED EVOLUTION OF THE PROBLEM.....	44
4 DIAGNOSIS OF THE CURRENT SITUATION.....	45
4.1 IMPORTANCE OF THE DIAGNOSTIC STUDY.....	45
4.2 IDENTIFYING THE AREA TO BE STUDIED .....	46
4.3 IDENTIFYING THE ASSIGNED POPULATION .....	49
4.4 DETERMINING THE EXISTING SUPPLY OF HEALTH SERVICES .....	54
4.5 DETERMINING THE DEMAND FOR HEALTH SERVICES... ..	58
4.6 OTHER RELEVANT DATA .....	62
4.7 CONCLUSIONS OF THE DIAGNOSTIC STUDY .....	66

5 IDENTIFYING POTENTIAL SOLUTIONS.....	69
5.1 INTRODUCTION.....	69
5.2 PROJECTING DEMAND.....	70
5.3 OPTIMIZING THE PRESENT SITUATION.....	75
5.4 TYPES OF PROJECTS.....	88
5.5 GENERATING AND DESCRIBING ALTERNATIVE SOLUTIONS.....	80
6 ASSESSING THE OPTIONS.....	87
6.1 INTRODUCTION.....	87
6.2 IDENTIFYING AND ASSESSING BENEFITS .....	87
6.3 IDENTIFYING AND ASSESSING THE COSTS OF EACH ALTERNATIVE SOLUTION .....	91
6.4 CRITERIA FOR CHOOSING AMONG DIFFERENT OPTIONS .....	106
7 PRESENTING THE OPTION SELECTED.....	115
BIBLIOGRAPHY .....	121
GLOSSARY .....	123
ANNEX N° 1.....	125
ANNEX N° 2.....	131
ANNEX N°3 .....	145

## LIST OF FIGURES

FIGURE 1: LIFE EXPECTANCY AT BIRTH.....	7
FIGURE 2: COST OF MORBIDITY AND MORTALITY .....	9
FIGURE 3: IMPACT OF EDUCATION ON HEALTH.....	10
FIGURE 4: THE HEALTH SECTOR PYRAMID .....	12
FIGURE 5: COVERAGE AND DERIVATION ON THE HEALTH SECTOR .....	13
FIGURE 6: RATE OF RETURN AND CAPITAL ACCUMULATION.....	24
FIGURE 7: THE COST OF UNCERTAINTY .....	29
FIGURE 8: PROJECT STAGES AND STEPS, AND TYPES OF EVALUATION.....	31
FIGURE 9: PROJECT DEVELOPMENT IN THE HEALTH SECTOR .....	33
FIGURE 10: HEALTH SYSTEM LOCATION MAP.....	39
FIGURE 11: CLASSIFYING THE POPULATION WITHIN THE AREA OF INFLUENCE .....	51
FIGURE 12: CLASSIFYING THE POPULATION WITHIN THE AREA OF INFLUENCE .....	52

## LIST OF TABLES

TABLE 1: EXAMINATIONS PERFORMED FOR ASSIGNED POPULATION.....	55
TABLE 2: AVAILABILITY OF VARIABLE HUMAN RESOURCES .....	56
TABLE 3: AVAILABILITY OF SPACE .....	57
TABLE 4: AVAILABILITY OF EQUIPMENT .....	58
TABLE 5: ESTIMATED DEMAND FOR EXAMINATIONS.....	59
TABLE 6: VARIABLE HUMAN RESOURCES REQUIREMENTS .....	61
TABLE 7: EXAMINATION BOXES REQUIRED (VARIABLE SPACE) .....	62
TABLE 8: SUMMARY COMPARISON OF SUPPLY AND DEMAND (BY ESTABLISHMENT) .....	67
TABLE 9: PROJECTION OF ASSIGNED POPULATION.....	72
TABLE 10: DEMAND FOR HEALTH CARE.....	75
TABLE 11: VARIABLE SPACES, OR BOXES, PROJECTED TO YEAR X.....	82
TABLE 12: VARIABLE MEDICAL PERSONNEL .....	83
TABLE 13: VARIABLE PARAMEDIC PROFESSIONALS .....	83
TABLE 14 : VARIABLE PARAMEDIC AIDES .....	84
TABLE 15: ADDITIONAL ANNUAL OPERATING COSTS .....	102
TABLE 16: TOTAL ADDITIONAL COSTS OF TRANSPORTATION OF PATIENTS AND COMPANIONS .....	104
TABLE 17: TOTAL ADDITIONAL TIME COSTS .....	105
TABLE 18: TOTAL ADDITIONAL COSTS TO USERS .....	105
TABLE 19: SUMMARY OF COSTS OF PROPOSED SOLUTIONS .....	106

## LIST OF PICTURES

PICTURE 1: FOCUSING OF BASICAL NEEDS .....	24
PICTURE 2: PREREQUITES IN ACCESS TO HEALTH CARE.....	26
PICTURE 3: THE CAS DATE CARD .....	42
PICTURE 4: THE CASEN SURVEY.....	42
PICTURE 5: SISBEN .....	43
PICTURE 6: REDATAM +.....	74

## LIST OF EXAMPLES

EXAMPLE 1: INCREASED PRODUCTIVITY RESULTING FROM IMPROVED HEALTH IN INDONESIA.....	9
EXAMPLE 2: IMPROVED USE OF RESOURCES AS A RESULT OF IMPROVED HEALTH IN AFRICA .....	11
EXAMPLE 3: COST OF PREVENTION VERSUS COST OF TREATMENT: POLIOMYELITIS AND AIDS.....	11
EXAMPLE 4: INEFFICIENT ALLOCATION OF RESOURCES .....	14
EXAMPLE 5: THE INFORMATION GAP IN THE HEALTH MARKET .....	19
EXAMPLE 6: FOCALIZING RESOURCES: INVESTING IN THE PRIMARY LEVEL .....	20
EXAMPLE 7: RECURRING COSTS: TACK OF FINANCING IN RWANDA.....	20
EXAMPLE 8: CONSTRUCTION AND EQUIPMENT COSTS.....	34
EXAMPLE 9: CHOOSING THE RIGHT EQUIPMENT .....	34
EXAMPLE 10: IMPORTANCE OF IDENTIFYING THE MAIN CAUSE OF A PROBLEM .....	36
EXAMPLE 11: SECTORAL POLICIES AND PROJECT DEVELOPMENT .....	37
EXAMPLE 12: PROJECT DEVELOPMENT: USE OF REDATAM.....	40
EXAMPLE 13: PROJECT DEVELOPMENT: USE OF INDICATORS .....	43
EXAMPLE 14: CONSIDERING THE URGENCY OF THE PROBLEM .....	44
EXAMPLE 15: IMPORTANCE OF CONDUCTING A MULTI-SECTORAL DIAGNOSTIC STUDY .....	45
EXAMPLE 16: TAKING CARE OF THE FLOATING POPULATION.....	49
EXAMPLE 17: CLASSIFICATION OF THE POPULATION.....	52
EXAMPLE 18: CHANGES IN THE ASSIGNED POPULATION .....	53
EXAMPLE 19: CLASSIFICATION OF HUMAN RESOURCES .....	56
EXAMPLE 20: IMPORTANCE OF CONSIDERING THE EPIDEMIOLOGICAL PROFILE OF THE POPULATION .....	63
EXAMPLE 21: USE OF HEALTH INDICATORS.....	64
EXAMPLE 22: ENVIRONMENTAL HEALTH PROBLEM: POLLUTION IN SANTIAGO.....	65
EXAMPLE 23: ESTIMATING YEAR 1.....	70
EXAMPLE 24: ESTIMATING GROWTH RATE AND ASSIGNED POPULATION .....	72
EXAMPLE 25: REASSIGNING POPULATION .....	73
EXAMPLE 26: TOTAL AND ADDITIONAL EXAMINATIONS .....	75
EXAMPLE 27: OPTIMIZING THE PRESENT SITUATION .....	76
EXAMPLE 28: IMPORTANCE OF COMPARING POST-PROJECT SITUATION WITH OPTIMIZED PRE-PROJECT SITUATION .....	76
EXAMPLE 29: MULTISECTORAL APPROACH TO SOLVING PROBLEMS ACCORDING TO THEIR CAUSE .....	81
EXAMPLE 30: BENEFITS DEPEND ON WHETHER PEOPLE MAKE THE MOST OF THEIR IMPROVED HEALTH....	88
EXAMPLE 31: BASIC NEEDS AND TYPES OF PROJECTS .....	89
EXAMPLE 32: UPDATING PRICES.....	93
EXAMPLE 33: ASSESSING A PROPERTY .....	95
EXAMPLE 34: RESIDUAL VALUE OF PROPERTIES.....	95
EXAMPLE 35: COST OF REPLACING FURNISHINGS.....	98
EXAMPLE 36: COST OF INPUTS .....	101
EXAMPLE 37: ESTIMATING CNV .....	108
EXAMPLE 38: ESTIMATING IRR .....	109
EXAMPLE 39: MINIMUM COST.....	110
EXAMPLE 40: COST PER BENEFICIARY .....	111
EXAMPLE 41: ESTIMATING EYC.....	112
EXAMPLE 42: EQUIVALENT YEARLY COST PER TEST .....	113



## ABSTRACT

This publication contains a practical approach to the process of project identification, preparation and appraisal in the health sector. It offers guidelines and examples for the correct formulation of health projects. The basic intention is to provide a useful and practical manual to experts and public officials responsible for prepare and appraising health care projects.

The first chapter of the document presents some information taken from the World Bank report entitled "World Development Report 1993 " Investing in Health". In addition to presenting an overview of the health sector in developing countries, this report discusses the characteristics and problems of national health systems and outlines policies that can help improve the quality and equity of the services provided and the role that the government should play in regard to the market in order to achieve the objectives outlined.

The second chapter contains a discussion of the importance of project preparation and evaluation and of the concept of equity as it applies to the health sector, followed by a description of the life cycle of a project and an analysis of the special characteristics of health projects.

The third chapter stresses the importance of identifying the problem accurately and discovering its underlying cause. Tools and techniques that are helpful in this task are discussed. Finally, suggestions are offered on how to describe the problem and how to assess it and anticipate its end result.

Chapter four describes methods that can be used to prepare a proper diagnostic study. The elements that need to be considered in identifying the area to be studied and estimating the supply of and demand for health care in that area are discussed. Suggestions are made on how to calculate the deficit or surplus of health care and/or resources in the area analysed.

Chapter five shows how the conclusions of the diagnostic study can be used to find a solution to the problem or problems identified. This is done by visualizing the problem over the medium term, and determining what human and physical resources will be needed to solve it within that time frame. From that point, different actions can be identified that will make it possible to solve the problem, and the specific requirements for each one can be determined.

Chapter six identifies and quantifies the benefits and costs of each proposed solution. Different evaluation methods are discussed, so that the most suitable option, in terms of the country's growth and development, can be chosen.

Finally, chapter seven summarizes the minimum elements that must be included in the health project profile. The chapters to be included in the profile document are discussed, and the content of each is described.



## **PREFACE**

Like education, health is one of the basic pillars of investment in “human capital”. Moreover, given the unique nature and complexity of health issues, additional challenges must be faced in order to ensure that investments in this field are efficient and equitable.

There are a number of elements that further complicate decision making in the area of health. In the first place, because health care is a basic service, it is important to ensure adequate financing, in order to it accessible to the poorest groups. In the second place, health as such is a “public asset” the positive externalities of which are not always estimated accurately. Finally, in the search for quality services at a cost that the majority of the population can afford, ways must be found to balance state intervention with market participation.

For the reasons mentioned above, most of the governments of the region are promoting special strategies that are aimed at modernizing and improving efficiency in the allocation of resources. Hence, proper project identification, preparation and evaluation is crucial to such efforts. The guidelines set forth herein, which have been prepared by Pilar Contreras, consultant to ILPES, under the supervision of ILPES expert Eduardo Aldunate are designed to contribute to this end.

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ILPES



## Introduction

Throughout history, mankind has had needs and has required goods and services in order to meet those needs. The resources available to produce those goods and services do not always match the needs. Resources are scarce, and it is therefore important that they be used wisely in order to ensure that they will bring maximum benefit.

The satisfaction of needs helps improve the quality of life of all members of society, and this in turn generates increased demand for the production resources that make it possible to meet these needs. Investing in productive capacity causes it to increase. Moreover, the quality of an investment is directly related to how the available resources are allocated, and resources cannot be properly allocated unless suitable projects have been designed.

If a country is to achieve economic growth and development, however, it must not rely only on the quantity and quality of investment; its development and growth will also depend on the quality of its work force and the technology applied in production. Thus, the amounts that are invested and spent on education, on health, and on science and technology will be fundamental in sustaining a country's development within a framework of social equity.

Consequently, it will always be important to identify and implement good projects that can have a real impact on the beneficiary population, and this is a challenge that will have to be faced by the national authorities responsible for social services. Hence, the proper identification, preparation and evaluation of projects is essential in order to ensure that they have the desired impact on society.

This document, which is part of the efforts to strengthen this work, is designed to provide guidance in the process of project identification and preparation in the health sector by suggesting the minimum elements that need to be considered at each stage. The specific objectives of this set of guidelines are the following:

- (a) To offer guidelines and practical tools for the identification and preparation of health projects;
- (b) To describe the minimum steps that must be followed in health projects, as well as the content of each one; and
- (c) To propose a format to facilitate the presentation of health projects.

The guidelines were designed with a view to facilitating the work, in particular, of officials who are responsible for drawing up health projects at the level of primary health care, i.e., directors of health centres and units, administrators of low-resolution hospitals, and local administrative staff.

It should be noted that, although these guidelines refer to the preparation and evaluation of projects in the overall health sector, special emphasis is placed on investment initiatives at the primary level, since these projects are most often needed at the local level. However, suggestions are also made regarding the different aspects involved in preparing more complex projects.

This handbook is divided into seven chapters. The first includes general background information on the health sector, with a view to providing orientation on the problems of the sector and information on its organization and operation. The second chapter explains some general concepts relating to the importance of proper project identification and presentation, the stages in the life cycle of a project and the stages of different types of health projects.

The third chapter stresses the importance of clearly identifying the problem that has created the need for the project. The elements that facilitate proper identification of the problem are also discussed.

The fourth chapter covers the main points to be considered in making an accurate diagnosis of the current situation. This diagnosis should lead to the identification of the shortage or surplus of health care in the area under consideration.

Following up on the theme of chapter four, chapter five explains how to identify possible solutions to the problem detected and suggests ways to facilitate quantification in each case.

In chapter six, methods for evaluating each alternative are discussed, and indicators that make it possible to select the best project are described.

Finally, chapter seven discusses the presentation of the study report, once again stressing the main aspects that need to be considered in evaluating projects from the standpoint of their social implications.

In addition, three annexes are included which provide supplementary information to facilitate the preparation and evaluation of primary health care projects





# 1 Background information on the health sector

*The information provided in this chapter has been taken from the World Bank report entitled "Informe sobre el Desarrollo Mundial 1993. Invertir en a Salud".. In addition to presenting an overview of the health sector in developing countries, this report discusses the characteristics and problems of national health systems and outlines policies that can help improve the quality and equity of the services provided. The authors also discuss the role that the government should play in regard to the market in order to achieve the objectives outlined, and examine investments in public health.*

## 1.1 Introduction

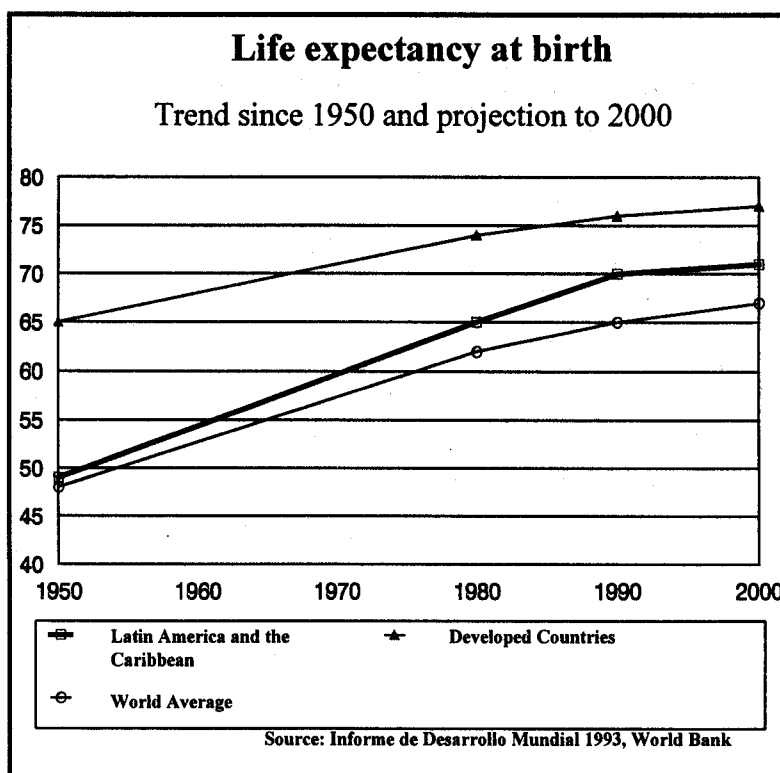
Over the last 40 years, life expectancy at birth has risen dramatically. Improvements in the health of the general population are reflected not only in greater wellbeing, but also in a reduction of the economic burden caused by the poor health of workers, in terms of absenteeism from the job and children's diseases and absenteeism from school.

These achievements have been possible partly because income and educational levels have improved worldwide, and partly because governments have been working to expand the scope of health services, which have also been enriched by new technologies.

However, the world is now faced with serious challenges in the field of health. Acquired Immune Deficiency Syndrome (AIDS) will take a terrible toll (approximately

1.8 million deaths per year by the year 2000) in the developing world, wiping out years of progress in the effort to reduce mortality rates.

Figure 1: Life expectancy at birth



There are three main factors that account for the improved health situation, as reflected in lower mortality rates. These are:

(a) Higher incomes

Higher income levels, especially among the poor, make it possible to buy more food and provide access to better housing and to health care services.

(b) Advances in medical technology

Scientific progress has expanded the range of low-cost practices and clinical treatment and the potential efficiency of health systems.

The impact of new health technologies also depends on factors such as the higher income levels of the poor, higher levels of schooling and public policies that have influenced the health system.

(c) Public health and dissemination of knowledge

The implementation of public health measures (potable water supply, sanitary services, etc.) has helped improve health conditions. Nevertheless, real progress was not possible until people began to understand the underlying causes of poor health.

## **1.2 Health and economic development**

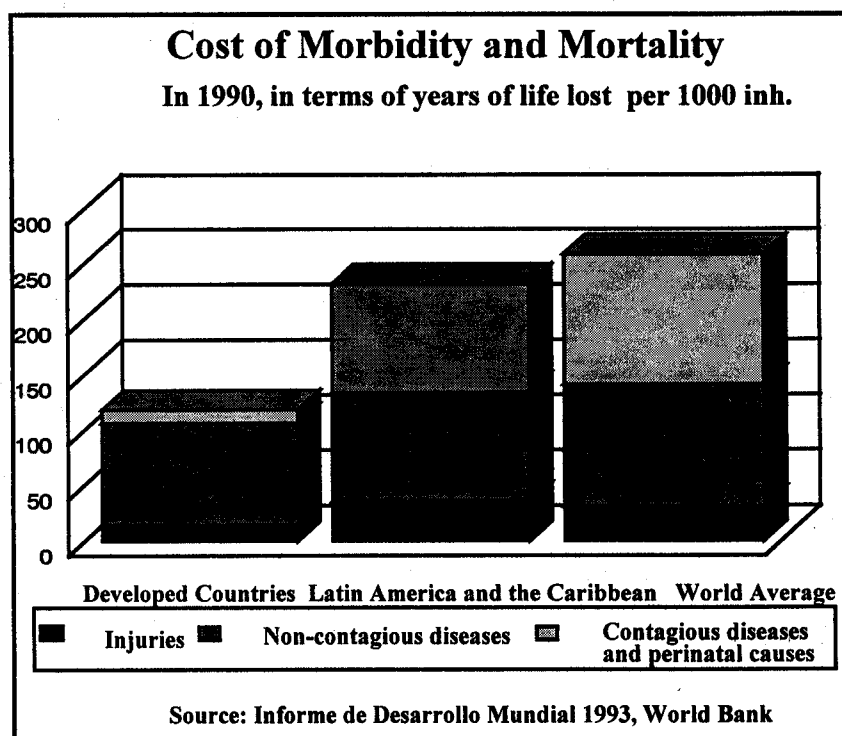
Good health is a fundamental goal of development, as well as a mean for accelerating it. Poor health has a detrimental effect both individuals and on family groups, and drains resources; it follows, therefore, that improving health conditions will improve the national economy.

It is a well-known fact that good health is essential to well-being; however, spending on health can also be justified on purely economic grounds. Improving the health of a country's population contributes to economic growth in four ways, as follows: production losses resulting from sick leave among workers are reduced; school enrolment and attendance improves, and children learn more resources normally used for treatment of diseases are freed for other uses, and natural resources that had been completely out of reach, because of disease, can now be used.

#### (a) Increased worker productivity

Worker productivity is improved as fewer work days are lost because of sick leave, workers are more productive on the job, they are able to get better-paying jobs, and they have longer active lives. Figure 2 shows the aggregate findings of a study conducted by the World Health Organization and the World Bank in order to quantify the loss of years of healthy life caused by approximately 100 types of diseases and injuries

Figure 2: Cost of morbidity and mortality



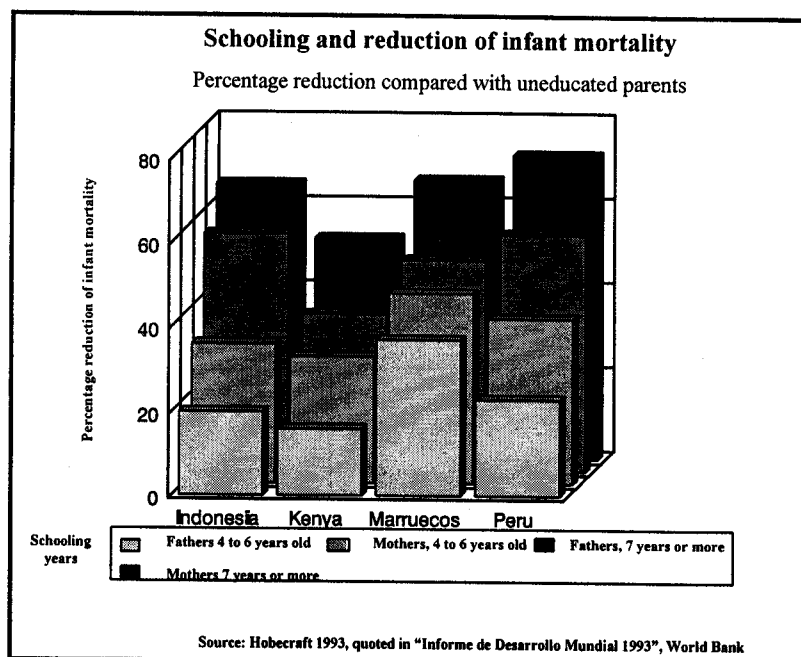
#### Example 1: Increased productivity resulting from improved health in Indonesia

*Studies conducted in Indonesia showed that iron deficiency anaemia caused by uncinaria ha reduced the productivity of construction and rubber plantation workers by almost*

*20%, compared with the productivity levels observed after the workers had been treated with iron supplements.*

**(b) Benefits to the next generation resulting from education**

It has been shown that there is a direct relationship between the educational level of the population and certain health indicators. Better education puts in motion virtuous circle of improved levels of health which in turn facilitate learning. This is clearly reflected in lower infant mortality rates that go hand in hand with improvements in the educational level of parents.

**Figure 3: Impact of Education on Health.**

Poor health and nutrition reduce the benefits of schooling in three regards, i.e., school enrolment, learning ability and participation of girls. Children who enjoy better health and are better nourished during early childhood can produce lasting problems, such as ferropenic anaemia, which slows down cognitive functions; iodine deficiency, which causes irreversible mental retardation, and vitamin A deficiency, which is the main cause of blindness in children.

Girls are particularly vulnerable to iodine and iron deficiencies, and this is why fewer girls finish elementary school. Other health-related factors that cause girls to drop out of school are pregnancy and parental concern about sexual violence.

**(c) Better use of natural resources**

Investing in health programmes aimed at eradicating or controlling disease allows for better use of certain natural resources that often remain underused because of the poor health conditions prevailing in the area.

**Example 2: Improved use of resources as a result of improved health in Africa**

*The onchocerciasis programme in Africa is a typical and well-known example of the benefits that can be obtained by improving the use of natural resources. This disease, better known as river blindness, is caused by a parasitic worm that produces millions of larvae that spread through the body, causing severe itching, general weakness and, eventually, blindness. The disease is propagated by a small mosquito that transmits the larvae from infected individuals to healthy ones.*

*Efforts to control this disease were begun in 1974 in seven countries in the Sahel region. The objective was to control the disease by combating the mosquito larvae with insecticides. In addition, infected individuals were treated in order to kill the larvae.*

*The programme has been highly successful. It now provides protection for nearly thirty million people, including nine million who were born after the programme began. More than 1.5 million seriously infected individuals have been completely cured of the disease. It is estimated that by the time the programme ends, it will have prevented blindness among approximately half a million people.*

*The impact on agricultural production has been equally significant. Approximately 25 million hectares of fertile land are now being planted that had been abandoned because of fear of the disease. This has all been achieved at an annual cost of less than one dollar per person. The World Bank estimates that the project will have a rate of return of at least 28%.*

**(d) Lower cost of medical care**

Money spent on reducing the incidence of disease can bring significant savings in treatment costs. This frees resources for use in other activities in the health sector or in other areas of economic activity. In the case of some diseases, the money spent on prevention is automatically offset by the results achieved, even though not all the indirect benefits of prevention programmes such as increased labour productivity and the alleviation of pain and suffering are known (see Example 3).

**Example 3: Cost of prevention versus cost of treatment: poliomyelitis and AIDS**

*The estimates made before poliomyelitis was eradicated from the Americas indicated that investing US\$ 220 million over a 15-year period in the eradication campaign would help prevent 220,000 cases, resulting in annual savings of between US\$ 320 million and US\$ 1,300 million per year in treatment costs. The net return on the programme, at a discount rate of up to 12% per year, was estimated at between US\$ 18 and US\$ 480 million.*

*Another case is that of AIDS, where prevention costs are much lower than the economic consequences of the disease. The latter are particularly high because of the fact that AIDS mainly affects adults who are in their most productive age, and the infections resulting from the disease generate a heavy demand for high-cost health services.*

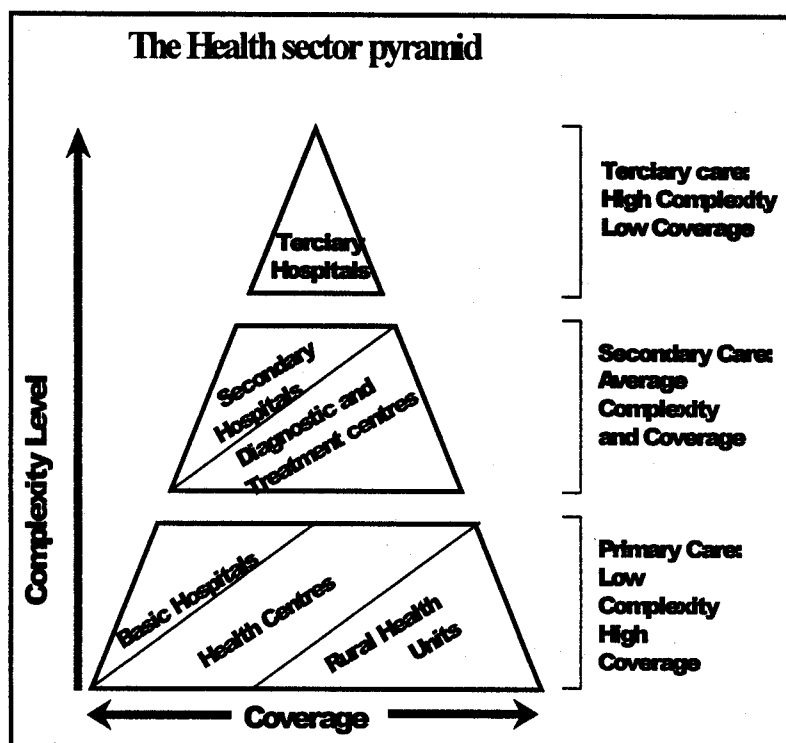
### 1.3 Description of the health system

The public health system is organized in pyramidal form, with the more sophisticated establishments (tertiary care) at the top and the less complex units (primary care) at the base of the pyramid.

Tertiary care hospitals provide highly specialized services within a closed system. It is in these establishments that most clinical research is conducted and training of health professionals and other workers is provided. These hospitals are usually located in large cities; given the specialized nature of their services, they do not provide wide coverage.

At the centre of the pyramid are hospitals of average complexity and open centres that provide specialized treatment and diagnosis. These establishments, which are located in medium-sized cities, usually have between 100 and 400 beds, serve populations of between 50,000 and 200,000, and provide medical treatment and surgical, pediatric, obstetrical, gynecological and dental services. They also provide anesthesiology, X-ray and clinical laboratory services.

Figure 4: The health sector pyramid



These secondary hospitals refer cases requiring hospitalization to the tertiary level (derivation). At the same time, the open treatment centres at the secondary level make referrals to hospitals at their own level.

Figure 5: Coverage and derivation on the health sector

At the base of the pyramid are three types of establishments that provide primary care, i.e., those that have a low level of complexity and provide wide coverage. Here may be found the rural health units that serve small rural communities; these have a paramedic on staff and are regularly visited by a doctor.

The primary health centres, both urban and rural, also operate at this

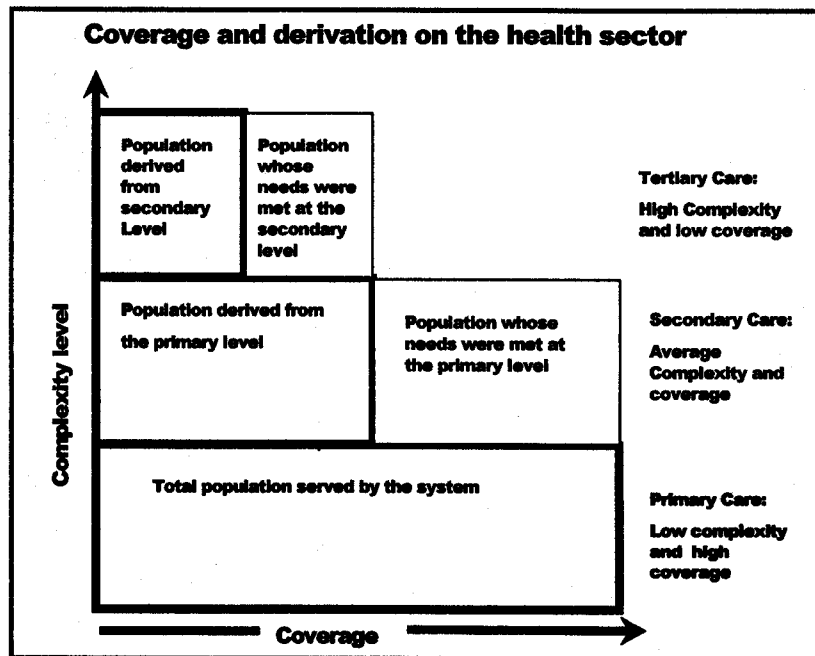
level. They are located in rural areas having a population of over 10,000, as well as in urban areas. These establishments, which provide open services, make up the first level from which patients are referred to more complex levels.

The closed treatment centres also operate at this level, and are usually located in rural areas having a population of over 10,000. They have 30 general-purpose beds, and are staffed by a general practitioner and a paramedic. They offer services in four basic fields, and provide only basic surgery; they also have an emergency service.

#### 1.4 Health systems and the problems they face

Although health care is only one of the factors that contributed to success in the past, there can be no question as to the important role they play in the developing world. Public health measures have led to the eradication of smallpox and have been fundamental in reducing deaths from childhood diseases that can be prevented by vaccination. As clinical services have been expanded and improved, millions of lives have been protected from the consequences of contagious diseases and traumas.

Nevertheless, health systems are faced with major problems which, if not resolved, will hinder efforts to reduce premature mortality and disability and to respond to new health problems and the threat of emerging diseases.



(a) Erroneous allocation of resources

Public resources are spent on health interventions that are not cost effective, while there is not enough funding for other priority measures that are highly cost effective.

**Example 4: Inefficient allocation of resources**

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*A hospital may take up to 20% or more of the budget of the Ministry of Health, even though most of the services it provides could be delivered at lower cost in less complex establishments.*

---

(b) Inequality

The poor have less access to basic health services, and the care they receive is of poor quality.

Public spending on health is disproportionately directed towards those who are better off financially, who receive health care for free or at rates that are lower than cost, in modern state hospitals at the tertiary level; in addition, they are subsidized by private and public medical insurance schemes.

(c) Inefficiency

Much of the money spent on public health is wasted. Brand name rather than generic medicines are purchased, health workers are poorly distributed and supervised, and hospital beds are underused.

(d) Explosion of costs

In some medium-income developing countries, health care costs are rising at a faster rate than income. The steadily increasing supply of both general practitioners and specialists, the availability of new medical technology and the growing use of medical insurance schemes that pay fees for services rendered have all worked together to generate increased demand for costly tests, procedures and treatments.



## 1.5 Health policy

Health conditions have improved throughout the world over the last 50 years. However, the achievement of a satisfactory level of health will depend on appropriate policies being designed that will allow for optimum use to be made of the resources that are invested in health programmes.

Countries can ensure good health for all if they bear in mind the following:

- Since overall economic growth and education are fundamental to good health, the countries need to implement appropriate macroeconomic policies that focus on reducing poverty. They also need to expand opportunities for basic education, especially for girls, who will eventually be using information and financial resources to make decisions relating to meals, fertility, medical care and other aspects that greatly influence the health of the family group.
- The governments of developing countries should reduce their current level of spending on interventions that are not cost effective, and they should double or triple spending on basic public health programmes, such as immunization and AIDS prevention, and on essential clinical services. A minimum programme, for example, might consist of treatment for sick children, family planning, prenatal and obstetrical care, and treatment for tuberculosis and sexually transmitted diseases (STDs).
- In order to improve quality and lower costs, the governments should encourage competition and diversity in the supply of services and inputs in the health sector, especially in regard to medicines, materials and equipment.
- The quality and efficiency of state health services could also be improved by considering decentralization, offering performance-based incentives to clinic administrators and doctors, and implementing training and management programmes.

In addition to the above general policy measures, the governments of the countries should also consider implementing public health measures such as the following:

- Providing low-cost but effective treatment for school children suffering from schistosomiasis, intestinal parasitosis and micronutrient deficiencies, along with teaching in schools about the human body and how to prevent health risks.
- Encouraging behaviours that are conducive to good health, among individuals and family units. This might include education about the benefits of nursing and about ways to promote healthy eating among children.
- Improving conditions in the areas where people live, especially for the poor, who are increasingly at risk because of deficient sanitary conditions, lack of potable water, poor hygiene and food preparation habits, garbage disposal problems, air pollution inside the house, overcrowding, etc.
- Disseminating information on hygiene and conducting effective campaigns to reduce the spread of AIDS.<sup>1</sup>

## **1.6 The role of government and the health market**

Governmental policies strongly influence spending on health programmes; however, policies on education, water supply, sanitation and other health-related sectors also affect the health of the general population, as do regulations pertaining to health care and other sanitary services.

Governmental policies also have an impact on health because they affect family income and educational levels, as well as on the financing of public health services and direct services.

Governmental action in the field of health should be guided by the following three economic considerations:

---

<sup>1</sup>

Conservative estimates by WHO indicate that by the year 2000, 26 million people will be carriers of the human immunodeficiency virus (HIV).

- The poor cannot always pay for health care, which would improve their productivity and well-being. Investing public funds to improve the health of the poor population can reduce poverty or at least mitigate its impact.
- Some health programmes benefit society at large or generate positive externalities. This is something that private markets do not accomplish, and even if they did, their action would be insufficient in this regard.
- In view of the deficiencies of the health care and medical insurance markets, government intervention is needed in order to improve living standards through improvements in the operation of these markets.

Governments have an obligation to ensure that public financial resources for the health sector are properly spent. This means that resources must be allocated in such a way as to obtain maximum results in terms of improved health for each dollar of public funds that is spent, bearing in mind the response of the private market to spending in the public sector. In this regard, government must be prepared to provide information and incentives to improve the distribution of resources by the private sector as well.

In most of the countries of the region, substantial improvements in health levels can be achieved with low-cost care, without being necessary to spend large amounts or set up high-level specialized medical facilities. Nevertheless, even though the governments agree that the State should guarantee access to certain basic public health services for the entire population, few of them actually achieve this objective, inasmuch as coverage is very low or non-existent in many regions. As far as clinical services are concerned, the main weakness of most governments has been that they have tried to provide everything for everybody, without making any distinction between services that are essential and those that are optional, and without assigning priority to helping the most needy patients.

Most governments do not do a good job of regulating the market for private services, including medical insurance. However, if more use were made of private clinical services, this could help improve the effectiveness of the system. The private sector is already serving a large and diversified clientele in the

developing countries, and private health services are often better, since they are not plagued with the long waiting lines and the shortage of materials and inputs that are frequent in state hospitals.

Regulation is an essential element of governmental efforts to encourage the private sector to offer health services. In the case of profit-oriented institutions, for example, governments must find a way to change the tendency to prescribe expensive medicines and to require an excessive number of diagnostic tests and other procedures.

State regulation of insurance schemes is also important. In most of the countries, part of the population is refused medical insurance because of certain prejudices that are prevalent among the insurance companies. Insurers make an “adverse selection” because of the different risks that people face. Insurers are mainly concerned with identifying high-risk clients who would be likely to use the system more with a view to excluding them or compensating for the added risk by charging higher premiums.

In addition, certain insurance plans actually increase the cost of health care. This is true especially of third-party systems and those that reimburse hospitals and doctors for each and every service provided, on an item-by-item basis. Moreover, since insurance lowers the financial cost of illness, people may tend to be less careful of their health, thus increasing illnesses and the need for care. The practice of transferring costs to others (in this case, to insurers) is referred to as moral risk.

Thus, adverse selection and moral risk both have a more serious impact on the medical insurance market than on other sectors of the economy, such as housing or automobile insurance. The limitations on moral risk and adverse selection that are applied to other types of insurance are less effective in the case of medical insurance. There is no market value for the human body nor is there any way to replace it with a new one when it wears out. The fact that there is no natural limit on costs is what makes health care different from other insurable risks (no price can be assigned to the human body for purposes of comparing costs).

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**Example 5: The information gap in the health market**


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*If a patient knew the outcome and the cost of every possible treatment to be considered, he/she could make a rational decision about the advantages and cost of each one. However, patients do not have access to such information, while doctors know much more than their clients. This information gap shows that health care personnel are not*

*merely service providers. There is a conflict of interest between what a health professional can earn by selling more services, and his/her duty to do what is best for the patient. The situation is even more serious when the patient is too sick to make a decision, or when a decision must be made quickly in order to save a life.*

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These situations reflect a problem that is very common in the health sector, where spending on medical services can be very high without all the necessary services even being provided; on the other hand, the usefulness of many of the services that are paid for is questionable. Some people are refused insurance, while other may be over-insured. To a large extent, the whole society pays for the excessive cost of health care.

### **1.7 Resources for health: Investing in public health**

Over the last few years, the developing countries have made significant investments in health care. They have built hospitals and other establishments and purchased equipment. They have trained doctors, nursing personnel and other health professionals, and have created new systems for supplying medicine, for conducting research and for disseminating information.

However, not all the resources allocated for health services have been well spent, inasmuch as many of the programmes could have been implemented at much lower cost. In virtually every developing country, establishments, equipment, human resources and medication tend to be geared towards highly complex health services. Yet public health and clinical services are most efficient at the level of low-complexity establishments.

The fact that public health services are often provided in high-resolution establishments only increases cost without improving quality. The best way to support essential clinical services is to invest in health centres and low-resolution hospitals and make these services accessible to areas that are not well covered. Channelling public expenditure towards lower level establishments is politically difficult, but some countries are making progress in that direction.

**Example 6: Focalizing resources: investing in the primary level**

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*In Papua, New Guinea, over the last ten years, public spending on hospitals has been limited to 40% of the regular budget of the Ministry of Health. This is much lower than the share budgeted by most developing countries, where hospitals account for between 40% and 80% of public spending on health.*

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In public health budgeting procedures, there is often some confusion regarding the real cost of health care establishments, so that resources are invested in large hospitals at the expense of the lower-level centres, which cannot be put into service because of a shortage of funds for recurring expenses (regular operating costs).

**Example 7: Recurring costs: lack of financing in Rwanda**

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*In Rwanda, a 200-bed hospital was completed in 1991. However, it is still not providing services to the population, because no funding has been available to meet the high recurring expenditures involved, which are estimated at 15% of the total annual budget of the Ministry of Health.*

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This is not to say that it would be wrong to allocate resources for tertiary establishments. Among other reasons, such spending is justified by the fact that these hospitals support research and training; however, the amounts budgeted for this level of health care should be much lower than it is at present.

As mentioned earlier, resources for health care need to be allocated with special regard for the poor, in order to introduce the dimension of equity in health services. The lack of infrastructure for the poor, especially in rural areas,<sup>2</sup> is the greatest obstacle preventing them from using health services. The distance they have to travel to get to a health establishment makes it difficult for them to seek medical care, especially when transportation is inadequate.

It is also important to consider ways of improving the productivity of installed hospital capacity before deciding to invest in new infrastructure. In addition to implementing reforms relating to hospital financing and management, efficiency can be improved by adopting measures such as the following:

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<sup>2</sup> There is usually a strong bias in favour of investments in health infrastructure in the urban areas.

- Part of the intensive-care capacity of more modest establishments might be used to accommodate patients who require lengthier but less intensive care, or for patients with chronic illnesses. In terms of cost per day per bed, such establishments are less expensive than the specialized ones. Since there are very few of the more modest establishments, patients occupy high-cost beds in intensive care units.
- Diagnostic procedures could be carried out on an outpatient basis, before patients are hospitalized.
- For certain illnesses, home care should be supported as an alternative to long hospital stays. Treatment protocols could be changed; for example, unnecessary or optional surgeries could be cut down, low-risk child-births could be handled in maternity clinics, and tuberculosis and certain surgical cases could be treated on an outpatient basis.
- Special care must be taken in regard to spending on medical equipment and supplies, inasmuch as technology has advanced to the point where is the possibility that equipment (specially for highly specialized treatments would be purchased that is too sophisticated from the standpoint of social goals.





## 2 General considerations

*The purpose of this chapter is to present some basic concepts which help understand the questions discussed below. A discussion of the importance of project preparation and evaluation and of the concept of equity as it applies to the health sector is followed by a description of the life cycle of a project and an analysis of the special characteristics of health projects.*

### 2.1 The importance of proper identification, preparation and evaluation

As mentioned earlier, a country's development is closely linked to how it invests resources for this purpose and to the quality of such investments. This is determined by how effectively and efficiently the objectives of the investment programme are achieved. An investment is effective if it makes it possible to achieve the desired objectives. It is efficient if these objectives can be achieved at the lowest possible cost.

The quality of an investment will necessarily depend on how well the resources in question are allocated. It is therefore important to identify the best projects, i.e., those that are most likely to contribute to development. This is why project evaluation is so important, inasmuch as it makes it possible to measure a project's contribution to the development process.

Figure 6 shows why it is so important to choose those projects that will bring the best return on investment. In this hypothetical case, it is assumed that the investment is being made in projects that will, within a year, return the capital invested plus a certain amount of profit (rate of return), and that these resources will all be reinvested in similar projects during the following year. After ten years, at a rate of return of 5%, the capital accumulated will have increased by 63%. On the other hand, if the resources are invested in projects with a 10% annual rate of return, the investment will grow by 159%. Project is to identify and assess the contribution it can make to the country's development. The idea is to identify the impact of the project on society as a whole. If the social benefits of a project are greater than the cost of implementing it, then the project may be considered profitable.<sup>1</sup> However, it is very

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When the benefits and the costs of a project occur in different years, they must be adjusted to the same date for purposes of comparison.

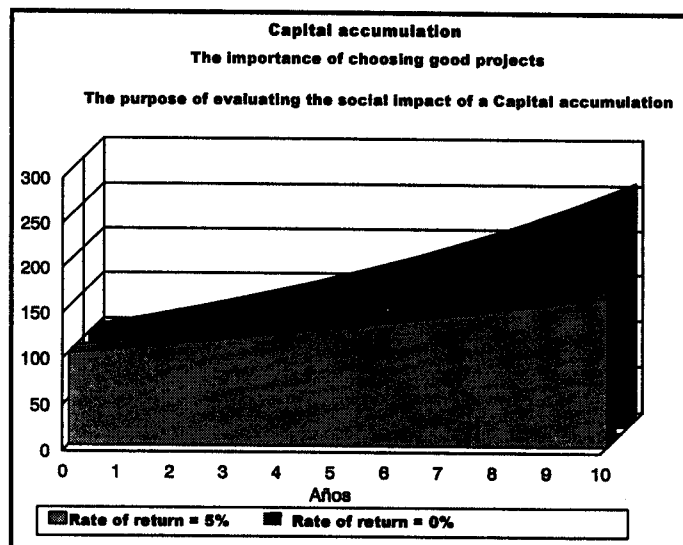
difficult to assign a monetary value to the social benefits of projects such as those relating to education, health and housing.

By their very nature, social projects generate consensus as to their necessity and importance. However, such projects must still be examined and evaluated even when it is agreed that they should be implemented. An evaluation can throw light on a number of questions that are fundamental to the proper implementation for the project.

The fact that there is usually no question about the profitability of social projects does not mean that they should be undertaken without any further study. It is important to know what the problem is and what alternative solutions are available. It will then be possible to answer questions such as: Is infrastructure the answer? Where should the project be located? Who will benefit from it? What will be its duration?

Project preparation is fundamental to any effort to find answers to these questions. The basic information that is gathered during the process of identification and preparation facilitates decision making regarding future action.

Figure 6: Rate of return and capital accumulation



Picture 1: Focusing of basical needs

### The Basic Needs Approach

This approach, proposed by H. Harberger in 1984, suggests that people are prepared to pay (e.g., taxes) in order to make available to others an asset or a service that is considered essential for a dignified life or for development. This includes nutrition, health, education and basic housing for the poorest sectors.

Applying this focus, when there is believed to be consensus on the need to carry out a social project, means that society is prepared to pay to make available to a given group of people, considered to be poor, a service that they are not in a position to pay for themselves. In other words, society perceives that the benefits it receives are greater than the cost of the programme.

Those responsible for project preparation should inquire, investigate and analyse until they are absolutely certain that they have identified the project option that will most efficiently achieve the desired results.

## 2.2 Ensuring equity in projects

*“Equity means equality of opportunities to participate in efforts to attain well-being and social position and possessions. This calls for eliminating discrimination and privileges in all systems, both those that have been established by law and those that are part of an economic, social or political structure.*

*Occupation, income level, educational achievements, family structure, urban or rural location, and political influence are factors that play a decisive part in determining what opportunities a person has. If there are sharp differences in any of these areas, there will also be serious inequalities as far as opportunities are concerned (ECLAC, 1991)”.*

The more modern theories of economic growth attribute a significant role not only to “machines” but also to the concept of investing in “people”. In this regard, the role of health and education in the development process has been clearly recognized. The extent to which capacities and skills can be generated in order to further development will depend fundamentally on the overall health of the population, and this may be determined, in particular, from the nutritional level of children.

It is a well-known fact that minors who are undernourished have serious learning disabilities and have difficulty developing their motor skills. These are health-related problems which hinder development and limit the opportunities people have by limiting access to better education, which is one of the pillars of development.<sup>2</sup>

Investing in people in order to increase the human capital of a country is essential to development. However, if growth is going to benefit the whole society and not just a few of its members, there must

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See Chapter 1, section 1.2: Guidelines for the identification and preparation of educational projects.

be equality of opportunities. Equality of opportunities depends to a large extent on how accessible health services are. Hence the importance of ensuring that, insofar as possible, everyone has access to all levels of health care.

Poverty levels are different in different parts of the world. In Latin America and the Caribbean, a high percentage of the population is poor. In this regard, there are different but very important reasons for investing in health care. Poor health is a particularly serious problem among the poor, not only because they get sick more often, but also because they make their living by doing hard physical labour, and they have no savings with which to meet health emergencies.

Picture 2: Prerequisites in access to health care

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**Prerequisites for achieving equity in access to health care**

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The following policies, conditions and actions can help ensure equity in access to health care:

- Define a set of essential clinical service that will allow for a minimum level of care to be provided to the entire population, and that will be accessible to everyone.
  - Invest sufficient amounts in infrastructure to generate the capacity to deliver basic health care to all
  - Ensure the proper distribution of resources allocated for health, paying special attention to basic services and to intermediate and highly complex services needed by the poorest sectors.
  - Grant subsidies and health insurance to those who are not able to meet health costs.
  - Inform and educate the public about specific health programmes and about the advantages of staying in good health.
  - Encourage health professionals to work in remote areas where the population is poor.
  - Ensure free access to all centres in the health system, independently of where the beneficiaries live.
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Thus, from the economic standpoint, spending on health is a productive investment, inasmuch as it can raise income levels, especially among the poor, and thus alleviate the human suffering that is part and parcel of bad health.

From the project standpoint, equity consists of improving access to health care, especially for poor and isolated populations. Every effort should be made to increase the numbers of professionals who are permanently available to provide primary health care, instead of promoting the training of staff for high-resolution services. Health establishments should have a pyramidal delivery structure, based on a set of basic clinical services that are to be defined by each country in terms of its own particular objectives and financial resources.

This will entail reviewing certain factors that lead to inequity, such as those relating to material access to health services, use of services, and distribution of the financial burden of health expenditures. Conditions must be created that will ensure equal opportunities for all, and delivery of health care in poor and backward areas must be improved and strengthened. The strengthening of health programmes and basic preventive health care, bearing in mind the needs of the local population and ensuring equity in delivery of services, is an important component of the development process.

## 2.3 Project cycle

The purpose of this section is to describe the evolution of an investment project from its inception to its implementation. This process involves several evaluations, the complexity of which will depend on the stage of development of the project.

An **investment project** entails deciding how resources will be used in order to increase, improve, maintain or resume the production of goods and/or services and/or the capacity to generate profits from a human or physical resource. The project may materialize in the form of a physical construction (e.g., a health centre) or certain specific actions (e.g., a vaccination programme).

In the case of the health sector, when the objective is to produce goods or provide services, projects will have to do with the building of infrastructure or the provision of equipment for health establishments, usually in connection with the coverage provided by the system. On the other hand, when the objective is to improve capacity to generate profits, projects will be focussed on the quality of services provided.

Every project goes through stages which, as mentioned above, culminate in the building of a physical work or the implementation of a specific action. The project cycle is made up of the steps that are required in order to transform simple investment ideas to the point where they are actually put in practice. Each step in this transformation calls for human, material, financial, information and other resources, and each of these adds value to the original idea. Although every case is different, certain general characteristics of the process can be outlined.

Every project goes through three stages, namely: **preinvestment, investment and operation**. The preinvestment stage involves the whole process of identifying the problem, drawing up the project and conducting an appraisal in order to determine whether or not it should actually be implemented. If it is decided to go ahead, the project moves on to the investment stage, which involves preparing a detailed design or engineering project and/or a step-by-step programme of activities, and actually building the work or carrying out the activities. Finally, the operation stage entails actually putting the work or the plan into operation as projected. It is at this stage that the profits envisaged during the preinvestment stage begin to be generated.

### **2.3.1 Pre-investment stage**

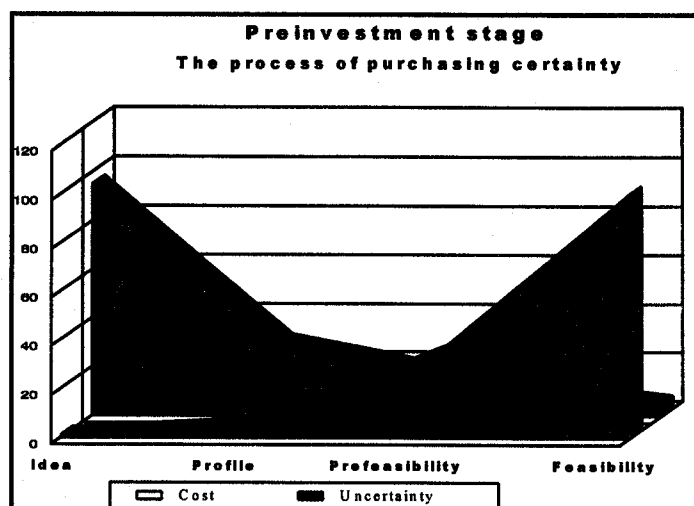
Several steps must be taken during the process of choosing the project and deciding whether or not it should be pursued. The complexity of preinvestment studies will depend on the complexity and cost of the project. The following steps are involved:

- Generation and analysis of the project **idea**
- Development of the project **profile**
- **Pre-feasibility** study
- **Feasibility** study

In each case, decisions will have to be taken as to when to move on to the next step, and whether to discontinue the study temporarily, or to conclude all studies once enough information has been obtained to decide whether the project should be implemented or cancelled.

Figure 7: The Cost of uncertainty

These steps are helpful in identifying the problem that needs to be solved, determining what goods or services are needed and establishing what technology should be used, as well as its cost and advantages. Thus, there is a gradual process whereby certainty is “purchased”, given that the more complex a project is, the higher will be the price of the detailed and in-depth studies that are required (see Figure 7).



#### a) Generation and analysis of the idea

Once a preliminary diagnosis has been made, or in some cases, when a petition has been received from the community, the problem or the unmet need is identified, and the target population, the geographic location and the objectives of the project are determined. Finally, a number of alternative solutions are generated.

#### b) Development of the project profile

At this point, additional information is included, and the information gathered during the preceding step is further refined. The project profile should include a preliminary analysis of technical and marketing considerations, a cost-benefit analysis and an appraisal. It should be drawn up with such information as is available at the time, without incurring any additional expenses for data gathering. The profile makes it possible to examine the technical and economic viability of the different options that have been proposed, with a view to eliminating those that are not feasible.

It should be noted that at the profile stage, uncertainty can be reduced substantially and at a relatively low cost. Hence, a good project profile is extremely important, inasmuch as it helps avoid spending on costly studies for projects that are not viable.

### **c) Pre-feasibility study**

At this point, the information set forth in the profile is further elaborated and additional data are included, so as to eliminate some options and improve others. Technical and economic appraisals are made of the options chosen for final consideration, in order to establish which one is best for the project.

### **d) Feasibility study**

This study should be focussed on a detailed examination of the option deemed to be most viable as a result of the pre-feasibility study. The effort is now directed at measuring and assessing as accurately as possible the costs and benefits of the project. A more in-depth study should be made of the variables that are involved. In addition, once the project has been identified and designed, all details pertaining to the physical work, the disbursement schedule, and the programme of execution and operation should be refined in order to ensure optimum efficiency throughout the process.

## **2.3.2 Investment stage**

This is the stage at which work begins on the physical execution of the project, based on the estimates made during the preinvestment stage. The investment stage involves the following steps:

- **Design** of the project or schedule of activities
- Execution** of the project or action

### **a) Design**

At this stage, detailed blueprints and/or engineering studies are drawn up, in the case of an infrastructure project. In the case of a service project, the design stage involves drawing up a programme of activities to be carried out, based on the requirements identified in the course of the study.

### **b) Execution**

This is the stage of construction of the physical facility or implementation of activities planned.



### 2.3.3 Operation

This is the stage at which the infrastructure projects are put underway,<sup>3</sup> and the profits projected during the pre-investment stage begin to materialize. In some cases, a distinction is made between the initial effort of putting a project underway and the stage at which the project becomes fully operational.

### 2.4 Project evaluation

An appraisal involves making a comparative analysis, in either numerical or non-numerical terms, of the potential costs and benefits of the project. If the analysis that is made from the standpoint of the company or the organization that is carrying out the project, it is called a financial appraisal. On the other hand, if it is made from the standpoint of society as a whole, it is referred to as an economic appraisal<sup>4</sup>

Finally, a technical appraisal of the project is conducted in order to determine whether the option chosen is technically viable.

**Physical and financial monitoring** involves following up on the project during the execution stage in order to determine how it is progressing in terms of physical works or of actions (volume of construction, services provided),

keeping on schedule and use of resources. The purpose of this monitoring exercise is to find out if execution problems are causing departures from the original project plans. This is done in order to

**Figure 8: Project stages and steps, and types of evaluation**

STAGE	STEP	TYPE OF EVALUATION
Pre- investment	Idea	Appraisal
	Profile	
	Pre-feasibility	
Investment	feasibility	Physical and Financial Monitoring
	Design	
	Execution	
Operation	Operation	Monitoring of Operation final evaluation

<sup>5</sup> When the purpose of a project is to provide a service (e.g., an educational or vaccination campaign), this stage entails project implementation.

<sup>6</sup> An economic appraisal is sometimes referred to as a social appraisal. These two terms are used synonymously in this document. It should be noted, however, that for some authors, the term “economic appraisal” has the meaning described above, whereas the term “social appraisal” refers to an economic appraisal which has been corrected to include income distribution.

allow for timely action to be taken to minimize the consequences (cost overrun, delays) of any problems that might arise.

The **final evaluation** is the process of systematically and objectively determining the relevance, efficiency and effectiveness of project activities in the light of the original objectives. The purpose is to improve activities that are underway and assist the project administrators in connection with the planning, scheduling and execution of future projects.

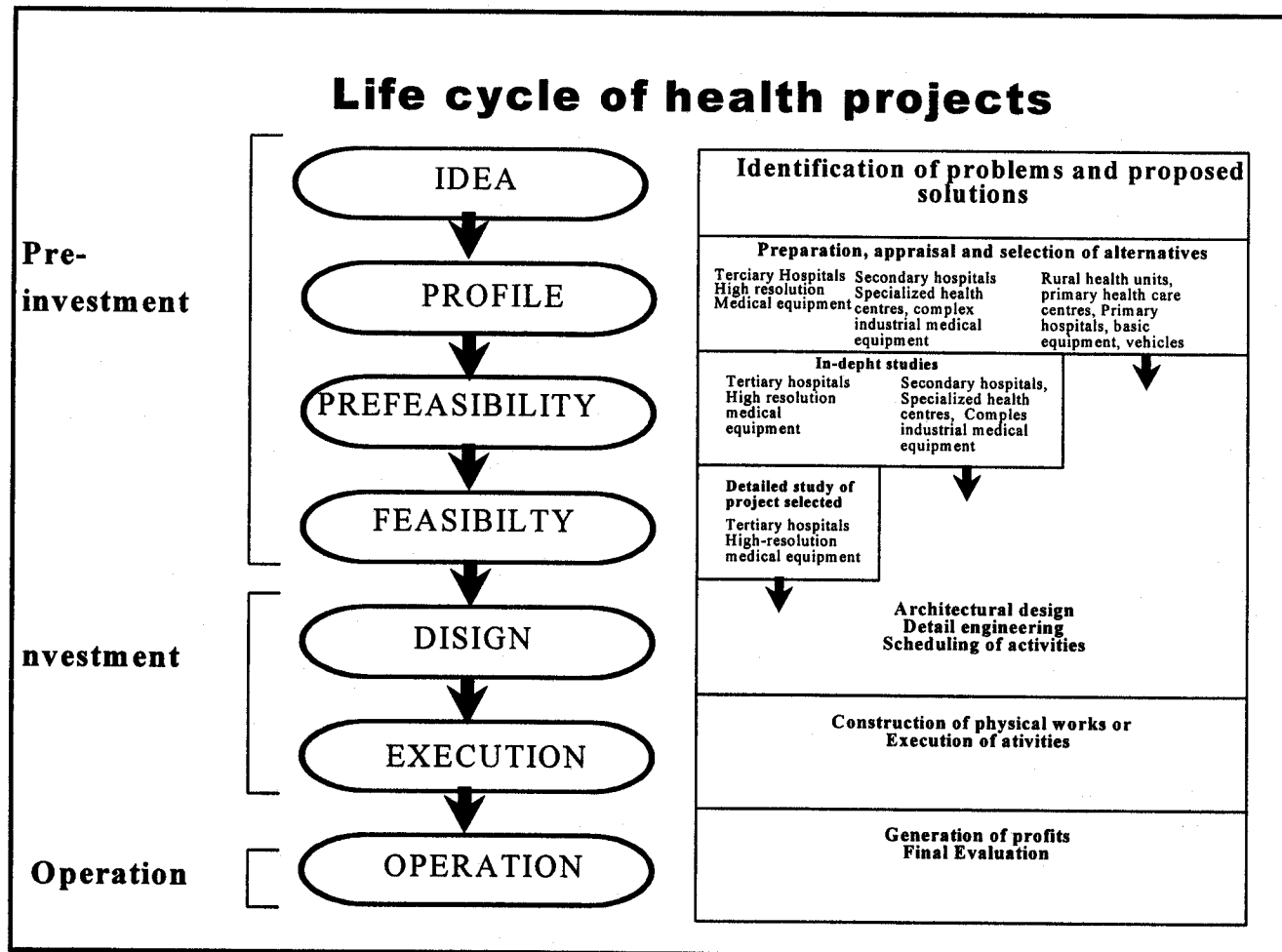
Thus, in order to close the project cycle and allow for feedback throughout the process, it is a good idea, during the investment and operation stages, to **follow up regularly** on those variables that might be significant indicators, in a subsequent evaluation, of whether or not the project is achieving (or has achieved) the objectives projected during the initial appraisal.

As mentioned earlier, the design and execution stage entails determining how much time and money will be needed to complete the project. This information, along with the information on problems encountered, the solutions found and the results obtained, should be summarized in a **project completion report** (ILPES, 1993; IDB, 1991). This report should include any information that may be needed in order to evaluate the efficiency and effectiveness of project execution. It should also suggest which variables should be monitored during the operation stage for purposes of preparing the final project evaluation.

## 2.5 Project development in the health sector

At the pre-investment stage, the complexity of studies relating to projects in the health sector will depend on the nature of the project (see Figure 9). Primary health care projects are usually formulated at the profile level. This is because they are not so complex as to require the expense (in human and financial resources) of more detailed studies (pre-feasibility, feasibility) to support them. A good profile will usually offer enough certainty to justify moving on to the project design stage or abandoning or postponing the project should it be deemed unsuitable for execution.

Figure 9: Project development in the health sector



The information that is needed in order to decide whether or not the investment will be worthwhile can usually be supplied by the establishment for which the project is being considered (when this is the case), the local government, the Secretariat or Ministry of Health, or neighborhood or community organizations.

Nevertheless, more complex projects (secondary and tertiary) projects are sometimes needed, and in such cases, pre-feasibility and/or feasibility studies must be made, given the size of the investments that are required by such projects. It should be noted that in this type of projects (high-resolution diagnostic centres and hospitals), the main expenditure is not for infrastructure but for specialized equipment.

**Example 8: Construction and equipment costs**

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*In 1993, a specialized health care unit was built in the town of Los Andes, Chile, to serve a population of 50,000. The total cost of the unit was US\$ 4,654,000. Of this total, US\$ 1,682,000, or 36%, was spent on the physical structure, and US\$ 2,972,000, or 64%, was spent on medical equipment.*

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In this regard, it should be noted that very thorough studies are needed in order to determine potential demand for the medical equipment. On the one hand, there is the possibility that overly sophisticated equipment might be purchased, and on the other, it is important to have detailed information on technical specifications, in order to see if they match the types, levels and quality of care required under the health care policy being implemented. Equipment costs rise exponentially according to level of sophistication.

**Example 9: Choosing the right equipment**

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*A health establishment was built for which an ultrasound unit was required. This unit was to be used for routine examinations of pregnant women. Many different types of equipment were available on the market, at widely varying prices.*

*The director of the establishment decided to buy a three-dimensional colour unit, at a very high price.*

*A review of the type of examinations for which the equipment is currently being used showed that the same tests could have been performed with a simple monochrome unit, at a cost three or four times lower than what was paid for the equipment. The cost of the equipment that was purchased would have been justified at a high-resolution establishment, but not at the establishment concerned in this case.*

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## 3 Identifying the project

*The purpose of this chapter is to stress the importance of identifying the problem accurately and discovering its underlying cause. Tools and techniques that are helpful in this task are discussed. Finally, suggestions are offered on how to describe the problem and how to assess it and anticipate its end result.*

### 3.1 Typology of problems

For the purposes of these guidelines, any gap in coverage, any establishment that is in poor condition or any deficiency in delivery of services is identified with a problem. A gap in coverage is understood to be any situation in which the population is not receiving health care because it does not have access to health establishments, either because they are too far away or because there are difficulties that hinder access to it. An establishment is considered to be in poor condition when its infrastructure is in such bad shape that adequate health services cannot be provided. Finally, delivery is deficient when the services provided do not meet the quality standards established by health authorities.

### 3.2 Importance of identifying and defining the problem accurately

Any investment project in the health sector should contribute to the achievement of the objectives established for the sector. At the same time, the immediate goal of the project should be to solve specific, clearly identified problems which, in one way or another, are hindering efforts to achieve the overall objectives of the health sector.

The crucial question that must be asked by those responsible for designing and evaluating the project is: **What is the problem for which a solution is sought?**

Normally, a preliminary analysis will clarify the **effects** of a problem rather than its **causes**.<sup>7</sup> That is why projects should always be formulated so as to allow for a solution to be found to the causes of the problem identified. Hence, the underlying problem and its **main cause** must be accurately identified

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<sup>7</sup>

The effect is the observable manifestation of a problem or need. The causes are the interrelated factors that work together to produce or generate the problem or need, either in the social or health services or within the community.

before a specific project idea is developed. Unless the main cause of the problem is identified, the project will probably not achieve the objective sought.

**Example 10: Importance of identifying the main cause of a problem**

*At a primary health care centre, there are bottlenecks and overcrowding. This problem may be caused by one or more of the following reasons:*

*(a) The health centre's work schedule was recently shortened.*

*(b) Some of the patients currently being served used to go to a different health centre, but it burned down and the road to it was cut off.*

*(c) The population has grown more than was expected, as a result of new industries being set up in the area, or because people have been moved there from other areas.*

*Whatever the project that is finally selected, it must be designed to solve the underlying causes of this situation.*

*The potential solutions to the problem of overcrowding at this health centre will vary greatly, depending on what the underlying problem is.*

*If the present situation has been caused by reason (a), then the solution will be to lengthen the work schedule. If the cause is reason (b), the project should probably envisage replacing the other establishment and/or investing in road improvements. And if the problem of overcrowding is due to item (c), then the project should envisage enlarging the establishment.*

*The first idea that usually comes to mind in a case such as this is to enlarge the establishment in question; however, if the underlying cause is sought, that solution would only be justified in the last of the three cases described.*

The reason it is so important to define the problem accurately is that this definition will be the basis for whatever project is proposed in order to solve the problem. Thus, decisions on what action should be taken and how, and on implementation of the project itself, will depend on how well the problem has been identified.

### **3.3 Tools and techniques for identifying projects in the health sector**

Following is a description of some tools and techniques that are useful in identifying problems in the health sector. Some of the tools described are costly and complex, and are therefore available to only a few countries in the region. However, since the advantages of these measures far outweigh their cost, they are worth pursuing. Whenever more than one tool is to be used in defining the problem, they should be analysed jointly, so as to identify complementary areas of interest.

### 3.3.1 Sectoral objectives and policies.

It is important, first of all, to consider the general context of the health sector, reviewing the established objectives, policies and guidelines. It is very important to become familiar with national sectoral priorities and regional implementation strategies. In addition, up-to-date information should be obtained on any new elements that are being or will be included in health care delivery, as well as on their quality. Comparing the health situation in a local community or in a region with the standards set in national objectives and policies will bring to light any problems that may be hindering the achievement of desired goals (see example 8).

#### Example 11: Sectoral policies and project development

*In a certain Latin American country, primary health care had been defined as the delivery of services in four basic programmes: infant and child health, maternity services, adult health and rural health.*

*However, a new health policy was established which was aimed at improving the quality of the health care delivered to patients and providing*

*services for basic chronic pathologies, with a view to providing both group and individual mental health services and thus improving the overall health of the population.*

*As a result, all primary health centres in the country that had not been offering this type of care were faced with the need to acquire additional equipment and human and physical resources in order to meet the new objectives.*

### 3.3.2 Gathering information at the establishment.

One of the easiest ways to identify a problem at the local level is through to find out what problems are perceived by the director of a health establishment or a community organization. Such problems are usually related to coverage, overcrowding, saturation of installed capacity, etc. In order to determine whether there is indeed a shortcoming, it is best, whenever possible, to go directly to the establishment, observe the situation and identify the possible causes.

The statistical records kept by the permanent paramedic in a rural health unit, or the records of the statistical services at health centres and hospitals are also useful sources of information that are available locally. For example, if infant and child nutrition in a given area is found to be worsening, this would be an indication that the health services are not working properly. This type of information can usually be investigated by approaching the director of the establishment, the beneficiaries

For example, if infant and child nutrition in a given area is found to be worsening, this would be an indication that the health services are not working properly. This type of information can usually be investigated by approaching the director of the establishment, the beneficiaries themselves and the health service or government authorities concerned.

### **3.3.3 Local maps.**

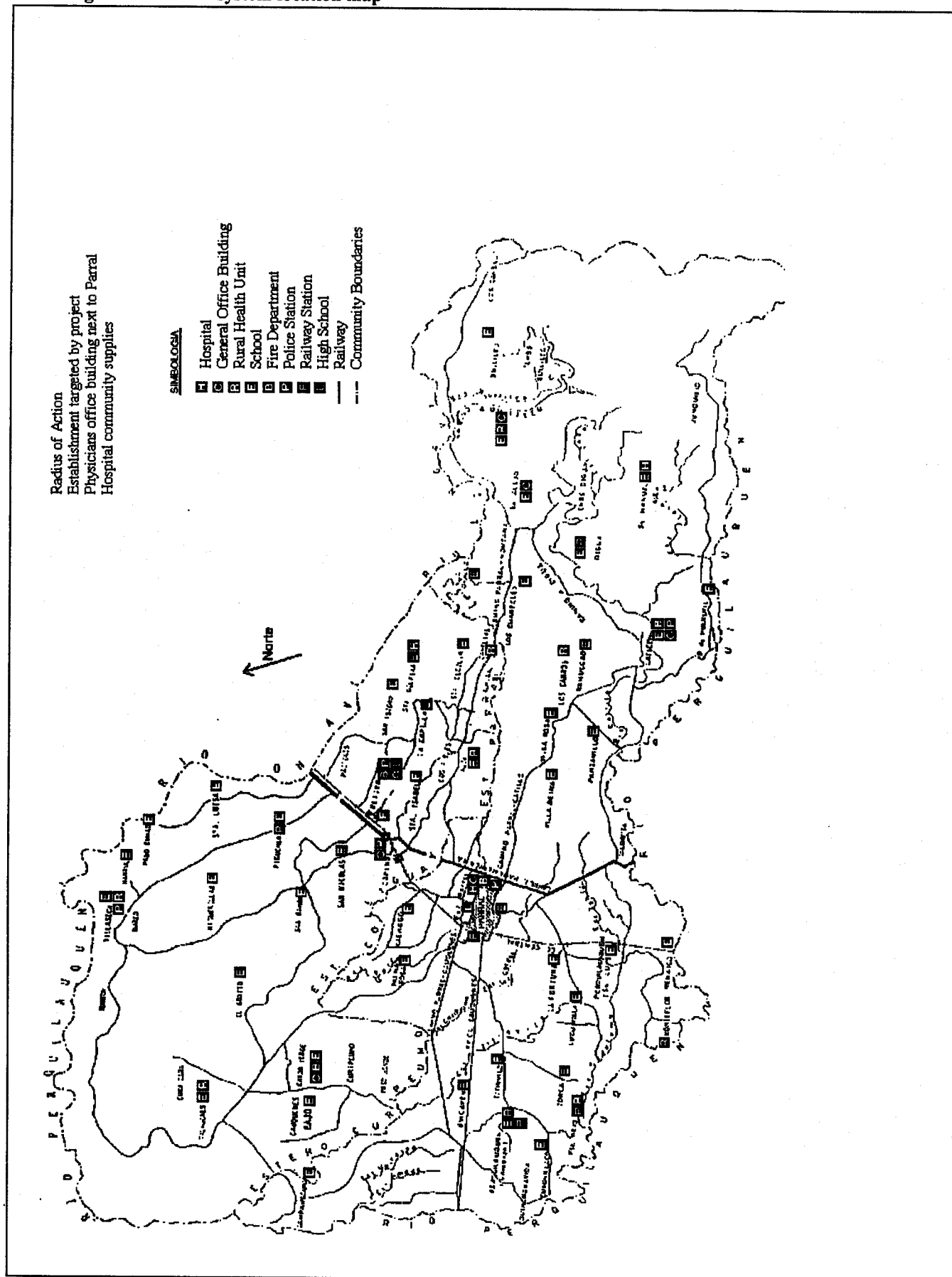
Maps of the health system can be used to help discover gaps in coverage and/or problems related to the location of establishments. These are simply maps of a given geographical area which show where the different health care establishments are located, as well as the types of service that are offered (open or closed), the level of specialization (as described in chapter 2), the capacity in terms of clients who can be served (in open establishments) or of number of beds (in hospitals), and the population assigned to each establishment. More detailed maps also indicate the age of buildings and the general condition of infrastructure.

### **3.3.4 Surveys.**

There are other, more elaborate tools, such as questionnaires or surveys, which are helpful in identifying gaps in health service coverage or situations in which services are not up to standard. These tools are also useful in focalizing benefits towards the group targeted by the project, determining the distribution of costs, and monitoring people's perception of the benefits offered.



Figure 10: Health system location map



### Example 12: Project development: use of REDATAM

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*A study conducted recently by ILPES for the Government of Chile showed the advantages of using the REDATAM PLUS programme (Retrieval of data for small areas by microcomputer), developed by the Latin American Demographic Centre (CELADE) to identify projects for implementation at the community level. The study produced a methodology for using census data which, when supplemented with other statistical sources and supported by the REDATAM*

*system, can be applied to a geographical information system for drawing up community maps geared towards identifying households and populations that have basic needs. In the case of the health sector, the census data on location and age structure of the population can be compared with the supply of health establishments in the area, making it easy to identify unmet needs according to socioeconomic level.*

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Some examples of such tools are the CAS record card and the CASEN survey (see boxes 3 and 4), currently in use in Chile, and the recently developed SISBEN used in Colombia (see box 5). The information supplied by these systems is useful to all sectors of society. In particular, the data are used in the health sector to select projects aimed at benefiting the poor, and to analyse focalization in resource distribution, scholarship programmes, supplementary food programmes and others.

### 3.4 Description of the problem.

Once the problem that is affecting an establishment or zone has been identified, the situation must be described in as much detail as possible (as much as allowed by the level of analysis attained). This is done in order to clearly identify the causes and effects of the problem. The description should cover at least the following aspects:

- (a) The **geographic location** of the problem should be established. Initially, it is sufficient to note the general location, since the actual boundaries will be further delimited at the different stages of analysis.
- (b) From the outset, the **population that is being affected** should be identified, as well as its social, economic and cultural characteristics.

- (c) Every cause that can possibly be determined which is pertinent to the **main cause** underlying the problem situation should be explored. From the outset, every effort should be made to find out whether the problem stems from a gap in coverage or from the present condition of the infrastructure of one or more establishments.
- (d) When pertinent, indicators that seem to point to the existence of a problem situation should be compared with international, national, regional and/or local **parameters**.
- (e) An effort should be made to find out **how the problem was detected**. It is important to determine whether the information provided is reliable, where it originated, and whether it is up to date, etc. When a problem is reported by the population that is directly affected by it, this is usually an indication that it has not yet been dealt with by the upper echelons, and that it is definitely having an impact. On the other hand, if the situation has already been identified at other levels, it is important to inquire about the views of the people who are directly affected—for example, the staff and patients of the health centre concerned—in order to get an inside look at the situation.

**Picture 3: The CAS data card**

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### **The CAS data card**

The CAS data card is a tool for describing the socioeconomic characteristics of households. It is used to identify the population that lives in extreme poverty, with a view to focalizing the benefits of the social network and of social programmes geared towards individuals. This data card is designed to target the poorest population group, and is applied and managed at the local level.

There are two versions of the card, CAS-1 and CAS-2. CAS-1 is designed to gather information on 14 items which show evidence of some degree of poverty. It includes points relating to housing, sanitary infrastructure, equipment and supplies available in the household, crowding, promiscuity, use of fuel, literacy and years of schooling of the head of household and spouse, activity or work that supports the household, and location of the dwelling by region and urban or rural categories. The different items are combined in a summary index called the CAS score ("index"). This value is what determines whether or not the household will have access to a given subsidy or programme.

When certain problems came to light during the application of CAS-1, studies were conducted which led to the development of CAS-2. This tool, which has been used since June 1987, is different from CAS-1 in the following regards: it adds items pertaining to the amount and source of family income; items already included in CAS-1 are redefined in order to eliminate contradictions and ambiguities; the dwelling is defined precisely as the unit to be surveyed, and the family variable is included in order to allow for subsequent identification of related families; a continuous score is used to express the family's socioeconomic situation; the weighting of items is changed, with different weights being assigned for urban and rural areas; and finally, in version CAS-2, weights are less "visible" to users, making it difficult to manipulate information (MIDEPLAN 1990, *La ficha CAS como instrumento de asignación de subsidios*).

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**Picture 4: the CASEN survey**

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### **The CASEN survey**

The CASEN (National Socioeconomic Characteristics) survey, conceived as a tool for planning social policy, makes it possible to measure and evaluate the redistributive impact of social spending. This survey facilitates the monitoring and evaluation of social programmes and the design and formulation of corrective measures and actions for programmes being implemented.

The central objective is to quantify and identify the situation of the poorest families and to determine what access they have to social programmes and monetary subsidies, as well as to the labor market. The survey is also designed to establish how social spending is being distributed among the population of the country and to quantify the percentage that is being received by the poorer sectors.

In the specific case of health, the idea is to find out how accessible the health care system is to the population as a whole and to the poorest sectors in particular. To this end, an analysis is made of the coverage of health care systems; of certain indicators of the overall health of the population, such as perceived morbidity, malnutrition and smoking; of access to health services, measured in terms of geographical access, coverage and free services, and of the coverage of certain specific programmes of the Ministry of Health, such as the national supplementary food programme, Papanicolau testing and dental care.

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- (f) It is important to find out **how long the problem has existed** and how much longer it is likely to continue. This can give an indication as to how urgent it is to find a solution. If the situation is not a recent one, it will be necessary to estimate how long it has existed and whether it has been addressed before.

If any measures have been taken to deal with the situation, it is important to find out when that was done, whether there is any information about the results of such action, and what those results were. In all likelihood, if any action has been taken during the last five years, it will have provided only a partial or a short-term solution or, in the worst case, a bad solution. The idea is to take advantage of the experience of those who identified, designed and implemented the previous solution, and to review the studies that were carried out at that time.

#### Picture 5: SISBEN

### SISBEN

The system for the selection of beneficiaries of social programmes, known as SISBEN (*Sistema de Selección de Beneficiarios de Programas Sociales*), consists of a set of rules, standards and procedures for obtaining reliable and up-to-date socioeconomic information for the purpose of focalizing spending on social programmes. This basic tool facilitates the technical, objective, uniform and equitable selection of beneficiaries of social programmes on the basis of their particular socioeconomic situation, as reflected in an indicator used to summarize quality of life.

The variables for the construction of this summary indicator were determined on the basis of information gleaned from a survey of socioeconomic characteristics conducted among 25,000 families throughout Colombia in 1993. This information was used to classify the families according to levels of

poverty, on the basis of a set of socioeconomic characteristics, including some associated with the region or department where they live, as well as with rurality.

One of the main results of SISBEN was the creation of a data base that contains valid, reliable and current information. This base is made up of data on current or potential beneficiaries of social programmes in the areas of health, education, social welfare and others, and facilitates interinstitutional coordination, as well as the analysis and monitoring of programme impact.

The data base should be updated regularly and used by all entities responsible for operating social programmes, at the departmental, district and municipal levels, so as to unify criteria for the identification and selection of beneficiaries.

#### Example 13: Project development: use of indicators

*In a certain area, the health indicator "professional care at delivery" is way below the regional level, and in turn, the regional rate is below the national average. This is a clear indication of a problem that needs to*

*be solved. A caliber of maternity care must be delivered that will make it possible to raise professional care at delivery to at least the national levels.*

Finally, in describing and reporting on the problem, it is very useful to **contextualize it** in terms of the immediate surroundings where the situation exists; in other words, the local environment should be described briefly, with reference being made to the job situation, the economy, and geographical and other features of the area where the problem has been located.

**Example 14: Considering the urgency of the problem**

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*A region in a certain country was being affected by a serious outbreak of influenza which was causing a high rate of absenteeism from work and school. The health authorities were preparing a vaccination campaign to control the outbreak and reduce the discomfort and the economic and social losses it was causing.*

*In the meantime, however, several cases of cholera were detected in a particular community in the region. As a result, the vaccination campaign had to be suspended in order to allow all available resources to be used to treat the cholera victims and check the spread of the disease. Given the more serious nature of this new epidemic, it had to be addressed without delay.*

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**3.5 Anticipated evolution of the problem** The emphasis here is to estimate what will happen if no action is taken to solve the problem or meet the need that has been identified. The following aspects should be considered:

- (a) What **health services will fail to be delivered**, what services are being delivered but are below standard, and/or what services will have to be suspended in the short term if the project is not carried out.
- (b) Compare the population that is being affected by the problem with the **population that might be affected** if no action is taken. In making this estimate, it is helpful to interview experts in this field or to refer to existing technical reports

## 4 Diagnosis of the current situation

*The purpose of this chapter is to describe methods that can be used to prepare a proper diagnostic study. The elements that need to be considered in identifying the area to be studied and estimating the supply of and demand for health care in that area are discussed. Finally, suggestions are made on how to calculate the deficit or surplus of health care and/or resources in the area analysed.<sup>8</sup>*

### 4.1 Importance of the diagnostic study

The problem that needs to be solved can be identified by conducting a diagnostic study of the area affected by the health problem, as well as of the social and cultural background of the population.

A diagnostic study covers different aspects of the health problems detected. It is therefore important that this step in project development be undertaken jointly by different professionals representing a number of disciplines, including physicians, paramedics, social workers, engineers, economists and architects, in order to ensure that all the different aspects and the full scope of the study are discussed and analysed from a truly professional standpoint.

#### Example 15: Importance of conducting a multi-sectoral diagnostic study

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*In a rural location, a programme was implemented to promote dental hygiene and health in order to reduce the number of extractions made necessary by the high prevalence of bad teeth. A follow-up study on the programme showed that the expected results had not been achieved.*

*The fundamental reason was that very few of the inhabitants of the area spoke Spanish. Consequently, the social worker suggested that the programme should be modified and that it should be publicized in the dialect of the area. By just making this change, the programme successfully met its goals.*

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<sup>8</sup>

The guidelines presented apply for diagnostic studies of primary health care establishments, which are the target of most projects carried out at the local level. Nevertheless, procedures to be followed for higher resolution establishments are also discussed.

A diagnostic study of the existing situation should include the following stages:

- Identification of the area to be studied
- Identification of the assigned population
- Determination of the existing supply of health services
- Determination of the demand for health services
- Study of other relevant data
- Conclusions of the diagnostic study

## **4.2 Identifying the area to be studied**

The area to be studied is the geographical zone that serves as the point of reference for contextualizing the problem, marking the boundaries for the analysis and narrowing down the range of potential solutions. Depending on the nature of the boundaries, it will be referred to as a **geographic area** or as an **area of influence**. In the following paragraphs, these concepts are explained and suggestions are offered on how to identify the area to be studied and when to use each concept.

### **4.2.1 Identifying the geographic area**

The geographic area is the area in which the health establishment is located. Its boundaries are determined in terms of distance and accessibility.

In the case of rural health units, since their objective is to extend health services to the population living in isolated rural zones, the location and boundaries of the establishment are of crucial importance. This is determined by two variables, namely, population size and physical accessibility.

In the case of other health establishments, the concept of area of influence is more important, although this does not mean that identification of the geographic area should be neglected. The concept of area of influence will be discussed in greater detail below.

#### **(a) Size of the population**

The rural health unit is the simplest structure at the primary level, and is designed to serve a population of between 400 and 5,000 people. It should be borne in mind that this range varies from country to country, depending on the levels of coverage and the quality of care provided in rural areas.



If a larger population is to be covered, consideration should be given to setting up an establishment such as a health centre. However, if the population to be covered is less than 400, implementation would not necessarily be automatically discarded, since there may be some very small and isolated populations that have no access to health care.

(b) Physical access

It is recommended that a rural health unit should have a radius of action of 12 kilometres. This distance may vary, depending on physical accessibility and whether the population can get from their homes to the reference centre. No one should have to travel more than two and a half hours to get to the health service.

In analysing physical accessibility, the following factors should be borne in mind:

- Topography of the location: this refers to the physical features of the land where the population centre is located. Access to the establishment will vary according to whether it is located on flat land or is in the foothills of a mountain range with numerous rivers and streams.
- Type of road system: this refers to the distribution and characteristics of roads. The health establishment will be more accessible when roads are in good condition than when there are no roads, or roads are in poor condition and/or are frequently cut off during the rainy season.
- Transportation: in rural areas, the most common modes of transportation are walking or riding on horseback, bicycles or rural buses. Access to the establishment will be easier or more difficult depending on which method is used.

In terms of the three variables mentioned above, a geographic area may be defined as that area which can be reached within a maximum time of 2-1/2 hours. Thus, once the boundaries are identified, an outline map of the area should be marked to show its geographic features, roads and other pertinent information, such as distances, bridges, schools, population centres, location of other health centres of equal or greater complexity as the one being studied, private establishments, etc.<sup>9</sup>

#### **4.2.2 Identifying the area of influence**

In the case of assistance centres other than rural health units, the first step is to identify the area of influence of the establishment where the original problem was found. This establishment is then designated as the reference centre or the focus of the problem.

The area of influence is made up of all establishments where patients might go if the problem at the reference establishment is not resolved. It should be noted that the alternative establishment(s) will not necessarily be the one(s) that seem to be closest from the geographic standpoint. Factors such as rough terrain and public transportation routes must also be taken into account.

It is important to note that in the case of health services, administrative boundaries may often be ignored, although certain communal boundaries are needed in order to organize and distribute resources. Health care should be dispensed wherever it is needed, and must not be “refused” just because the patient belongs in another zone.<sup>10</sup> In practice, people do in fact go to the assistance centres that are closest to home, so this problem is minimized.

In order to identify which establishments patients should go to if the problem in the reference centre is not solved, the professional in charge of drawing up the project should interview the personnel who are most qualified to provide information, so as to get an idea of the situation that might arise if the problem is not solved.

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<sup>9</sup> The same type of information should also be marked on an outline map in the case of projects involving more complex health care establishments, such as higher resolution centres and hospitals.

<sup>10</sup> Freedom of access to health centres, independently of where a person lives, is crucial to ensuring greater equity in access to health services.

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**Example 16: Taking care of the floating population**


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*During the summer, many people leave their usual place of residence to go on vacation. In areas where there is a heavy influx of such people, the health infrastructure, which is set up to take care of the permanent population, must now also serve the vacationers who also require health care. To meet this need, the establishments in question are usually designed to serve the population assigned to them plus a 20% floating population.*

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The person in charge of preparing the project should contact the director of the health centre, the hospital director or the directors of specialized centres, as the case may be. The chief nurse, administrative director, local government officials, health service officials and patients should also be contacted directly.

Interviews with the above mentioned officials should make it possible to estimate what percentage of the population currently assigned to the reference establishment would choose each of the following alternatives should the establishment be closed down:

- Would not seek care
- Would go to another establishment (specify which)
- Other (specify: private sector, non-traditional medicine, etc.)

The information thus supplied should provide an overall picture as to which establishments are included in the area of influence. It should be borne in mind that the establishments that might be chosen as alternatives to the reference establishment would have to offer equivalent services. A hospital is not an alternative to a health centre, since the services it offers are not comparable in terms of complexity.

### **4.3 Identifying the assigned population**

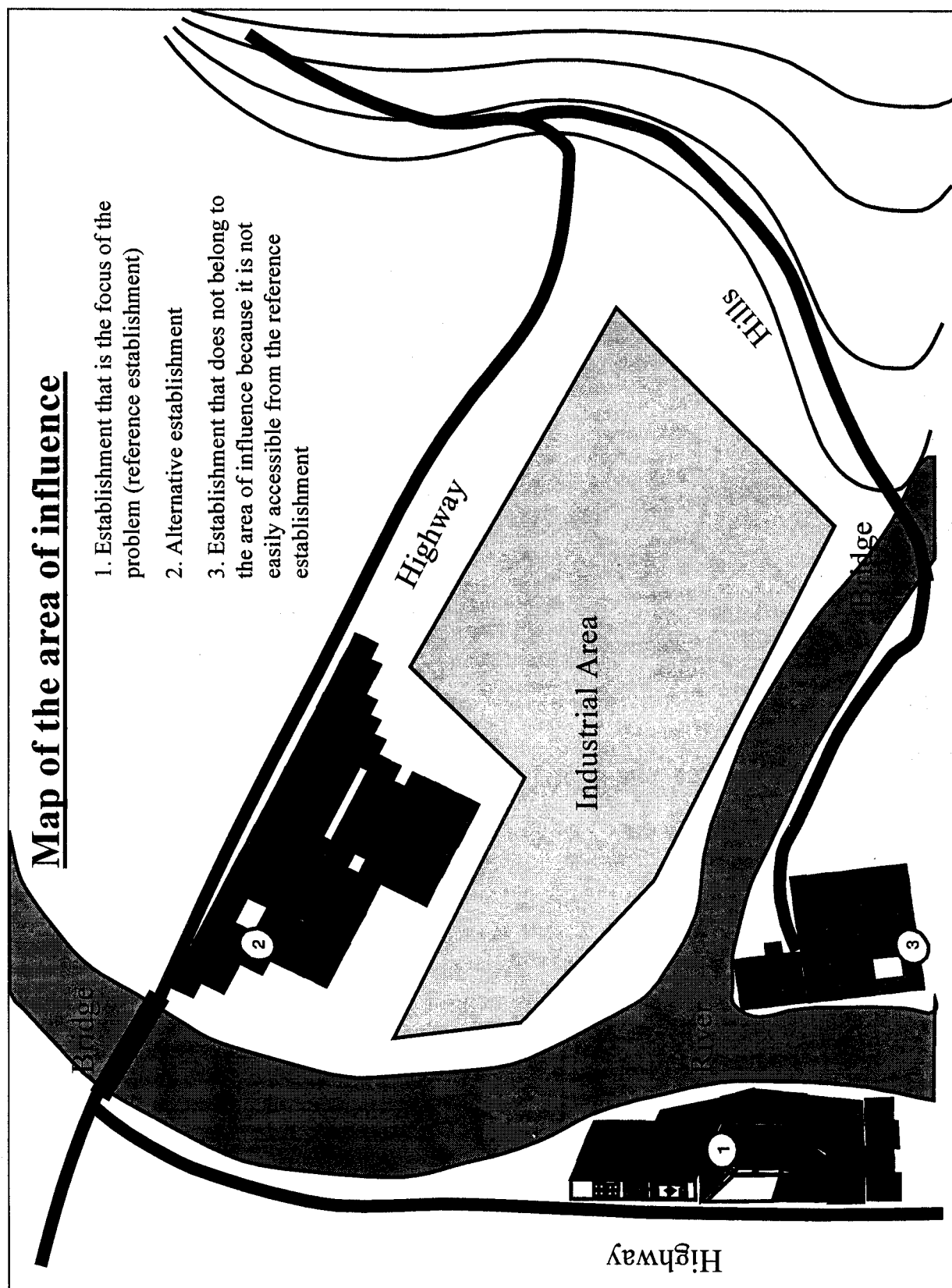
Another important aspect to be considered is the population living in the area. This should be considered independently of whether these people are beneficiaries of the system or have been assigned to the establishment in question. In this regard, it is important to understand the following concepts:

**(a) The reference population** is the total population of the area being studied. It is the point of reference for all the population subgroups defined below.

**(b) The assigned population** is the population subgroup of the reference population that is likely to require the type of health service the project is intended to provide. The assigned population may be divided into two categories: those who are affected by the problem (affected population) and those who are not affected by the problem or need (unaffected population).

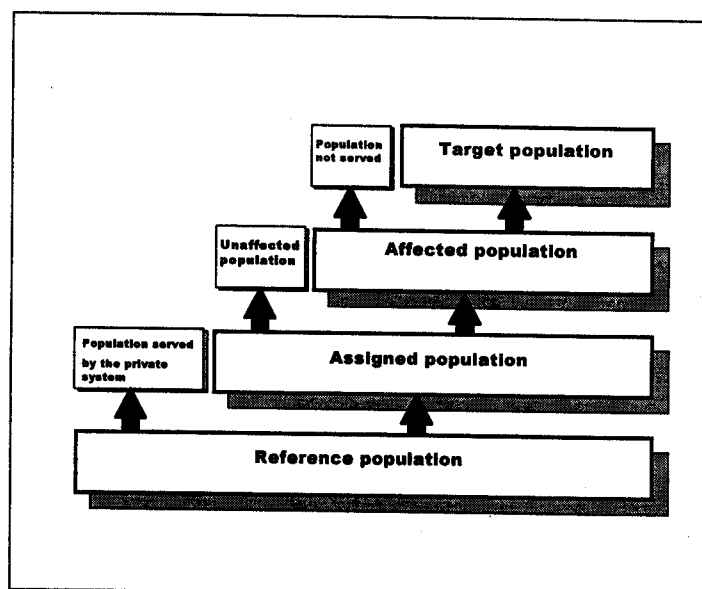
**The affected population** is the subgroup of the assigned population that is being affected by the problem.

Figure 11: Classifying the population within the area of influence



(c) **The target population** is the subgroup of the affected population whose problem might be solved. In identifying the target population, it is important to take into account the government's policy on focalization of social investment. This policy indicates what the government's priorities are, how much is being allocated for the different sectors of the population, and what groups are being targeted for special treatment (children living in extreme poverty, the handicapped, etc.). The focalization policies currently in force may lead to only one part of the affected

Figure 12: Classifying the population within the area of influence



population being considered as a target population. Basic health infrastructure projects are usually designed to meet the needs of the entire assigned population. From now on, therefore, these guidelines will refer only to the concept of assigned population. It should be borne in mind, however, that there are health projects in which a distinction is made between assigned population, affected population and target population.

#### Example 17: Classification of the population

*Suppose a diphtheria, tetanus and polio vaccination campaign is to be carried out in urban and rural outpatient centres in a particular region. The assigned population will be made up of all those people who are not served by private health centres and who must therefore go to the outpatient centres.*

*The affected population will be made up of all minors who are at the right age to be vaccinated but have not yet had their shots. The target population will be the same as the affected population, unless some logistical, social or financial problem prevents some of the minors from being vaccinated.*

When the problem lies within an existing establishment, the assigned population (AP) is usually known; this does not mean, however, that the case does not need to be reviewed, should adjustments have to be made. Should this be necessary, there are certain indicators that are useful in making estimates.

When the problem is the result of a gap in coverage, the gap may be in a rural or an urban zone. In a rural zone, the assigned population would be the same as the total population of the geographic area. In an urban zone, the indicator could be obtained by referring to information from another establishment that is similar to the one envisaged in the proposed project.<sup>11</sup>

In the case of basic hospitals, which are usually located in rural areas, the assigned population would be the entire population of the zone. In the case of higher resolution establishments, which are located in medium-sized and large urban zones, the assigned population would be the entire population of the area, with the only distinction being based on socio-economic status, given the availability of private health care options.

#### **Example 18: Changes in the assigned population**

*In a certain area, a study was being made with a view to replacing a hospital. In the survey that had been made to determine demand, it had been assumed that the traditional beneficiary population would remain unchanged.*

*However, an economic analysis showed that the area, which had previously been a low-income area, had moved up, and now much of the population would not go to the public establishment, but would use private health services instead.*

*It therefore became necessary to redefine the AP for the health centre.*

*It should be noted, however, that redefining the population in this way is only justified if health care alternatives are available, which in this case would mean having access to the private sector. In the absence of such alternatives, the entire population of the area, regardless of income levels, would be beneficiaries and would therefore be assigned to the health establishment.*

<sup>11</sup>

An alternative methodology for estimating the assigned population that is used in Chile consists of basing calculations on the control activity in the infant and child health programme. (ODEPLAN/MINSAL, 1986).

It should be noted that the assigned population of basic urban health centres is usually smaller than the population served in more complex centres, both open and closed. This is due to the fact that the cost of a visit to the doctor or of morbidity can be absorbed as a private matter.

On the other hand, hospital and specialized care is very costly, and therefore the population automatically becomes a beneficiary of the public health system.

#### **4.4 Determining the existing supply of health services**

For the purposes of these guidelines, the existing supply of health services consists of the capacity of existing establishments to deliver health services in accordance with rules and standards established by the Ministry of Health or another competent authority. The existing supply should be determined not only for the establishment where the problem is located, but also for every establishment considered to be an alternative.

Thus, the supply is understood to be the human and physical resources that are available to provide health care services. In the case of human resources, the supply is expressed in terms of hours. In the case of health centres, physical resources are identified in terms of the number of boxes and the amount of equipment that is available.

In the case of hospitals, physical resources are listed according to the number of beds, the percentage of beds that are occupied, number of operating rooms, etc. In addition, information should be requested concerning items that are not considered part of the health care supply itself, such as number of examinations<sup>12</sup> performed per programme<sup>13</sup> (infant and child health, maternity services and adult health), in the case of health centres; in the case of hospitals, the survey should include data on the number of patients discharged, both for individual clinical services and in global terms (demand met).

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<sup>12</sup> This information would consist of the number of regular check-ups plus the number of examinations related to morbidity.

<sup>13</sup> These guidelines focus on how to determine supply and demand for the three basic programmes (infant and child health, maternity services and adult health) and the dental health programme. However, depending on the health policies and available resources of the country concerned, other programmes (e.g., mental health and chronic illness) might be included as well.



### 4.4.1 Examinations performed

With regard to the services delivered in health centres, it should be noted that in most countries, such information is not recorded directly with the Medical Orientation and Statistics Service. Consequently, some elaboration of existing information is required. The usual practice is to record the number of examinations performed by type of professional.

Information on examinations performed per programme and on patients discharged, when pertinent, can be recorded in a table such as the one shown below as Table I, which should be filled out for each establishment. The most recent statistics available in the health service should be used. If for any reason this information is not representative of the normal level of operations of the establishment, then it would be better to consider the average number of examinations performed over the last three years.

**Table I : Examinations performed for assigned population**

Name of the establishment:

Year:

Programme	Assigned Population	Examinations Performed
Infant and Child Health		
Maternity Services		
Adult Health		
Dental Health		

### 4.2.2 Human resources

In analysing the existing human resources, a distinction should be made between variable resources and fixed resources. Variable human resources are those individuals who are involved in providing direct health care services (check-ups and morbidity), while fixed human resources are all the members of the support staff.

In many cases, one professional may carry out two different types of activities. In order to determine the supply of services, that professional's hours of service should be prorated according to the hours specified in the contract for each activity.

**Example 19: Classification of human resources**

*A director of medical services devotes part of his day to providing direct services to patients, and part to administrative and supervisory tasks.*

*In this case, only the hours spent on direct services (checkups and examinations) would be listed under "variable"; the remaining hours would be listed under "support staff".*

A table the one shown below as Table II might be used to record information relating to the availability of variable human resources.

**Table II: Availability of variable human resources**

Name of the establishment:

Year

Resource	Infant and Child Health Programme		Maternity Programme		Adult Programme		Dental Health Programme		Total	
	Total hrs/mo	Con-tracts	Total hrs/mo	Con-tracts	Total hrs/mo	Con-tracts	Total hrs/mo	Con-tracts	Total hrs/mo	Con-tracts
Doctors							-0-	-0-		
Dentists	-0-	-0-	-0-	-0-	-0-	-0-				
Paramedics							-0-	-0-		
Aides										

Note: Professional personnel considered to be paramedics are nurses, midwives and nutritionists; paramedic aides are individuals who monitor the health of school children and those who work as dentists' assistants.

Fixed human resources should be recorded on a list describing the activity performed (administrative tasks, statistics, field, procedures). Fixed human resources usually include statisticians, administrative officers, service assistants, drivers, etc. An example of a list of fixed personnel is shown in Annex 3.

#### 4.4.3 Physical resources

The physical resources of a health care establishment, whether it is a health unit, a health centre or a hospital, are divided into infrastructure and equipment. Infrastructure is the building or buildings used to provide the health care services (space). Equipment is the set of instruments, medical and industrial equipment, as well as the furniture placed in the establishment and the vehicles available to it.

The infrastructure or space may be fixed or variable.<sup>14</sup> Variable-use space is that which is set aside for boxes, operating rooms, and hospital rooms. Fixed space includes the Medical Orientation and Statistics Service (MOSS), halls, laboratory, etc. These areas are also referred to as support areas. The availability of space may be noted in a table such as the one shown below as Table III.

**Table III: Availability of space**

Name of establishment:

Year:

Space		Number	Area of unit	Total area
Variable space (boxes)	Infant and Child			
	Maternity Adult Dental			
	Subtotal			
Fixed (MOSS)	Administration			
	Procedural Boxes Preparation Boxes General Services Others			
	Subtotal			
TOTAL				

All the equipment existing in the institution should be listed, noting in each case whether it is in good, average or poor condition. This information may be shown in a table such as Table IV below.

<sup>14</sup> Hospital space is divided into three functional areas, as follows:

- Services or clinical areas: the area in which direct services are provided. This includes medicine, surgery, gynaecology-obstetrics, pediatrics, etc.
- Support services: the area occupied by services such as X rays, laboratory and blood bank.
- Complementary services: the area occupied by services such as laundry and kitchen.

**Table IV: Availability of equipment**

Name of establishment:

Year:

ITEM	QUANTITY AND CONDITION			
	Good	Average	Poor	Total
Equipment and medical instruments _____ _____ _____				
Furnishings (office furniture, etc.) _____ _____ _____				
Other equipment and vehicles _____ _____ _____				

The data-gathering tables proposed have been designed with basic health centres in mind, and should be filled out not only for the establishment where the problem is located but also for all establishments within its area of influence.

#### 4.5 Determining the demand for health services

For the purposes of these guidelines, demand for health services is the number of examinations anticipated for the population assigned to each programme, over a given period of time.<sup>15</sup> As in determining supply, demand must be determined both for the establishment where the problem is located and for the establishments considered as possible alternatives.

Demand is estimated in terms of the number of examinations the population is expected to request, in accordance with the standards set in each country. Both human and physical resources are needed to supply this service. This section explains how to determine the demand for services and how to translate this in terms of the human and physical resources required.

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<sup>15</sup>

The time period chosen may be the same as the period used in determining supply, usually the previous year.

### 4.5.1 Examinations expected

The number of examinations which the population is expected to request (NEE) may be obtained for each programme with the following formula:

$$NEE = AP * ER \quad (1)$$

where: NEE = Number of examinations expected

AP = Assigned population

ER = Examination rate: Number of examinations per person per year

The examination rate, which includes check-ups and treatment of sick patients, is obtained by using technical coefficients defined by the competent health authorities or experts for each programme in terms of pre-established goals.<sup>16</sup> The relevant information might be recorded in a table such as Table V below.

**Table V: Estimated demand for examinations**

Name of establishment:

Year:

Programme	Assigned population (from Table I)	Examination rate* (exam./inh./year)	Number of examinations expected per year
Infant and Child Health			
Maternity			
Adult			
Dental Health			

\*Technical parameter

<sup>16</sup>

In Chile, for example, examination rates for the infant and child health, maternity and adult programmes are 3.31, 1.75 and 2.0 examinations per inhabitant per year, in that order. In the case of the dental health programme, a rate of 1.5 examinations/inhabitant/per year may be used.

## 4.5.2 Human resource requirements

Human resource requirements should also be divided into variable and fixed resources. The estimates are made by programme, with distinctions being made between medical and dental personnel, professional paramedics, and aides.

The estimates should be based on the number of doctor/hours and dentist/hours and the number of professional paramedics and aides required per inhabitant. For the purposes of these guidelines, a final factor is used which is obtained from calculations made by experts in estimating human resources required per inhabitant per month.<sup>17</sup>

The information thus obtained by category and by programme might be recorded in a table such as the one shown below as Table VI.

As far as fixed human resources are concerned, as mentioned above, these are made up of the support personnel. Since the demand for this type of human resource does not depend directly on the assigned population, it cannot be estimated on a per capita basis. However, the director of the establishment concerned will be familiar with the situation at that particular institution and his/her input is therefore crucial in estimating the requirements in this category.

It is important to have at least a proposal on which to base the estimates and draw up a list of the fixed human resources required and the activities to be carried out by this staff (see Annex 3).

<sup>17</sup>

In Chile, for example, the following parameters are applied to determine human resource requirements:

Programme	Doctor hrs/inhab./month	Paramedic contracts/mo.	Paramed.aide cont./inhab.
Infant and Child Health	0.032	0.00016	0.00002
Maternity	0.007	0.00018	-0-
Adult	0.017	0.00002	-0-
Dental Health	0.011	-0-	0.00007

**Table VI: Variable human resources requirements**

Name of establishment:

Year:

Programme:	Infant and Child Health		Maternity		Adult		Dental Health		
Assigned population:									
Resource	Factor*	N°	Factor*	N°	Factor*	N°	Factor*	N°	
Doctors (hrs/mo)									
Dentists (hrs/mo)									
Paramedics (N° contracts)									
Aides (N° contracts)									

- Technical parameter

### 4.5.3 Physical resource requirements

In this case also, estimates should be made for each establishment included in the area of influence. The following formula should be used to calculate requirements for variable space:<sup>18</sup>

$$\text{Required number of Boxes} = \frac{\text{NEEH}}{\text{Performance: Box/Hour}} \quad (2)$$

where: NEEH = number of examinations expected per hour  
 Performance: Box/Hr = technical parameter which determines the number of patients that can be examined per hour in a box<sup>19</sup>

<sup>18</sup> In the case of hospitals, variable space would actually consist of the support areas, which would be determined, in the case of operating rooms, in terms of performance and number of interventions. In the case of hospital rooms, they are usually designed with a set number of beds, and are not strictly associated with the size of the population assigned to the establishment. Room size is based on the concept of the Nurse Unit. A Nurse Unit for a hospital includes 30-32 beds, a nurses' station, a procedure room, a dirty work room and a clean workroom. In an ICU, the Nurse Unit has 12 beds.

<sup>19</sup> Good results have been obtained with the following values:

Programme:	Infant and Child	Maternity	Adult	Dental Health
Examinations/box/hour:	4.0	4.5	4.0	4.0

The number of examinations expected per hour is calculated as follows:

$$\text{NAEH} = \frac{\text{NEE}}{\text{R}} \quad (3)$$

where: NEE = number of examinations expected per year (from Table V)  
 R = total hours of examinations provided by the establishment per year. This is obtained by dividing the number of days the establishment is in operation during the year by the number of hours it operates per day. This value will obviously change depending on whether the establishment operates 1, 2 or 3 shifts per day.<sup>20</sup>

This information may be set out in a table such as Table VII.

**Table VII: Examination boxes required (variable space)**

Name of establishment:

Year:

Programme	NEE	NEEH	Perf.: Box/hr*	Boxes required
Infant and Child Health				
Maternity				
Adult				
Dental Health				

\*Technical parameter

As far as equipment is concerned, the requirements should be estimated later on, in connection with the choice of alternatives, so as not to duplicate the effort.

## 4.6 Other relevant data

In addition to the analyses described above, a good diagnostic study should cover other matters directly or indirectly related to the health sector that have not yet been considered, such as health indicators, environmental health and availability of other public services. This will make it possible to develop a good description of the area of influence and to identify elements that might influence the decision on how to solve the problem.

<sup>20</sup>

In Chile, R = 1.920. This value is based on the assumption that the establishment operates 8 hours per day, 240 days per year.



It is also useful to include a brief history of the problem that needs to be solved. This should describe when and why the problem was first noticed, how it has evolved and what partial or temporary solutions were proposed and/or adopted.

#### **4.6.1 Health indicators**

A number of indicators are applied to projects in the health sector. The following indicators are most useful in measuring broad-coverage programmes that have a strong impact on health:-

- Infant mortality rate
- Infant malnutrition rate
- Professional care at delivery

Indicators that measure the development of a country are:

- Life expectancy
- General mortality rate

Without prejudice to the above, and although they are not direct indicators, it is very important to ascertain the epidemiological profile of the population, in order to identify the most prevalent diseases and the main causes of death in the area. This is crucial because it helps determine what health programmes should be emphasized and to hire specialized personnel and develop the necessary infrastructure.

#### **Example 20: Importance of considering the epidemiological profile of the population**

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*In an area where the main economic activity is coal mining, there is a high rate of pulmonary diseases caused by firedamp gas. As a result, the health establishments have the human and physical resources required to deal with this type of morbidity.*

*In other parts of the region, where the main activity is gathering shellfish, the health centres have a hyperbaric chamber in order to allow divers that have been affected by rapid decompression to gradually regulate gases that have dissolved in the blood and prevent the formation of bubbles.*

---

The health indicators mentioned above should be studied at the levels of geographic area, region and country, in order to allow for a comparative analysis to be made of the different territories, so as to determine whether the area envisaged for the project has a generally good or poor level of health.

In addition, the following indicators may be used to show the availability of resources:

- Number of beds per 1,000 inhabitants
- Number of doctors per 10,000 inhabitants, etc.

It should be borne in mind, however, that higher values for these indicators do not necessarily mean that the health conditions in a country are better.

#### **Example 21: Use of health indicators**

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*In a study that was conducted in connection with the building of a rural health centre, the three most relevant indicators for primary health care delivery were reviewed. This analysis provided comparative data on the*

*geographic area where the beneficiary population lived, the region in which it was located, and the nation as a whole. The following results were obtained:*

<i><b>Indicator</b></i>	<i><b>Area</b></i>	<i><b>Region</b></i>	<i><b>Country</b></i>
<i>Infant mortality rate</i>	28.2	21.8	19.9
<i>Infant malnutrition rate</i>	11.0	10.2	8.7
<i>Professional care at delivery</i>	0.3	3.9	2.0

*In general terms, these three indicators clearly show that health in the region has deteriorated in respect of the region and the country. However, the infant mortality and*

*professional care at delivery rates are particularly alarming. Consequently, this area needs a programme that will give priority to improving infant and child health.*

---

### **4.6.2 Environmental health**

A good diagnostic study will also include an analysis of environmental health conditions in the area. This is important because overcrowding in a health centre could be caused by a heavy increase in demand for services resulting from increased morbidity caused by poor environmental sanitation.

In such cases, increasing the establishment's capacity to provide services would only partially solve the problem, inasmuch as environmental conditions would have to be improved in order to truly solve the problem.

For example, it would be useful to find out about water and air pollution, the existence of vectors, how solid waste is collected and disposed of, and similar issues.

If the problem is an environmental one which cannot be solved by the health sector, it should be reported to the competent authorities, and any measures that are taken to solve the problem should be closely monitored (see Example 22).

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**Example 22: Environmental health problem: pollution in Santiago**

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*In Santiago, Chile, the emergency medical services become very crowded during the winter because of a high demand for treatment of respiratory ailments, especially in children.*

*during the winter months, since this is the underlying cause of the increased demand for health services.*

*In this case, even though increasing the capacity to handle emergencies would alleviate the situation, the problem cannot really be solved until a way is found to reduce environmental pollution in the city*

*To this end, the health authorities are coordinating their action with other concerned entities, such as the Ministry of Transport, the Ministry of Housing and Urban Development, the Ministry of Education, the local governments, and industry associations, among others.*

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### 4.6.3 Availability of other services

The diagnostic study should also look into the availability of other services within the area of influence, such as schools, fire stations and police stations. Other matters to investigate are the situation with respect to potable water supply, sewerage and electricity, as well as the characteristics of the road and transportation systems.

This information is especially useful in preparing programmes that might involve the participation of other services, e.g., schools that might assist with a vaccination campaign. It also helps to determine alternative sites for the health infrastructure.

### 4.6.4 Other aspects

Other aspects to be considered are the weather conditions prevailing in the zone, which could make a difference in the type of infrastructure and/or construction methods that would be chosen. It is also important to identify the main sources of employment in the area and their relationship with the problem that has been detected, since they may be a direct or indirect cause of the problem, or be helpful in finding a solution.

## **4.7 Conclusions of the diagnostic study**

At this point, a comparison should be made of the supply of and demand for health services with respect to each establishment, in order to identify any deficit or surplus of services and resources. This will make it possible to draw conclusions that will be helpful in identifying the underlying problem that needs to be solved.

This comparative information may be recorded in a table like the one shown below as Table VIII. It should be borne in mind that the information to be included under “Supply” and “Demand” would be taken from the preceding tables. Columns 3 and 4 will reflect the deficit or surplus in absolute terms and in percentages with regard to examinations, human resources and physical resources.

If there were a deficit in the area, when the solution is implemented, the establishment in question would only be responsible for the share relating to the population assigned to it.

Finally, an analysis of the comparative data regarding supply of and demand for services and resources, along with the points mentioned under section 4.6 of this chapter, will make it possible to identify the problem or problems existing in the area of influence, which may be caused by a number of different factors (infrastructure, human resources, equipment, etc.)

**Table VIII: Summary Comparison of Supply and Demand (by establishment)**

Name of establishment:

Year:

Item	Programme	Tool	Supply: Services Delivered, Resources Available (1)	Supply: Services Expected, Resources Required (2)	Comparison in N° (3)=(1)-(2) (3)	In % (4)= (3)/(1)x100 (4)
Services	Infant and Child Health					
	Maternity					
	Adult					
	Dental Health					
Boxes for variable services	Infant and Child Health					
	Maternity					
	Adult					
	Dental Health					
Variable human resources	Infant and Child Health	Doctors				
		Param. Prof.				
		Param. Aides				
	Maternity	Doctors				
		Param. Prof.				
	Adult	Doctors				
		Param. Prof.				
	Dental Health	Dentists				
		Dent. Aides				
Fixed human resources	Establ. as a whole					



## 5 Identifying potential solutions

*This chapter shows how the conclusions of the diagnostic study can be used to find a solution to the problem or problems identified. This is done by visualizing the problem over the medium term, and determining what human and physical resources will be needed to solve it within that time frame. Finally, from that point different actions can be identified that will make it possible to solve the problem, and the specific requirements for each one can be determined.*

### 5.1 Introduction

The identification of alternatives consists of originating project ideas that will make it possible to solve the problem or problems that have been detected. If the problem identified in the diagnostic study is one of a lack of equipment and/or human resources, a solution is sought for the present need. It does not make sense to store up equipment for the future or to hire staff in advance.

Nevertheless, if the problem diagnosed is one of infrastructure, the solution should not only satisfy current requirements, but those that are projected for the future. It is not feasible to keep building, year after year, to keep pace with population growth. Consequently, it is better to choose medium-term solutions (10-15 years).

For the purposes of these guidelines, it is important to clarify the following concepts: present situation, additional, year-1 situation and projection-year situation.

**Present situation:** this is the situation that exists at the time when the study is carried out. Where physical resources are concerned, reference is made to a listing of the spaces used for boxes, an inventory of equipment, etc. In the case of assigned population, services and other items, the information will consist of the latest statistical information available. This will usually be the data for the previous year, but for the purposes of the study they will be considered current. In any event, it is advisable to verify the information in the field and update it whenever possible.

**Additional:** this is the amount by which an item (e.g., assigned population, services delivered or resources used) is increased or decreased by the project. It should be borne in mind that the additional will not exist if the project is not implemented, i.e., the term “additional” refers to the

difference between a “no project” situation and the situation “with the project”.

Where a new establishment or a replacement are involved, the “additional” concept refers to the total amount of services and resources. However, if the population assigned to a health care establishment is reduced, it will increase for another establishment; in such cases, the net result should be used.

**Year -1 situation:** this refers to the theoretical situation during the first year of project operation. It usually consist of the present situation plus the additional. In determining year-1, it is important to take into account all the stages of the project, from inception to implementation, must be taken into account, and the time each stage will take must be estimated. When all these time frames are added to the present date, the year when the project will actually be put under way can be estimated.

#### **Example 23: Estimating Year 1**

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*During preparation of a health infrastructure project, the following time periods were estimated for the stages that would have to be completed before the project could be put underway:*

- Preparation of profile	3 months
- Approval of project	4 months
- Architecture project	2 months
- Engineering design	2 months
- Application for financing	6 months
- Bidding on works	2 months
- Execution of works	18 months
- Equipment and furnishings	2 months

---

*Thus, a total time of 39 months would be needed before the project operations could start. Consequently, assuming that it was now the last quarter of 1995, Year 1 would be 1999, provided that no extra time had to be set aside for requesting project approval or funding. Should that be the case, it would be advisable to indicate a starting and a finishing date for each stage, in order to meet the established deadlines.*

**Projection-year situation (year x):** this refers to the theoretical situation that would exist during the year chosen as the projection horizon. In order to determine this situation, projections of demand must be made, as explained below

## **5.2 Projecting demand**

The demand over the horizon projected beginning with the year when the project is being prepared should be estimated by projecting the population assigned to the establishment that is the focus of the



problem and to each establishment in the area of influence. This is done by using the following formula:

$$AP_x = AP_A * \frac{(1 + d)^x}{100} \quad (4)$$

where:  $AP_x$  = Assigned population projected to year x

$AP_A$  = Assigned population for year 1 (current)

$d$  = Annual population growth rate, expressed as a percentage

To obtain these values, “d” must be calculated first; this information is usually available in national statistical institutes. If the available information does not meet the requirements of these guidelines, “d” will have to be calculated from census data for a number of year, applying the following equation:

$$d = n \sqrt[n]{\frac{\text{Final population}}{\text{Initial population}} - 1} \quad (5)$$

where:  $d$  = Annual population growth rate, expressed as a percentage

$n$  = Number of years between the two population data available

This information may be recorded on a table similar to Table IX below.

The information on the assigned population is taken from Table I. It should be noted, however, that once the present situation is improved or possible solutions have been found (see sections 5.3 and 5.4), it may be in order to reassign the population among different establishments in the area of influence. Should that be the case, the population that would be reassigned would have to be added to or subtracted from the Table I figures. With the new data, the assigned population would be projected for the solution that is being considered<sup>21</sup> (see example 25).

<sup>21</sup> Note that the population would have to be projected for each one of the possible reassignments being considered.

**Table IX: Projection of assigned population**

Name of establishment:

Year:

Program	Age group	Assigned Population	Growth factor*	Assigned population	
				Year 1	Year of projection (Year x)
Infant and Child Health	0-14 years old				
Maternity	Women aged 15 and over				
Adult Health	General population aged 15 and over				
Oral health	General population				

- To be estimated for each project or for the country as a whole.

**Example 24: Estimating growth rate and assigned population**

*At a certain location, no information on annual growth rate is available, but two censuses have been taken, the findings of which were as follows:*

1982 population: 3,500

1992 population: 4,900

*The formula shown above is applied, and the results are as follows:*

$$d = (4900/3500)(1/10) - 1 = 0.0342$$

*In other words, between 1982 and 1992, the population of the area grew at an average annual rate of 3.42%.*

*With this information, it is possible to project the assigned population for a given establishment. Assuming a projection horizon of 10 years and a present assigned population of 10,200, the equation would work as follows:*

$$PA_{10} = 10,200 \times (1 + 0.0342)^{10} = 14,280$$

*Thus, assuming that the growth rate remains unchanged, it can be estimated that, by the year of projection, the population of the area will be approximately 14,280.*

The growth factor is the percentage population growth in the smallest possible territorial unit(s) included in the area of influence. In the Latin American countries, for example, information is usually available at the regional, provincial and community levels. In such cases, the information on the community or communities included in the area of influence would be used.

It is important to obtain the population growth rates by age groups, according to the programmes to be carried out (infant and child health, maternity, adult and oral health).

Once the projected assigned population has been estimated, the number of examinations that will be required by that population by the year of projection should be estimated; the number of additional examinations with respect to the present situation should be noted.

In estimating the number of examinations, the same rate should be used that was used in estimating the number of examinations expected (NEE) in Table V. This information may be summarized in a table like the one shown below as Table X.

#### Example 25: Reassigning population

*Let us assume that there are two health centres (A and B) in a city of 100,000 inhabitants. Each centre has an assigned population of 40,000 people. The rest of the population are in the middle and high income sectors, and use private medical services. Both centres are overcrowded, since each one was originally designed to serve a population of only 30,000.*

*There are at least two possible solutions to this problem. The first would be to expand both health centres so as to enable them to serve the current assigned population, as well as to absorb future growth. Thus, the population assigned to each centre would have to be projected to year 1 and to year x. Since the areas assigned to the two centres may have different population growth rates, the projected demand would probably not be the same for both.*

*Another possible solution would be to expand only one establishment (A) and reassign part of the total population to it, in order to avoid overcrowding in the other health centre (B).*

*However, if 10,000 inhabitants were reassigned to centre A, centre B would soon become crowded again, as a result of further population growth.*

*It would therefore be advisable to begin by assuming that the establishment that would not be expanded (B) would serve a population of 30,000 by the horizon year projected (year x). The estimated population growth rate for the area covered by centre B would then be used to estimate the population that should be assigned to it right now so as to ensure that it would be serving 30,000 people by year x.*

*Let us assume, for example, that the area covered by establishment B has an annual population growth rate of 2%, while the area covered by establishment A has an annual growth rate of 4%, and that a projection horizon of 10 years is to be used. The following results would be obtained:*

$$P_{B-10} = 30,000 \text{ inhabitants}$$

$$P_{B-1} = P_{B-10} / (1.02^{10}) = 24,610 \text{ inhabitants}$$

*Thus, around 14,000 people would be reassigned to centre A, and the final figures would be as follows:*

$$P_{A-1} = 40,000 + 14,000 = 54,000 \text{ inhabitants}$$

$$P_{A-10} = P_{A-1} * (1.04^{10}) = 79,933 \text{ inhabitants}$$

*Thus, the expansion should be designed so as to enable health centre A to serve 80,000 people by the horizon year projected. In other words, it would need to expand its capacity to serve an additional population of 50,000.*

Picture 6: Redatam

The information shown in the columns "Assigned population", "Year 2" and "Year x" is taken from Table IX; the examination rate, as indicated above, is the one used in the diagnostic study to estimate demand; the column "Present examinations" is taken from Table I ("Examinations performed"); the columns "Total examinations performed" are obtained by multiplying the assigned population by the examination rate; and the information to be entered in the last two columns will be the difference between examinations delivered at present and the total number of examinations expected.

### REDATAM+

The REDATAM+ programme (Retrieval of data for small areas by microcomputer) was developed by CELADE in response to the countries' need for a rapid and low-cost way to access information on population and housing in small geographic areas.

Redatam+ may be defined as a friendly interactive microcomputer system which provides access to statistical files that are organized by geographic regions. These statistical data are usually taken from country censuses or large-scale demographic or other socioeconomic surveys. The main objective is to organize and maintain these voluminous files within the limited capacity of a microcomputer, so that tables or other statistics can be generated for small geographic units, such as cities, neighbourhoods or blocks, or for groupings of such units.

To a large extent, the usefulness of Redatam+ depends on whether it can be linked to geographic information systems which allow for alphanumeric data to be expressed cartographically. Such systems make it possible to show in territorial terms the main socioeconomic features or the physical infrastructure of a community.

It should be noted that if the project is a new one, all examinations will be additional, since no services are being delivered at present.

With this information, the problem identified in the diagnostic study can be quantified, both for year 1 and for the horizon year projected. If the diagnostic study shows that there is a deficit in services, the projection will make it possible to determine the extent of such a deficit over the medium term.

**Table X: Demand for health care**

Name of establishment:

Year:

Programme	Assigned Population		Examination Rate	Present Examinations	Total Examinations Expected		Additional Examinations Required	
	Year 1	Year x			Year 1	Year x	Year 1	Year x
Infant and Child								
Maternity								
Adult								
Oral Health								

**Example 26: Total and additional examinations**

*Let us assume that in a certain location, there is no health care centre, and one must be built. In other words, at present there are no services, and the deficit or problem amounts to the total number of examinations expected, both for year 1 and for year x.*

*Thus, all examinations performed during year 1 and during the projected horizon year will be additional. By the same token, if an establishment does exist but it is beyond repair and must therefore be replaced (a new one must be built), all expected examinations will be considered additional.*

It should be noted that in projecting the deficit, both of examinations and of human and physical resources, it is assumed that the only cause of variation would be population growth. It is assumed that all other factors that might affect the examination rate or the demand for resources would remain constant, all other things being equal.

**5.3 Optimizing the present situation**

It is crucial to improve the present situation before deciding on any proposed solution. This means making a study to determine what measures should be taken, with a minimum use of resources, to partially or totally solve the problem that has been identified. Such measures will usually be administrative in nature, or they may sometimes involve marginal investments not included in the overall cost of the project.

### Example 27: Optimizing the present situation

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*Let us assume that the diagnostic study carried out at an overcrowded health centre has shown that there was an infrastructure deficit—specifically, that there were not enough boxes for the infant and child health programme. Nevertheless, the necessary human resources and equipment were available to meet the demand for health care.*

*In this case, since the problem had to do with infrastructure, the first idea that came to mind was that the establishment should be enlarged. However, the needs of the entire population could probably be met simply by adding another shift to the daily work schedule of the establishment*

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The measures taken to improve the present situation can significantly alter the costs and/or benefits of the project. It is important to improve the present situation as much as possible so that the estimated benefits can actually be attributed to the project. This helps ensure that benefits are not overestimated in comparing the “after-project situation” with the present situation before improvements; instead, the comparison will be between the after-project situation and the improved present situation. Moreover, if the pre-project situation is not optimized, there is a risk that the estimates for the new project will not be accurate.

### Example 28: Importance of comparing post-project situation with optimized pre-project situation

---

*A health care establishment is overcrowded. The available information shows that it was built 20 years ago to serve a population of 15,000.*

*At present, the health centre is in good shape, it operates one shift, and has an assigned population of 50,000. The sudden growth of the population was due to the fact that new population groups moved into the area from other parts of the country. Hence, both the area of influence and the geographic area have experienced a population growth far in excess of the normal vegetative growth.*

*Given this situation, the authorities concerned are considering expanding the establishment, since this would bring the “benefit” of enabling it to serve 50,000 people.*

*This is an erroneous conclusion, however, because the post-project situation has been compared (in terms of benefits) with the present, pre-project situation, which has not been optimized.*

*It should be borne in mind that the establishment can adequately serve a population of 15,000. By adding a second shift, it would have the capacity to serve a population of 30,000.*

*Thus, the “additional” population to be served would be equal to the difference between services delivered at the optimized pre-project level and the level of service that is actually required. The net benefits of the project should therefore be estimated in terms of 20,000 people, since the remaining 30,000 can be served even without the project.*

---

Among the measures that should be considered during the optimization process are the following:

- Redistributing staff, either within an establishment, among programmes and/or shifts, or among establishments within the area.
- Hiring additional staff (or letting staff go, If they are redundant).
- Reassigning population among establishments, provided there are establishments in the area that have idle capacity.
- Increasing the working hours of one or more establishments, possibly in connection with changes in assigned population.
- Redistributing equipment or medical instruments internally (among programmes) or among establishments.
- Making minor repairs in space or equipment (when this can be done without requesting additional resources).
- Improving efficiency in the delivery of services through training, changing procedures, implementing computerization, applying incentives, etc.
- Educating the community in order to reduce examination rates (as a result of lower morbidity rates and/or a reduction in unnecessary examinations).

It must be borne in mind, however, that many of the measures suggested above entail higher operation costs, especially if additional staff are hired or working hours are increased by paying overtime. The increase in costs must be estimated and the necessary additional resources need to be requested.

## 5.4 Types of projects

If the problem is approached by implementing a programme, the following aspects should be taken into account:

- **Food programmes:** These are projects which provide food to meet basic subsistence needs of individuals.
- **Training:** These projects are aimed at giving people the skills they need in order to carry out certain activities.
- **Monitoring:** These projects involve measuring and taking certain steps in order to maintain or achieve certain levels in indexes such as the infant mortality rate, control of hydatidosis, etc.
- **Eradication:** These are projects designed to eliminate a given disease or situation, e.g., malaria eradication programmes.
- **Nutrition:** This type of project is aimed at providing special foods to malnourished individuals in order to restore them to pre-established standards (weight/size; weight/age).
- **Prevention:** These are projects that are intended to prepare people or animals in advance, in order to prevent a specific risk, e.g., cholera, hepatitis, etc.
- **Vaccination:** The purpose of these projects is to protect the health of people or animals by reducing the impact of a contagious disease.

On the other hand, if the solution is to be found by providing infrastructure or equipment, other types of projects would be considered for health units, health care centres and hospitals. In determining what type of project should be envisaged, the following definitions should be borne in mind:

- **Expansion:** These are projects that are designed to increase the installed capacity of a service without changing the existing facilities. An expansion project may involve increasing both the theoretical installed capacity and the actual capacity. The theoretical installed capacity is increased when under the present or pre-project conditions, the establishment is overcrowded



and the project would increase the physical space without there necessarily being an increase in the population assigned to the establishment. The actual installed capacity is expanded when the project makes it possible to increase the population assigned to the establishment that is being enlarged.

- **Building:** This consists of materializing a service that does not exist at present. Such projects include all those that involve the creation of an establishment designed to delivery some type of health services that was not heretofore offered by the health system in the area studied.
- **Procurement:** These programmes entail purchasing and/or installing the elements that are needed so that a health establishment can operation under optimum conditions. This type of project is understood to involve the purchase and/or installation of “new” elements in an existing establishment, since this is essential for the operation of the centre and should have been considered and included in the original project to set up the establishment. Procurement projects may also call for the replacement of equipment, i.e., renewal of existing equipment, which may also include increasing the inventory of equipment.
- **Upgrading:** These projects are intended to improve unsuitable facilities, and include projects that involve remodeling and/or repairing existing buildings in order to make them suitable for the delivery of health care services.
- **Standardization:** These are projects whereby existing health establishments are modified in order to bring them in line with spatial and traffic standards set by the health authorities. This includes all projects that involve the functional reorganization of a working health establishment.
- **Repair:** Such projects are aimed at repairing existing establishments that become deteriorated from time to time. This includes any works that may be needed to enable the establishment to provide quality health services. There are two types of repairs:
  - Major repairs: Large-scale repairs that must be designed and executed by experts in the field, such as roof covering, general electrical system, etc.

- **Minor repairs:** Less complex repairs, such as changing windows, fixing plumbing, etc.
- **Replacement:** These projects involve the partial or full replacement of existing projects, with or without changing installed capacity and/or the quality of services delivered. The difference between building projects and replacement projects is that in the case of building projects, the health system had not previously been delivering health care to the population in the area studied, whereas in the case of replacement projects, services are being provided but not according to the efficiency and quality standards set by the country's health system. Thus, replace a health establishment is not the same as "creating" one, even though the project involves building a new work.
- **Relocation:** These projects are aimed at changing the location of a health establishment that will deliver the same services to the same population, although the relocation may involve changing the quality of services and/or the installed capacity of the establishment. The purpose of relocation projects is usually to bring the services "closer" to the assigned population.

## 5.5 Generating and describing alternative solutions

At this point, the time has come to identify possible solutions to the problem identified. It is important to generate more than one possible solution, in order to visualize all the options that are available and not make a hasty choice.

The alternatives should be quantified carefully, bearing in mind the conclusions of the diagnostic study conducted in the area of influence. The study should make it possible to determine where there is a surplus of resources that might be used to solve the problem at the reference establishment.

If the problem is one of infrastructure in the area of influence, then any solutions that are proposed will have to do with the infrastructure of the health system. On the other hand, if the problem is not in the infrastructure, the solution may be found through the Health Service or some other initiative may be generated.

**Example 29: Multi-sectoral approach to solving problems according to their cause**

*A certain town in the region had a high infant mortality rate. A diagnostic study showed that the situation was caused by poor food-handling practices on the part of mothers and by malnutrition among children.*

*In this case, the problem was not solved by sending more doctors to the area, nor by creating centres for undernourished children, but rather by putting underway a supplementary food programme for children between the ages of 0 and 6, and by teaching mothers about food handling and cleanliness.*

Once the alternative solutions have been identified, a detailed description of each one should be developed. Before this, however, a preliminary analysis should be made, and any options that do not appear to be feasible given the existing circumstances—legal, administrative, economic, etc.—should be discarded.

The detailed project descriptions should include estimates of human and physical resources required to ensure proper project operation (optimum size), as well as the proposed location of the project in order to ensure adequate service (optimum location).

Following are some suggestions on how to estimate needs in regard to infrastructure, human resources and procurement.

### **5.5.1 Infrastructure requirements**

The infrastructure that will be required over the horizon projected may be determined based on the projected demand for health services.

Infrastructure requirements for each programme and for each establishment within the area of influence are estimated by applying equation (2) above (page 63), using the number of examinations expected for the horizon year projected (year  $x$ ). This information may be recorded in a table such as Table XI below.

**Table XI: Variable spaces, or boxes, projected to year x**

Name of establishment:

Year:

Programme	NEE	NEEH	Yield/Box/Hour *	Number of boxes		
Infant and Child Health				Required	Existing	Additional
Maternity Service						
Adult Health						
Oral Health						

\*Technical parametre.

For each alternative solution, the assigned population and the number of examinations expected should be noted both for year 1 and for the horizon year projected; the number of variable spaces required should also be noted.

### 5.5.2 Estimating physical resources

The variable human resources that will be needed to deliver the services projected may be estimated by filling out the tables shown below.

Table XII is designed for estimating the total number of doctor hours required and the number that will be additional to those available at present. These estimates are made both for year 1 and for year x (medium term), as well as for the additional number of hours. The information to be filled out in the first two columns is taken from Table IX. The data for the fourth and fifth columns are obtained by multiplying the parametre for each programme by the first and second columns. The information to be filled in the last two columns will be the difference between the number of hours required in year 1 and year x, and the hours currently available (from Table II). The hours currently available would include both the number of hours under contract at present and the surplus of hours available at another establishment that might be reassigned.

**Table XII: Variable medical personnel**

Name of establishment:

Year:

Alternative solution:

Programme	Assigned Population		Doctor/hours/month				
	Year 1	Year "x"	Per inhabitant (technical parametre)	Required		Additional	
Infant and Child				Year 1	Year "x"	Year 1	Year "x"
Maternity Services							
Adult Health							
Oral Health							

In the case of new projects, there will obviously be no information on hours under contract, but there may be a surplus within the area of influence that could be reassigned.

The number of paramedic professionals and paramedic aides is estimated following the same procedure shown above. This information may be set forth in tables such as those shown below as Table XIII and Table XIV.

**Table XIII: Variable paramedic professionals**

Name of establishment:

Year:

Alternative solution:

Programme	Assigned Population		N° of Paramedic Professionals				
	Year 1	Year "x"	Per inhabitant (technical parametre)	Required		Additional	
Infant and Child				Year 1	Year "x"	Year 1	Year "x"
Maternity Services							
Adult Health							

**Table XIV: Variable paramedic aides**

Name of establishment:

Year:

Alternative solution:

Programme	Assigned Population		N° of Paramedic Aides				
	Year 1	Year "x"	Per inhabitant (technical parametre)	Required		Additional	
Infant and Child				Year 1	Year "x"	Year 1	Year "x"
Oral Health							

(It should be noted that paramedic aides only participate in the infant and child health programme and the oral health programme.)

The information generated by these tables will produce an estimate of the additional variable human resources that are needed. However, the project will also need fixed human resources.

The additional fixed human resources required are estimated by drawing up a staff list based on the proposal included herewith as Annex 3. Total requirements should be estimated both for year 1 and for year x, and this information is compared with the information on the present situation. It will then be possible to estimate the additional staff that will be needed both for the first year and for the horizon year projected.

It should be noted that the available staff is the staff that has already been hired plus any surplus there may be at another establishment, provided this extra staff can be reassigned to the establishment where the project will be implemented.

**5.5.4 Location**

A study should also be made of the different possible geographic locations for each possible solution. A preliminary analysis will refer to the zone where the project would be located as the **macro-location**.

A study will then have to be made to determine the standards that must be met by the **property** in order to be suitable for the project. In other words, an analysis of the **microlocation** will also be necessary, inasmuch as it will have a direct bearing on the design of the project.

The property on which a health establishment (of any type) is to be built should meet the following basic requirements, among others:

(a) Accessibility

The property must be easy to get to by the means of transport and under the conditions prevailing in the area.

If the project is to be located in an urban area, the availability of public transport should be borne in mind; if it is to be located in a rural area, the property should be close to a main road.

In the case of a rural health establishment, there should at least be roads on which people can travel by horse or by foot.

(b) Community activities

Providing direct services to patients is not the only purpose of a health establishment, especially one that is designed for primary health care. These establishments also carry out educational activities geared towards the community. Thus, it is important that it be located as close as possible to the area where most community life takes place (schools, stores, parks, etc.), in order to ensure that it becomes an integral part of the community.

(c) Safety

Health establishments should be located at a safe distance from heavily travelled highways, railway stations and crossings, vacant lots, etc. It is also important to ensure that it is not close to areas where natural disasters are likely to occur (avalanches, floods, etc.).

(d) Pollution-free zones

In order to avoid harming the population, the health centre should be located in such a way as to avoid winds and drafts from garbage dumps, toxic industries, animal breeding grounds and other highly polluted areas.

(e) Geographic features of the property itself.

It is important to ascertain the suitability of the land itself for the project. This will involve analysing soil quality, topographic features and size of the lot, in order to meet governmental standards for public spaces.





## 6 Assessing the options

*The objective of this chapter is to identify and quantify the benefits and costs of each proposed solution. Different evaluation methods are discussed, so that the most suitable option, in terms of the country's growth and development, can be chosen.*

### 6.1 Introduction

Like any other investment, projects in the health sector give rise to benefits and costs. A project will be good for society if the benefits it generates are greater than the costs incurred in implementing it. It is often difficult to identify all the benefits a project will generate, and even more so to estimate the monetary value of these benefits.

In fact, it is usually so difficult to assign a value to the benefits of a health project that it is simply assumed that health is a need that must be met by the state. The benefits of a project are identified and quantified (if possible) on the assumption that the benefits are greater than the cost of attaining them.

Each project option will have costs and benefits, and these must be studied in order to decide which one should be chosen. In some cases, it may be assumed that all the proposed projects will generate the same or similar benefits, and hence, the choice will depend on which one is less costly.

### 6.2 Identifying and assessing benefits

In considering the potential benefits of a health project or programme, it should always be borne in mind that the objective in every case is to save lives (postpone death) and reduce the incidence of disease. Disease control programmes may have a dual purpose, i.e., it may be designed with both humanitarian and economic considerations in mind.

The humanitarian goals are obvious and do not need to be elaborated. From the economic standpoint, it should be noted that health is both a consumer good and an investment. It is a consumer good because people feel better when they are in good health; it is an investment because it improves production, both at present and in the future. As an investment, health contribute to the development of human capital, since individuals become better agents of production and thus make it possible to achieve

greater productivity in the future. This is also true of other instances in which human capital is developed, e.g., education.

The services that are offered by health establishments bring benefits at the level of individuals and of society as a whole. Part of this value is translated into greater productivity. The benefits that are generated, however, will depend on what use the person makes of the health he/she has received.

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**Example 30: Benefits depend on whether people make the most of their improved health**

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*Two people are in a drug rehabilitation programme. One of them finishes the programme and manages to find his place in society. He gets a job, is accepted by society and starts a family. The other person, however, falls back into drug abuse and becomes a delinquent.*

*Thus, he does not personally appreciate the new opportunities that have been opened up to him as a result of his improved health, and thus, he does not realize the value of being accepted by society according to its standards.*

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Consequently, even though both individuals have received the same help, the benefits generated by the rehabilitation programme have not been the same in the two cases.

Therefore, in order to measure the real benefits of a health project, it will be necessary to find out how the health services delivered have changed the lives of the people who received them (e.g., by comparing their situation with the situation of a similar group that did not receive the services). An effort should also be made to find out how much the people appreciate the improvement in their health. This is not easy, and it will be even more difficult to estimate the benefits of a project that is in the preinvestment stage. The cost and effort required to make a good estimate of the benefits of a health project may in fact be greater than the cost and effort required to actually implement the project.

In view of the above, health projects are often evaluated according to the basic needs approach proposed by professor Arnold Harberger (originally presented in Harberger, A., 1984; see also Gutiérrez, H., 1993). Harberger assumes that society considers that benefits of health care outweigh the costs involved in providing it. However, this is only true of certain groups and up to a certain limit.

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**Example 31: Basic needs and types of projects**


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*Let us consider the case of a project that involves building a health centre to serve the population of an extremely poor area. The nearest establishment offering the same type of health care is 80 kilometres away, and the roads are in bad shape.*

*As a taxpayer:*

*- Would you be willing to have your taxes used to build and operate the health centre?*

*- Or, on the other hand, would you be willing to have your taxes used to build and set up an aerobic gym in a high-income sector, since exercise is good for health?*

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Consequently, even though it hard to assess the benefits of health projects, it is important to do so and to identify the beneficiaries of such projects. The benefits to be gained from improving the health of the population may be classified in terms of increased individual productivity and of health as a consumer good.

From the standpoint of productivity, the benefits are the result of:

- Fewer premature deaths
- Less time wasted, both on the job and during leisure hours
- Stronger workers who are less likely to lose their ability to work hard

In other words, there is a reduction in the harm caused by poor health. The benefits of a given project would consist of the degree to which it would reduce the harm caused by illnesses. In theory, part of these benefits would be measurable in terms of the increased time available and the greater productivity of individuals as a result of their enjoying better health. From this standpoint, estimates would need to be made in two areas:

- The gains in productive working hours brought about a given project, and
- Assessing the monetary value of the time saved by postponing death or reducing down time caused by illness, or to the loss of productivity caused by weakness resulting from illness

However, a number of problems arise in this connection, including the following:

- How much will a person earn during the rest of his/her life? This depends on their age, age at death, experience, employment status, i.e., on how much they contribute to the product at each age in life.
- In the case of people who do not work or who work but do not receive monetary compensation, how much is their time worth?

Clearly, it is difficult to assign a monetary value to the measurable benefits of an investment project.

As regards the benefits of health as a consumer good, the following factors are involved:

- The emotional suffering of family members
- The inconvenience and discomfort caused by sickness

Such benefits are even more difficult to express in monetary terms. Given the difficulties discussed above, therefore, it will be necessary to use other means, such as indicators, which are not benefits themselves, but are related to them. Thus, when it is difficult to measure and assess the benefit itself, it is possible to measure one or more variables that may be directly related to the real benefits of the project. It may usually be assumed that if the project affects these variables, the benefits expected will materialize.<sup>22</sup>

To this end, the following indicators may be used as proxy variables for benefits, especially in the case of primary health care projects:

- Infant mortality rate
- Infant malnutrition rate
- Professional care at delivery

Unfortunately, it is usually difficult to estimate how a given project will affect these indicators. That is why the benefits of a project are usually “measured” in terms of the products it is intended to deliver, such as:

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<sup>22</sup> The only way to know if this is indeed the case is to monitor the project carefully and conduct a thorough evaluation when it is completed.

- Number of examinations (per programme)
- Number of vaccinations administered
- Amount of food distributed

It should be noted the the aforementioned variables are not benefits of the project; they only measure the volume of service produced. One may assume that the greater this volume is, the greater will be the benefits perceived by society.

### **6.3 Identifying and assessing the costs of each alternative solution**

The costs of a health project may be divided into four categories:

- Investment costs
- Operating costs
- Maintenance costs
- Costs to users of the service

Some of the general concepts that are applicable to all project costs are described below, and some guidelines on how to estimate them are discussed.

#### **6.3.1 General considerations**

In this section, some general aspects of all project costs are discussed, and some are then discussed in detail in connection with specific costs<sup>23</sup>

- a) All resources required by the project, regardless of whether they belong to the institution concerned, or donated or loaned at no cost, must be assessed in terms of the social usefulness. This must be done because from the standpoint of society, any resource that is used for the project might be used for some other activity (an alternative use). When a resource is used in a given investment initiative, society stops receiving the benefits it would get from using the resource in another project or activity.

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<sup>23</sup>

For a broader discussion of these issues, see Gutiérrez, 1993.

- b) For society, the taxes on project inputs are not a cost. Indeed, even when they must be paid when the project is executed or during its operation, they are used for other works. It is assumed that resources that are taken from the project in the form of taxes are used by the Government (national, regional or local) for other projects that are equally profitable. On this assumption, taxes on project resources are for society, which is tantamount to taking money from one pocket to put it in another pocket.

Thus, both the net and the gross prices of taxable resources must be listed. **The net cost is to be used in connection with the project evaluation and the gross price is to be used in drawing up the project budget** in order to determine how much funding is needed.

- (c) When pertinent, the social price of the inputs required for the project should be estimated. Taxes are deducted from the prices of inputs in order to determine how much the project is really costing society. In some cases, however, that is not the only correction that is needed. Because the market is subject to other, non-tax-related distortions, the private price of inputs must be adjusted by a correction factor in order to determine its real cost to society. These correction factors are called social prices, the most commonly used ones being the social price of manpower and the social price of foreign exchange. These are usually estimated on a yearly basis by the central planning or economic agency, and are distributed to the different project-evaluation bodies.

These estimates are obtained by multiplying the private price of the input by the correction factor (social price). The result is the real cost of the input to society.

All money figures should be expressed in terms of a currency at the same point in time (including the exchange rate). This is particularly important when a country has double-digit inflation. In order to ensure that the cost assigned to different resources makes sense, all money figures must be expressed in terms of the same purchasing power of currency.

The following steps should be followed in order to bring all figures in line with the same date:

- Choose an indicator that will allow for price corrections to be made; this will usually be the consumer price index or the wholesale price index.
- Determine the index value for the date of the known price of each resource.
- Chose the date to be used in expressing all costs, and look up the corresponding index value.
- Calculate the corrected prices or costs, i.e. expressed in terms of the currency at the desired date, by using the following formula:

$$\text{Corrected price} = \text{Known price} * \frac{\text{Index Known price}}{\text{Index Corrected price}} \quad (6)$$

### Example 32: Updating prices

*Suppose that the Ministry of Health plans to conduct its second annual AIDS-prevention campaign. It will distribute pamphlets and posters and broadcast spots on radio and television.*

*In January 1994, the Ministry requested a quotation for the pamphlets and posters; the price quoted was \$ 2 459 000. It is known that the radio and television spots broadcast in June 1993 cost \$ 3 600 000.*

*The health authority wants to determine the cost of publicizing this campaign, stated in currency at July 1994, when it is supposed to begin.*

*The authority decided to use the consumer price index which is published every month by the national statistical institute. This shows the following figures:*

*June 1993: CPI = 115.34*

*January 1994: CPI = 157.25*

*In addition, the Ministry of Finance has sent all agencies a CPI table for the whole year. This table shows that in July 1994, the index value will be 185.00.*

*With this information, the estimated costs, stated in terms of July 1994 currency, would be as follows:*

*Pamphlets and posters:*

*\$ 2 459 000 \* (185/157.25) = \$ 2 892 941*

*Radio and television advertising:*

*\$ 3 600 999 \* (185/115.34) = \$ 5 774 233*

*Thus, the total estimated cost of publicizing the campaign would be \$ 8 667 174 (since this is only an estimate, the figure may be rounded up to \$ 8 700 000).*

### 6.3.2 Investment costs

Investment costs are the costs incurred from the time project execution is begun until it is ready to start operations. In other words, investment costs are all costs incurred from the time the decision is made to undertake a project until it is ready to begin providing services.

In the case of health projects, this will include all expenses incurred until the establishment begins to delivery health care or until the programme is put underway.

The investment costs of a health project usually include the following:

(a) Land

This is the cost of the physical space required to execute the works. In determining the area required, the architectural standards for such establishments in the country concerned should be used. The area required for the work itself, grounds, room for expansion and other aspects should all be taken into account.<sup>24</sup>

The land should be assessed at market prices, regardless of whether it is to be purchased, or it belongs to the institution, is donated or is loaned free of charge. That is because the land can always be used for another purpose, and therefore, the fact that is used for the health establishment entails a cost to society. However, this cost is to be considered only for purposes of the assessment and is not to be included in the project funding budget, unless it is actually necessary to purchase the land.

When the land is to be purchased for the project, it is important to consider the total cost of such a purchase, including the amount to be paid for the land and all expenses involved in the transaction (notary feels, title transfer costs, etc.). If the land is available or is to be donated or loaned, the imputed value should be the market price (the price at which it could be sold, provided there were no impediment).

In addition, all expenses that will be incurred in order to prepare the grounds, such as clearing, drainage, levelling and fencing, should be included. Likewise, if the property is not connected

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<sup>24</sup> Where hospitals are concerned, it is recommended that the building should not take up more than 30% of the total area of the property. In exceptional cases, such as when underground parking is planned, the building may occupy 50% of the land. In the case of a building to house doctors' offices, it is usually all right to occupy 50% of the property, since less area will be needed for parking, loading and unloading, lawns, etc.



to utilities (electricity, potable water, sewers), the cost of these connections should be included, as well as the cost of conducting a feasibility study on utilities, should such a study be needed.

Any cost that is incurred in connection with a tax (e.g., title transfer tax) should be taken into account for the project budget, but not for purposes of the evaluation.

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#### **Example 33: Assessing a property**

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*Suppose a health centre has to be expanded by 1,000 m<sup>2</sup> and that there are two vacant lots of the same size (550 m<sup>2</sup>) right next to it. One of them belongs to the city, which has offered to loan it free of charge to the Health Service for 100 years. The second one is privately owned and may be purchased at a cost of \$ 22 500 000. In addition, there is a title transfer tax of 5% of the sale price.*

*In assessing the cost of the project, an amount of \$ 45 000 000 would be included to cover the cost of the land,*

*since the private property would cost \$ 22 500 000 and the city property, even though it would be granted on loan, must be assessed at its market price, which is estimated in terms of the price of the other lot. The transfer tax is not included in the assessment of social costs.*

*However, only the cost of one lot would be included in the project execution budget; this would amount to \$23 625 000, which represents the cost of purchasing the private property (\$ 22 500 000), plus the transfer tax (\$ 1 125 000).*

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Moreover, in estimating the cost of buying the land, its residual value must also be taken into account. The residual value is the estimated price at which the land can be sold at the end of the useful life of the project. The price of land usually goes up rather than down; hence, even being conservative, it would be safe to say that when the useful life of the infrastructure ends, the land could be sold at its original purchase price.

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#### **Example 34: Residual value of properties**

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*Continuing with the previous example, suppose that the infrastructure to be built has an estimated useful life of 30 years.*

*It may therefore be assumed that by the thirtieth year, the expanded section of the health centre would cease operations.*

*The property that is on loan would be returned to the city, and would therefore not generate any income. The private property that was purchased could be sold, however, and could generate an income (in year 30) of \$ 22 500 000 (assuming the buyer would pay the transfer tax).*

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(b) Construction<sup>25</sup>

Construction costs include the value of buildings and other physical works that are required in order to materialize the proposed project. This includes the cost of purchasing and transporting materials, as well as manpower, supervision, advisory services and other elements needed in connection with the construction of the physical works.

The assessment should be made in terms of cost per square metre, and a distinction should be made between construction, remodeling, repair and other costs. It is suggested that the reference unit should be the cost per square metre of construction of the most recent works that are similar to the project works that have been built in the area being studied (this cost usually includes all expenses incurred by the construction company in executing the work). If no similar projects have been built in the area, reference may be made to construction costs of other buildings, provided they are similar to those of the proposed health project. If no reference point can be found, a detailed budget of the construction will have to be drawn up. The advice of an expert in construction costs who is familiar with the area should be sought for this purpose.

It should be noted that if the project involves an expansion, only the additional square metres should be considered, not the entire Medical Architecture Programme.

In estimating the social value of the project, it may be necessary to correct some of the prices of inputs in order to convert them to social prices. In this case, taxes will not be included; some correction may be needed to eliminate market distortions.<sup>26</sup>

It will also be necessary to estimate the residual value of the buildings by the end of the useful life of the project. This will be the estimated sale price of the buildings to be constructed, minus the cost of the land, which has already been considered.

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<sup>25</sup> This section refers to construction in general terms, which may include construction, repairs, remodeling, etc.

<sup>26</sup> This is done by applying the so-called social prices, the most common of which are the social price of labour and the social price of foreign exchange.

Finally, as in the case of the land, an assessment must be made, at the relevant market prices, of any contribution in the form of manpower and/or inputs that may be made for project construction. These are considered for purposes of assessment, but not for the budget.

(c) Furnishings

This is the value of the furniture and other elements needed in order to begin operations. This would include chairs, desks, medical equipment, instruments, etc. The cost of furnishings should include installation costs, when pertinent.

If an establishment is being expanded or replaced, only the remaining equipment needed, rather than the complete inventory, should be considered.

Furnishings are assessed at market price for purposes of the project budget, but for purposes of evaluation, taxes should not be included. Donated furnishings are also assessed at market price for project evaluation. In some cases it may be necessary to correct the market price of equipment in order to obtain the social price. In the case of imported equipment, it will often be necessary to correct the price by applying the social price of foreign exchange.

A cost that must not be forgotten is the cost of replacing equipment, particularly since its useful life is usually shorter than the useful life of the infrastructure. Consequently, during the time period covered by evaluation, some of the equipment will need to be replaced. Since different types of equipment have different useful lives, it will be necessary to estimate each type would be replaced. This cost should be noted in the project cash flow for the year when it would be incurred.

Finally, some equipment may have a residual value at the end of its useful life, and this should be treated as income for the year when it is replaced.

### Example 35: Cost of replacing furnishings

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*Let us consider a project involving construction of a basic hospital. Among other things, the furnishings would include 30 imported hospital beds and 30 locally produced mattresses. The total costs are US\$ 30 000 for the beds and \$ 6 000 000 for the mattresses.*

*Thus, for years 2, 4, 6, 8, 10, 12, 14, 16 and 18, there would be a cost of M\$ 6 000 for mattress replacement. In addition, at an exchange rate of \$ 500 per US\$, a net cost of M\$ 10 000 would need to be budgeted in year 10 for replacement of the hospital beds ( $US\$ 30\,000 * 500 \%/US\$ = \$ 5\,000\,000$ ).*

*The evaluation horizon is 20 years and the social price of foreign exchange is 1.2. It is estimated that the mattresses would have to be replaced every two years, and would have no residual value. The hospital beds would have a useful life of 10 years and a residual value of \$ 5 000 000.*

*However, in evaluating the social implications of the project, this cost would have to be corrected by the social price of foreign exchange. Thus, the cost of replacing the hospital beds would be \$ 13 000 000 ( $US\$ 30\,000 * 1.2 * 500 \%/US\$ = \$ 5\,000\,000$ ).*

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#### (d) Other investment costs

In projects that involve specific action, such as a cholera prevention programme, advertising and other publicity expenses should be included as an investment cost, in order to ensure that the project recommendations reach the target population. These costs may include items such as the printing of flyers and posters, radio and/or television campaigns, etc. In the case of programmes, the purchase of inputs needed to carry them out should be included as investment costs, when they are one-time expenses at the beginning of the programme.

### 6.3.3 Operating costs

Operating costs are all the expenses involved in providing regular health care services. These expenses are quantified on a yearly basis.

In estimating the costs of proposed solutions, the costs that need to be considered, in each case, are those that would be **additional to current costs**. It is recommended that estimates be made for the first year of project operation (year 1) and for the last year in the horizon projected (year x). Then the simple average would be the value that would be assigned to each year. However, if operating costs are expected to change significantly from one year to another, they would have to be estimated separately for each year.

Operating costs for health projects usually include the following items:

(a) Payroll

This item includes the cost of the human resources needed for delivery of health care services. It includes salaries of physicians, paramedics, aides and administrative staff, plus social benefits, bonuses and other costs (gross salary).

In order to identify the costs associated with this item, it is important to consider all personnel who represent **additional disbursements** for the establishment operating the project. **Costs for existing personnel should not be included**, since they will be on the payroll regardless of whether the project is implemented or not. In the case of volunteer workers, strictly for purposes of assessing project costs, an estimate should be made of how much it would cost to hire personnel to perform the work done by the volunteers.

In health projects, the additional staff required for the investment project should be estimated by figuring the difference between the total staff required and the staff currently on payroll, as shown in the last two columns of Table XII, Table XIII and Table XIV; the additional fixed personnel should be added.

In estimating the additional payroll costs for each category, one of two situations will obtain:

- (1) **When a single national, regional or local wage scale** applies for health workers, the reference wages will be those set forth in the scale that is considered representative for each category (physicians, aides, etc.). Since under such a system wage levels usually depend on seniority, an average level of experience will have to be estimated for each category. It should be noted, however, that when this salary scale is substantially different from the market rates for professionals with similar skills, the market values should be used in the social evaluation of the project. In such cases, the salary scale would only be used in preparing the budget of operating costs.

- 2) **When salaries and wages are determined by the market**, an study will have to be made to determine the average level of wages and salaries for each category in the area where the project is to be implemented. In the case of support and administrative staff, levels can be determined by observing ads published in the press, employment agencies and other agencies in the area. This is possible because such staff do not need to have training that is specific to the health sector. Physicians and paramedics, on the other hand, have sector-specific training. Consequently, fair salaries for such personnel must be estimated by reference to other health establishments in the area where the project is to be implemented or in areas having similar characteristics.

Whatever the case may be, it will still be necessary, in drawing up a social evaluation of the project, to correct payroll costs by taking into account the social price of manpower. This can be done by multiplying the estimated cost, possibly according to skill levels, by the corresponding correction factor provided by the institution that is responsible for estimating it (usually the Ministry of Planning or the Ministry of Economic Affairs).

**(b) Inputs**

This item includes the cost of those elements that are essential to the proper operation of the establishment and its delivery of health care services, such as cotton, surgical gloves, antibiotics, detergent, pencils, etc.

As with the categories mentioned above, only the additional cost incurred in executing the proposed project should be considered. When the proposed project involves replacing certain existing inputs by new ones, only the incremental net cost should be considered, i.e., the cost of the new inputs minus the cost of the ones being replaced.

Thus, in a health project, the **additional** materials, medicine and other supplies required for the investment project for a one-year period should be estimated on the basis of the health service's records on use of such items.

In estimating the prices of inputs required for the proposed project, it is helpful to refer to the experience of other health establishments or projects. However, more accurate and up-to-date prices can be obtained by drawing up a list of the inputs to be purchased and finding out their market prices; the prices quoted should include the cost of transportation to the project location. In addition, all applicable taxes should be noted separately. In the case of imported inputs, their prices should be corrected to take into account the social price of foreign exchange in order to assess the social cost of the project.

#### **Example 36: Cost of inputs**

*A project involving renewal of furnishings at a health establishment provides for the purchase of a floor-washing and polishing machine. In this case, the cost of inputs would include the cost of the energy, detergent and wax used by the machine.*

*However, it would no longer be necessary to buy brushes, manual floor polishers or traditional detergents. Consequently, the net annual cost to be considered would be the difference between the cost of the inputs used at present and the cost of the inputs that would be used by the machine.*

#### **(a) Basic services**

This item covers the cost of utilities, such as water, electric power, telephone and, in some cases, fuel for heating and/or air conditioning. It should be borne in mind that, as in the previous case, only the additional costs involved in project execution should be considered.

The cost of utilities can usually be determined by calling the companies concerned and asking for their rates. If this is not feasible, and some of the services have to be generated by the project itself (e.g., a power generator), it will be necessary to determine the costs by contacting the entities that provide the service in question.

#### **(a) Rent**

This item includes the cost of leasing the building or buildings, land and/or vehicles required for project operation. The total cost of each lease, including commissions, should be considered; however, taxes should be excluded for purposes of the evaluation. If a security deposit is required, it should be listed as a cost on the date of payment, and as income on the date when reimbursement is expected.

In estimating these items, reference should be made to the costs incurred for the same purpose in similar projects that have been implemented recently or to quotations made by potential suppliers. The rental rate may also be estimated as a percentage of the value of the property or object rented.<sup>27</sup>

(e) Other operating costs

These include all other operating costs pertaining to the proper operation of the health establishment, such as communications, printing and publications, insurance, bank and financial fees, etc. Only the additional costs incurred in connection with the project should be considered, and for purposes of the social evaluation, taxes should be excluded.

Items that fall within the category of operating costs are those that are commonly used by the health service. The values to be assigned to such items are arrived at by averaging the prices for the first year of operation and the prices projected to the horizon year (year x).<sup>28</sup> Table XV shows how some of the items would be listed:

**Table XV: Additional annual operating costs**

Name of establishment:

Year:

Proposed project:

ITEM	Year 1	Year x	Average
Payroll			
Materials			
Medicine			
Supplies			
Rentals and leases			
General expenditures			
Other			
Total			

<sup>27</sup> For example, it is a common practice to estimate the cost of renting a property as 1% of its value.

<sup>28</sup> It should be noted that variations between year 1 and year x will only be due to changes in the amounts used. It is assumed that the unit price of each input will remain constant.



### 6.3.4 Maintenance

This item covers the expense involved in maintaining the capacity of the real estate or chattels to generate benefits and preventing them from deteriorating or wearing out prematurely. This includes expenditures such as painting and minor repairs on buildings, regular maintenance of vehicles and equipment, repairing and painting furniture, etc.

These costs are usually estimated as a percentage of the value of the property, vehicle or equipment in question. Only the additional costs generated by the project should be taken into account.

### 6.3.5 Costs to users

It will often be the case that a proposed project will call for individuals to travel to the health establishment or change their present travel habits. If the proposed project envisages providing transportation or if it involves changes in travel time and distance, the relevant travel or transportation costs should be considered.

In addition, under present circumstances, users may have long waits in line, and this time represents a cost to them and to society (in terms of wasted time, either leisure or work time).

#### (a) Transportation of patients and companions

This item includes the cost of transportation to and from the institution where the service is provided. In some cases, patients will travel alone and in others they may need companions (e.g., minors, the elderly and people with certain diseases would need to be accompanied). In such cases, transportation costs should include both the patient and the companion.

Only the costs that are additional in respect of the present situation should be considered.

In estimating this cost, an estimate is made of the number of individuals would need transportation during year 1 and year x, and these two values are averaged. This new value is multiplied by the round trip fare on the mode of transport that would most probably be used in the area.

- Travel on foot, horseback or bicycle should not be included in this cost.

- When travel is by public or hired conveyance, the cost would be the price of a round-trip ticket.
- When travel is by some other mode of transportation, the cost would be the price of a round-trip fare by that means.

This information may be shown in a table such as Table XVI below.

**Table XVI: Total additional costs of transportation of patients and companions**

Name of establishment:

Year:

Proposed project:

Type of transportation	N° of additional persons to be transported		N° of additional persons to be transported (yearly average)	Unit cost of travel (round trip fare)	Total additional (cost per year)
	Year 1	Year x			
By foot, horseback or bicycle					
By bus					
By taxi					
By car					
Other					
Total					

**(b) Cost of time**

This item covers the cost of time spent travelling and standing in line and the stay at the establishment.

This cost should be estimated in terms of the number of hours spent both in travel and standing in line, as well as the hours spent at the establishment. Estimates should be made for year 1 and for year x, and these values should then be averaged. This figure should be multiplied by the value of one hour, which is obtained by dividing the monthly minimum wage by the number of hours worked per month.<sup>29</sup>

<sup>29</sup>

In the case of Chile, for example, a value of 240 hours per month is used.

This information may be recorded on a table such as Table XVII below.

**Table XVII: Total additional time costs**

Name of establishment:

Year:

Proposed project:

Time category	N° of additional hours spent		N° of additional additional hours spent (yearly average)	Unit cost per hour	Total additional (cost per year)
	Year 1	Year x			
Travel					
Waiting					
Stay					
Total					

The total additional cost per year to users of the health service will be the sum of the two items mentioned above. This information may be summarized in a table such as Table XVIII below.

**Table XVIII: Total additional costs to users**

Name of establishment:

Year:

Proposed project:

Type of cost	Total additional cost
Transportation	
Travel time	
Waiting time	
Total	

Finally, a summary should be drawn up (Table XIX) of the costs of each proposed solution, based on the average of year 1 and year x, for operating costs, maintenance, and costs to users.

**Table XIX: Summary of costs of proposed solutions**

Name of establishment:		Year:	
Item	Option A	Option B	Option C
(a) Investment - Land - Construction - Furnishings - Other			
(b) Operating costs: (average) - Payroll - Inputs - Utilities - Rental and leases - Other			
(c) Maintenance (average)			
(d) Costs to users: - Travel - Time			
TOTAL			

## 6.4 Criteria for choosing among different options

Once the costs of each proposed project have been identified and quantified, and the variables that will be used to estimate benefits have been selected and estimated, the next step is to evaluate the different options that are available.

This evaluation will entail comparing the costs and benefits of each option, and accepting those whose potential benefits are greater than their expected costs.

However, this is not always easy or feasible. As mentioned above, with very few exceptions, the benefits of health projects cannot be determined in strictly monetary terms. Consequently, other techniques must be used. Since these guidelines focus on the identification and preparation of health projects, the specific methods used to evaluate alternative proposals cannot be discussed in depth. Following are brief descriptions of only a few of the most commonly used techniques.<sup>30</sup>

<sup>30</sup>

For more detailed information on evaluation of social projects, see Gutiérrez (1993), MIDEPLAN (1991), Fontaine (1992) or Londero (1991).

Essentially, the evaluation methods used in the health sector fall into two categories:

- Cost-benefit methods
- Cost-efficiency methods

#### 6.4.1 Cost-benefit methods

Cost-benefit methods are applied in those cases in which both costs and benefits can be expressed in monetary terms. There are different indicators that can be estimated once the costs and benefits have been determined; these include cost-benefit ratio, capital return period, net current value (NCV) and internal rate of return (IRR). Of these, net current value and internal rate of return are recommended.

##### (a) Net current value

Net current value (NCV), also known as present net value, is used to quantify the amount of wealth, measured in terms of current wealth, that will be earned by those responsible for implementing a project. The following formula is used:

$$VAN = \sum_{i=0}^{i=n} \frac{B_i - C_i}{(1+r)^i} \quad (7)$$

where:  $B_i$  = Benefits of the project in year  $i$   
 $C_i$  = Costs of the project in year  $i$   
 $r$  = Discount rate

NCV is one of the most useful indicators for ascertaining the benefits of a project. However, its application to health projects is limited by the difficulty of estimated benefits in monetary terms. Thus, it is only applicable to projects such as those that involve replacing equipment or providing services to be charged to the beneficiaries.

##### (b) Internal rate of return

The internal rate of return is the rate that makes the NCV of a project to be equal to zero. Using the same formula shown above, the IRR will be that rate  $r$  which:

$$0 = \sum_{i=n} \frac{B_i - C_i}{(1 + \text{TIR})^i} \quad (8)$$

This rate is determined by following a repetitive process, testing different values of “r” until the IRR is found. Fortunately, all electronic spreadsheets and financial calculators have functions for automatically calculating the IRR of a cash flow.

### Example 37: Estimating CNV

*A health service specializing in cardiology has decided to raise funds by offering a training course in this field for the other health services in the country. Would it be a good idea for this service to carry out this activity? In other words, would the project be worthwhile in financial terms? It would take two months to prepare for the course, and the service would have to pay \$3 000 000 in advance for development of guidelines and materials. The course would be offered for three years in a row, the first one starting twelve months after preparations began.*

*The yearly operating cost of \$ 5 000 000 (professors, physical facilities and materials) would be payable at the beginning of each course. The enrolment fee, also payable at the beginning of the course, would be \$450 000 per student. It is estimated that 15 students would enrol in each course. The discount rate for the service is assumed to be 12%.*

*With this information, the following cash flow table would be developed (values expressed in thousands of \$):*

Year	Benefits	Costs
0	0	3 000
1	450*15=6 750	5 000
2	450*15=6 750	5 000
3	450*15=6 750	5 000

*Each of the terms in the formula may then be calculated as follows (i=0 to i=3):*

$$\begin{aligned} i=0: & (0-3000)/(1+0.12)^0 = -3\,000 \\ i=1: & (6750-5000)/(1+0.12)^1 = 1\,563 \\ i=2: & (6750-5000)/(1+0.12)^2 = 1\,395 \\ i=3: & (6750-5000)/(1+0.12)^3 = 1\,246 \end{aligned}$$

*In summary: CNV = M\$ 1 204*

*In other words, the Service would earn a profit, in current terms, of \$ 1 204 000; hence, it is worthwhile to offer the course, since the Service would have M\$ 1 204 more after carrying out the project than it would without the project.*

**Example 38: Estimating IRR**

*Entering the data set forth in example 37 into an electronic spreadsheet will show an IRR of 34.2%.*

*To check this figure, the estimates shown above are repeated, replacing  $r$  (0.12) by 0.342. The CNV will then be zero.*

**6.4.2 Cost-efficiency methods**

When the benefits of a project cannot be expressed in monetary terms, or it is not worth the effort to try to do so, cost-efficiency methods are used. The purpose here is to determine which project option can achieve the desired objectives at the lowest possible cost (i.e., more efficiently).

**(a) Minimum cost**

The minimum-cost method is used to compare project options that generate identical benefits. Thus, given equal benefits, the only difference between options will be in their cost, so that we would choose the one that allows us to achieve the desired objective at the lowest expense. However, since the costs of the different options may be incurred at different points in time, they must be compared in terms of current value. This is done by applying the following formula:

$$CVC = \sum_{i=0}^n \frac{C_i}{(1+r)^i} \quad (9)$$

where: CVC = Current value of costs

$C_i$  = Project costs in year  $i$

$r$  = Discount rate

This indicator is widely used in the health sector, since it is very useful in comparing different projects that generate identical benefits, such as those involving replacement of one piece of equipment by another with the same specifications, or different potential sites for an establishment, subcontracting services vs. providing them directly, etc.

**b) Unit cost**

The minimum cost method can only be used when the different project options offer identical benefits. Sometimes, however, different project options generate different benefits. In such cases, when the differences lie mainly in the “volume of benefits” generated (measured by means of a “proxy” benefit variable), the criterion for choosing between options could be that of cost per beneficiary, per examination or per patient dismissal, or, to state it in more general terms, per “unit of benefit” produced. This is done by estimating the CVC for each option and dividing it by the “volume of benefits” to be produced, measured by means of a “proxy” benefit variable

**Example 39: Minimum cost**

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*A hospital needs a linear accelerator to perform sophisticated testing techniques. One possibility is to buy it next year; it is currently priced at M\$ 12 500, and has a useful life of 12 years. It is assumed that after year 12, it will have no value whatsoever (residual value of zero).*

*The second possibility is to lease the linear accelerator for a 12-year period, in which case the yearly cost, to be paid at the beginning of each year, would be M\$ 1 500. In this case also, it is assumed that by the end of year 12, the equipment will have no value, and hence, there would be no question of exercising a purchase option.*

*In either case, the hospital would bear all the operating and maintenance costs. Since the same equipment would be used, it is assumed that these costs would be identical in both cases. Whichever option is chosen, it would be exercised twelve months hence.*

*Since the benefits of the two possibilities are identical, the minimum cost criterion can be applied. Moreover, the maintenance and operating costs are the same in both cases, so such costs do not need to be taken into account (strictly for purposes of comparing options).*

*Applying the formula mentioned above, and assuming that the government requires that any public sector project apply a discount rate of 12%, the following results would be obtained:*

$$CVC_{Alt\ 1} = \sum_{i=1}^{i=12} \frac{12.500}{1.12^i} = \text{M\$ } 11.161$$

$$CVC_{Alt\ 2} = \sum_{i=1}^{i=12} \frac{1.500}{1.12^i} = \text{M\$ } 9.292$$

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In other words:

$$C/U = \frac{CVC}{N^{\circ} \text{ of Units}} \quad (12)$$

where: C/U = Cost per unit of the proxy benefit variable

CVC = Current value of costs (see equation (9))

N° of units = Total number of examinations to be generated, services to be delivered or population to be served during the project evaluation horizon.

#### Example 40: Cost per beneficiary

*Consider the previous example, and suppose that the hospital in question covers an assigned population of 500 000. With this information, we can estimate the cost per beneficiary of each option, as follows*

$$C/B_{Alt1} = M\$ 11\,161/500\,000 = \$ 22.32 \text{ per person}$$

$$C/B_{Alt2} = M\$ 9\,292/500\,000 = \$ 18.58 \text{ per person}$$

#### (c) Equivalent yearly cost

Another way to compare options that generate identical benefits is to estimate the equivalent yearly cost. Under this method, all project costs are stated in terms of an annual figure, the updated value of which is equal to the CVC of project costs. The following formula is used:

$$EYC = CVC + CRF \quad (13)$$

where: EYC = equivalent yearly cost

CVC = current value of costs of project

CRF = capital return factor, which is defined as:

$$CRF = \frac{r * (1+r)^n}{(1+r)^n - 1} \quad (14)$$

where: r = discount rate  
n = number of years

#### Example 41: Estimating EYC

Recalling the project for the purchase of a linear accelerator, let us also use a 12-year time period ( $n=12$ ) and a discount rate of 12%. With these data, we can estimate (or refer to a table) the corresponding CRF.

$$CRF = (0.12 * 1 + 0.12)^{12} / ((1 + 0.12)^{12} - 1) = 0.1614$$

With this CRF, we can estimate the following EYCs for the possibilities under consideration:

$$EYC_{Alt1} = 0.1614 * 11\,161 = M\$ 1\,802$$

$$EYC_{Alt2} = 0.1614 * 9\,292 = M\$ 1\,500$$

Note: It should not be surprising that the EYC of the second option is the same as the lease rate, which is a fixed amount over the same time period. In practice, what we have done is reverse the previous calculation.

#### (d) Equivalent yearly cost per beneficiary or per unit

As in the case of the minimum cost method, the equivalent yearly cost can also be stated in terms of cost per beneficiary unit of the proxy benefit variable. This is done by dividing the equivalent yearly cost by the number of beneficiaries, examinations or patient dismissals to be produced by the project option, or, to state it in general terms, by the number of units of the variable chosen as a proxy for the benefits, as follows:

$$\frac{EYC/U = CVC * CRF}{N^{\circ} \text{ of Units}} \quad (15)$$

where: EYC = equivalent yearly cost per unit of benefit  
CVC = current value of costs of project  
CRF = capital return factor  
N° units = number of examinations to be delivered or beneficiaries to be served per year

$$CRF = \frac{r * (1+r)^n}{(1+r)^n - 1} \quad (16)$$

#### Example 42: Equivalent yearly cost per test

*To continue with the example of the linear accelerator, let us suppose that it is expected to perform 1 250 tests per year. With this information, we can estimate the equivalent yearly cost per test performed, as follows:*

$$\begin{aligned} EYC/test_{Alt1} &= M\$ 1\,802/1250 = \$ 1\,442/test \\ EYC/test_{Alt2} &= M\$ 1\,500/1250 = \$ 1\,200/test \end{aligned}$$

Which of the methods mentioned above is best will depend on the nature of each project. Whenever possible, it is advisable to estimate for more than one indicator, even if the results turn out to be quite similar.



## 7 Presenting the option selected

*This chapter summarizes the minimum elements that must be included in the health project profile. The chapters to be included in the profile document are discussed, and the content of each is described.*

Once a detailed analysis has been made of each possible solution for the problem identified, and once the options have been evaluated, it will be possible to choose the project that will actually be implemented. This project may be related to the coverage provided by the health system or to the quality of the services delivered.

The project that has been selected must be submitted to the appropriate authorities, who must approve it for execution and/or provide the necessary funding. In some cases, it may be wise to present it to the community as well, explaining the reasons for the choice and the benefits and costs associated with it. It will be necessary to prepare a project report, which should be organized according to the structure described below.

### **Guidelines for presenting the project profile**

#### **I. Summary and conclusions**

The project presentation must begin with a well-written summary of the most important issues identified during the study. This will help give the reader an overview of the problem analysed and of the solutions proposed.

This summary should begin by describing the problem that needs to be solved, either totally or partially, and of the area of influence that will be covered by the project. It is important to mention the main characteristics of the problem and of the area analysed, including both geographic features and the population.

The findings of the diagnostic study of the present situation (deficit or surplus) should then be discussed, with special reference being made to the population that needs to receive the project services. Finally, the results of the project appraisal should be presented, along with the different options considered and an explanation of the main reasons that led to the choice of the project that is to be implemented.

**II. Diagnostic study of the present situation** This section should include a summary of the main aspects analysed in the diagnostic study of the present situation. The summary should mention any variables that may help clarify the problem identified.

- A. **Area of influence.** A location map that clearly shows the area of influence and its main features should be attached to the report.
- B. **Supply.** Background information should be provided on the supply of primary health care services in the project area of influence; a description should be made of the supply available at each of the establishments considered as possible alternatives for the establishment where the problem has been found, as well as for this establishment itself.

The human and physical resources that are currently available to supply health care services should be considered. In addition, although this is not a part of the supply itself, mention should be made of the number of people who are served by each programme.

- C. **Demand.** The number of examinations expected to be required over a given period of time by the population assigned to each programme, both in the problem establishment and in each of the alternative establishments should be indicated. The study should also indicate what human and physical resources are needed in order to provide this level of service.
- D. **Other pertinent data.** The diagnostic study should be supplemented with information on other important matters within the area of influence that have not been discussed in the previous items, such as health indicators, socioeconomic status of the beneficiary population,

epidemiological profile of the population in the area under study, population growth, decrease in population, prospects for new economic activities, etc.

- E. **Conclusions of the diagnostic study.** This should include a comparison between the supply of and demand for health services in each establishment, in order to determine whether there is a deficit or a surplus of services and resources. Thus, once the conclusions of the diagnostic study are made available, it will be possible to identify the fundamental problem that needs to be solved.

### III. Identifying possible solutions

The following aspects should be dealt with under this heading:

- A. **Projecting demand.** Estimate the potential demand over the horizon projected, starting with the year when the project is being designed. This should be done by projecting the population assigned to the establishment where the problem has been located, as well as to each establishment within the area of influence.
- B. **Optimizing the present situation.** Whenever possible, indicate how the present situation might be improved—as regards either coverage or quality of service—by taking certain administrative steps or management decisions (with only a minor investment).
- C. **Defining the possible solutions.** Prepare a brief description of each alternative project analysed, indicating its main physical and/or operational characteristics.

### IV. Evaluating the project option

A summary of the benefits and costs of each project option should be presented, including the criteria and variables that were taken into account in choosing the project that will be implemented. The following aspects should be included in these summaries:

- Identification and quantification of the benefits of each possibility
- Identification and quantification of the costs of each possibility
- Criteria followed in selecting the project to be implemented.

## **V. Project chosen**

Finally, the report should include an overview of the benefits and costs of implementing and operating the project chosen. In other words, describe what the situation would be once the project has been implemented.

### **A. Benefits**

This section should include a general description of all the benefits, both measurable and not measurable, that would be associated with the project chosen. Measurable benefits should, insofar as possible, be discussed in terms of health indicators. When benefits cannot be expressed in terms of such indicators, they should still be described in the report.

### **B. Costs**

Here a detailed description should be made of each cost item associated with the project chosen, mentioning the relevant units of measurement and specific costs associated with each item. When pertinent, the following items should be included:

#### **(a) Investment costs**

- i. Land
- ii. Construction (summary of the architectural plans and costs per square metre of construction)
- iii. Furnishings

#### **(b) Operating costs**

- i. Payroll
- ii. Inputs
- iii. Basic services



- iv. Rentals and leases
- v. Maintenance
- vi. Other

(c) Cost to users of the service

- i. Transportation of patients and companions
- ii. Travel time, waiting time and stay

## **VI. Annexes**

It is suggested that documentation supporting the interpretation of the situation described should be included as an annex to the project profile. Among others, the following documents might be included:

- Map showing the location of the project developed as a result of the study; this map should indicate the following: area of influence, sectors where demand is located, establishments which make up the supply of health services, distances, etc.
- Medical architecture programme
- Architect's blueprints, when pertinent
- Engineer's designs, when pertinent
- Detailed budget of the project
- Certificates showing the legal status of the land to be occupied by the project
- Certificate showing the feasibility of financing the operating costs of the project, as well as the backing of the competent authority
- Commitment of the community to be involved in the execution and/or operation of the project
- Feasibility of obtaining connections for utilities
- Photographs presenting a visual picture of the situation described
- Technical reports to support the technical features of the proposal

It is suggested that the charts and tables shown in each section of the document should be used as a frame of reference for the annexes suggested above, as well as other pertinent sections of the report.



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**GLOSSARY**

<b>Primary care:</b>	Delivery of basic health care: high coverage, low complexity
<b>Secondary-level health care:</b>	Delivery of intermediate-level health care: intermediate coverage and complexity
<b>Tertiary-level health care:</b>	Delivery of highly specialized health care: low coverage, high complexity
<b>Professional care at delivery:</b>	Births assisted by professionals as a percentage of total live births
<b>Boxes:</b>	Spaces set aside for direct delivery of health care under different programmes or procedures
<b>Diagnostic and treatment centres:</b>	Open or outpatient health establishments where diagnostic and therapeutic procedures of average complexity are provided
<b>Health centres:</b>	Open or outpatient health establishments where primary or basic health care is provided. Located in urban and rural areas
<b>ECLAC:</b>	Economic Commission for Latin America and the Caribbean
<b>Coverage:</b>	Number of inhabitants to whom health care is delivered
<b>Life expectancy at birth:</b>	Average number of years that a person can expect to live from the moment of birth onwards
<b>STD:</b>	Sexually transmitted disease
<b>Basic hospitals:</b>	Closed health care establishments that provide basic services. Usually have rooms with beds for general care of all patients; usually located in rural areas
<b>Tertiary hospitals:</b>	Closed health care establishments that provide highly complex treatment
<b>Secondary hospitals:</b>	Closed health care establishments that provide medical treatment of average complexity
<b>ILPES:</b>	Latin American and Caribbean Institute for Economic and Social Planning
<b>WHO:</b>	World Health Organization

<b>MAP:</b>	Medical Architecture Programme
<b>Rural health units:</b>	Open or outpatient health care establishments that provide primary or basic care. Services are provided by a resident paramedic aide and visiting medical teams. Located in remote and/or hard-to-reach rural areas.
<b>AIDS:</b>	Acquired Immune Deficiency Syndrome
<b>MOSS:</b>	Medical Orientation and Statistics Service
<b>General mortality rate:</b>	Total number of deaths per 1000 inhabitants at 30 June of the year in question
<b>Infant mortality rate:</b>	Number of deaths of infants under 1 year old per 1000 births in one year
<b>Infant malnutrition rate:</b>	Percentage of malnourished children within the reference population
<b><i>Unidad de enfermería:</i></b>	Unit of measurement used in determining hospitalization areas in a hospital centre
<b>HIV:</b>	Human immune deficiency virus

## **ANNEX 1: Recommendations on the preparation of medical architecture programmes and design of primary health care establishments**

The following information should be helpful in drawing up medical architecture programmes and architectural designs for primary health care establishments, and ensuring that they are consistent with the relevant preinvestment studies.

The designs for health units and centres have been developed in the course of a study of the experiences of local health services, as well as those of project designers at the central level. Consequently, unless there is a good reason to change them, the areas and functional relationships shown in these plans should be maintained.

1. If the age distribution of the population is different from the national mean, the number of boxes per programme will be different (see demand), and the corresponding changes may be made in the plans.
2. Likewise, if the size of the population is different from that of the population for which the plans were drawn up, spaces may be added or eliminated as required.

### **A. BACKGROUND INFORMATION**

#### **1. Medical Architecture Programmes**

- 1.1 Criteria followed - The Medical Architecture Programmes have been developed by applying technical project-design coefficients to populations having a structure similar to the national distribution patterns. The following programmes are included:

- (a) Health Units (HU) for 800 to 2,000 inhabitants
- (b) Rural Health Centres (RHC) for 10,000 inhabitants
- (c) Urban Health Centre (UHC 20) for 20,000 inhabitants
- (d) Urban Health Centre (UHC 40) for 40,000 inhabitants

#### **1.2 Programmes**

- (a) Health Units (HU)
  - i. Access area with open porch
  - ii. Service area

- Adult box
- Infant box
- Maternity box
- Auxiliary box, including food storage space, food delivery area, space for MOSS, radio, archives and services to patients
- Restroom for Maternity box and Visiting Medical Teams
- Waiting room
- Storage room for materials and inputs
- Public restroom, with access from outside

- iii. House for resident paramedic aide
  - Living room - dining area - kitchen
  - 2 bedrooms
  - Bathroom
  - Closet

(b) Rural Health Centre for 10,000 inhabitants (RHC 10)

- i. Access
  - Covered porch
- ii. MOSS
  - Lobby
  - Information Nucleus, including space for accountants and social workers
- iii. Administration
  - 1 Administration Office with restroom (space for two administrative and supervisory staff members)
  - Secretary's office area
- iv. Service area
  - 2 Infant boxes
  - 1 Infant preparation box
  - 1 Infant waiting room
  - 1 Maternity box with restroom
  - 1 Adult box
  - 1 Maternity preparation box - adult
  - 1 Maternity waiting room - adult
  - 1 Dentistry box and clinic
  - 1 Procedures box, with separate areas for vaccination, wound care, treatment and sample taking
  - 1 shared waiting room for Dentistry box and Procedures box
  - 1 bedroom with bathroom for professional on duty, with quick access to outside and to the Procedures box
  - 1 Scabies box, with independent entrance shared with Emergency Room or service entrance



- Public restrooms for men and women
- v. Support area
  - Sterilization
  - Multipurpose room
  - Pharmacy and food delivery, plus storage space
  - General warehouse
  - Closet for:
    - clean clothing
    - dirty laundry
    - materials
    - cleaning supplies
  - Staff dressing room, with men's bathroom and shower
  - Staff dressing room, with women's bathroom and shower
- (c) Urban Health Centre for 20,000 inhabitants (UHC 20)
  - i. Access
    - Covered porch
  - ii. MOSS
    - Lobby
    - Information nucleus, including space for social worker
    - Accounting office
  - iii. Administration
    - Director's office
    - Secretary's office space
    - Professional paramedic's office and *terreno*
  - iv. Service area
    - 3 Infant boxes
    - 1 Infant preparation box
    - 2 Maternity boxes with 1 shared restroom
    - 1 Maternity preparation box
    - 1 Maternity and Infant waiting room with 2 public restrooms
    - 2 Adult boxes
    - 1 Dentistry box with 2 clinics
    - 1 Adult and Dentistry waiting room, with 2 public restrooms
    - 1 Procedures box, with separate areas for sample taking (with restroom), vaccination, wound care and treatment
    - 1 Scabies box, with independent access or shared with service entrance
  - v. Support Area
    - Sterilization
    - Multipurpose room

- Pharmacy delivery and storage room
- Food delivery and storage space
- Closet for:
  - clean clothing
  - dirty laundry
  - materials
  - cleaning supplies
- Staff dressing room, with women's bathroom and showers
- Staff dressing room, with men's bathroom and showers

(d) Urban Health Centre for 40,000 inhabitants (UHC40)

- i. Access
  - Covered porch
- ii. MOSS
  - Lobby
  - Information nucleus, including space for social worker
  - Accounting office
- iii. Administration
  - Director's office
  - Secretary's office space
  - Professional paramedic's office and *terreno*
  - Restroom
- iv. Service area
  - 5 Infant boxes
  - 1 Infant preparation box
  - 1 Infant waiting room with public restrooms
  - 3 Maternity boxes with restroom
  - 1 Maternity preparation box
  - 1 Maternity waiting room with 2 public restrooms
  - 4 Adult boxes
  - 1 Adult preparation box
  - 1 Waiting room with 2 restrooms
  - 1 Dentistry box with 3 clinics
  - 1 Dentistry waiting room, shared with Adults or with Procedures
  - 1 Procedures box, with separate areas for treatment, wound care, vaccination and sample taking, with restrooms, organized according to preliminary project alternatives
  - 1 Scabies box, with independent access or shared with staff entrance
- v. Support Area
  - Sterilization
  - Multipurpose room
  - Pharmacy delivery and storage room

- Food delivery and storage space
- Food storage room
- General storage room
- Closet for:
  - clean clothing
  - dirty laundry
  - materials
  - cleaning supplies
- Staff dressing room, with women's bathroom and showers
- Staff dressing room, with men's bathroom and showers

## 2. Determining size of spaces

- 2.1 **Criteria followed** - In determining the size of the different spaces to be set aside in the Medical Architecture Programmes, the main consideration was how to make the best use of each space, according to the human resources that would be operating it, the minimum equipment needed, and the functional relationship between staff and equipment.

The same criterion was applied for all groups of spaces that make up a functional unit, such as the wound care, vaccination and sample-taking box in the Rural Health Centre for 10,000 inhabitants, and the Infant boxes in the Urban Health Centre for 40,000 inhabitants.

## 3. Preliminary project outlines

### 3.1 Criteria followed in designing Rural Health Units

Rural Health Units were designed with two distinct areas, i.e., the service area itself and the residential area for the resident paramedic aide. The auxiliary box joins the two spaces, in order to facilitate night service and save on basic expenditures when the visiting medical team is not in the area.

The paramedic aide's box has been designed to bring together the following functions: MOSS services, including archive and radio; food storage and delivery, and health care-related services. It also has enough space to hold a stretcher for in-transit patients.

The food delivery section has direct access to the outdoors in order to limit public access.

The storage rooms are designed to hold enough supplies for 30 days. This size may be changed depending on how often local deliveries are made.

### 3.2 General criteria followed in designing the Health Centres

The following criteria are common to Rural Health Centres and Urban Health Centres for 20,000 and 40,000 inhabitants:

- (a) Different entrances for the general public and for services and/or staff

- (b) In MOSS, the space provided for the social worker must provide privacy yet not be visually isolated from the rest of MOSS
- (c) It should be easy to move between MOSS and the administrative offices, and between the administrative offices and the public areas.
- (d) The multipurpose room should be easily accessible from the service zone and from the public areas.
- (e) The Scabies box should have a separate entrance or a shared entrance, in addition to a secondary entrance.

3.3 Specific criteria applied to the design of the Rural Health Centre for 10,000 inhabitants (RHC 10):

- (a) Direct access to the Procedures box in order to allow for night-time emergency service to be provided independently, without making use of the rest of the establishment. This sector should be easily accessible from the doctor's residence.
- (b) The Laboratory is designed to provide minimum support to the medical services. Consequently, it only has space enough for microhematocrit analyses, reagent tape testing, and sterilization.
- (c) The Procedures box has been designed to include enough space for wound care, vaccination and sample taking.
- (d) The food delivery area is large enough to store a one-month supply of food.

**ANNEX 2****Standard furnishings for health establishments****A. Rural health unit (146.96 m<sup>2</sup>)****ENTRANCE**

1 national flag (2 x 3 m)

**WAITING ROOM**

16 stackable chairs  
1 chalkboard  
1 bulletin board (60 x 120 cm)  
1 space heater (depending on the region)  
1 metal wastebasket

**WOUND CARE AND TREATMENT CLINIC**

1 wound care and examination table  
1 footstool (2 steps)  
1 clinical desk (2 drawers)  
2 chairs  
1 glass case (150 x 60 x 40 cm), with lock  
1 infant scale  
1 table scale  
1 *infantómetro*  
1 adult scale with *cartabón*  
1 nonextendible tape measure  
1 universal base with rollers  
1 file case (3 metal drawers)  
1 card file (40 x 40 x 25 cms)  
1 stainless steel wash basin  
1 step-on bucket

**ADULT EXAMINATION BOX**

1 clinical desk (2 drawers)  
2 chairs  
1 wound care and examination table  
1 footstool (2 steps)  
1 metal wastebasket  
1 ledge for materials (*obra*)  
2 dozen intramuscular needles  
2 dozen subcutaneous needles  
10 stainless steel tongue presses  
3 aluminium trays (18 x 24)

1 N° 3 scalpel handle  
 2 N° 10 scalpel blades  
 2 N° 21 scalpel blades  
 2 N° 23 scalpel blades  
 1 N° 3 large scalpel handle  
 2 stainless steel boxes (20 x 10 x 5.5)  
 1 stainless steel box (35 x 15 x 10)  
 1 nose speculum  
 1 Pinard stethoscope  
 12 pair surgical gloves  
 20 hypodermic syringes (2.5 ml)  
 10 hypodermic syringes (5 ml)  
 10 hypodermic syringes (10 ml)  
 6 hypodermic syringes (20 ml)  
 4 tuberculin syringes (graduated 1/100)  
 1 percussion hammer  
 2 anatomic clamps (13 cm)  
 2 surgical clamps (13 cm)  
 2 straight Kelly clamps (15 cm)  
 1 Mayo-Hegggar needle holder (15 cm)  
 2 stainless steel *riñones*  
 1 N° 7 and N° 9 Nelaton catheter  
 1 N° 10 Nelaton catheter  
 1 N° 12 Nelaton catheter  
 1 N° 12 Nelaton catheter connected to funnel and tube  
 2 stainless steel sterilization drums (12 x 15 cm high)  
 12 clinical thermometers  
 1 pair straight blunt scissors (15 cm)  
 1 pair curved blunt scissors (15 cm)  
 10 test tubes (16 mm x 16 cm)  
 2 sphygmomanometers with small handle (adult)  
 2 phonendoscopes with earphones  
 1 electric *Poupinel* (40 x 40 x 33)  
 1 anatomic bedpan  
 2 oral aspirator pipettes (Lee)  
 1 aluminium basin  
 1 urinal (bedpan)

### CLOTHING

10 gauze compresses (20 x 30)  
 6 clinical towels (70 x 70)  
 1 pair high boots  
 12 small sheets  
 12 white semifine linen sheets (1.60 x 2.60)

INFANT EXAMINATION BOX

- 1 clinical desk (2 drawers)
- 2 chairs
- 1 wound care and examination table
- 1 metal wastebasket
- 1 ledge for materials (*obra*)

MATERNITY EXAMINATION BOX

- 1 gynaecology examination table with tray and footstool
- 1 revolving stool
- 1 Burton lamp
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 two-piece folding screen
- 1 step-on bucket
- 1 metal wastebasket
- 1 2-level cabinet, including washbowl

BEDROOM N° 1

- 2 one-place *marquesas*
- 2 mattresses
- 2 pillows
- 2 night tables
- 1 modular cabinet

BEDROOM N° 2

No furniture provided

LIVING ROOM/DINING AREA

- 1 set of living room furniture (1 two-place sofa, 2 armchairs and *cuerpo*)
- 1 cooker (wood or gas)
- 1 dining room table
- 4 chairs
- 1 sink
- 1 counter with shelves

EQUIPMENT AND INSTRUMENTS

- 8 N° 4-5 half-circle suturing needles (4 each)
- 2 dozen endovenous needles
- 2 dozen intradermic needles
- 4 woolen blankets

- 1 pillowcase
- 1 surgical apron (size 50-52)
- 1 plastic bib
- 6 absorbent towels (50 x 100)

### SUNDRIES

- 1 portable stretcher
- 2 galvanized iron buckets (12 litres)
- 4 hand scrubbing brushes
- 2 horsehair floor brushes
- 1 complete *douche* (2 litres)
- 2 aluminium jugs, with lids (250 cm)
- 1 stainless steel jug, with lid (5 litres)
- 1 kerosene lamp (500 candlepower)
- 2 stainless steel wash basins (24 cm)
- 1 flashlight, with 3 batteries
- 1 metal alcohol burner
- 1 hand-wound wall clock (30 cm circumference)
- 1 covered garbage can (20 litres)
- 2 multipurpose extinguishers (4 kg)
- 1 refrigerator

### NONMEDICAL EQUIPMENT

- 1 radio transmitter



**B. Urban health centre<sup>35 36</sup>****MOSS**Lobby

1 national flag (2 x 3 m)

Information and Social Assistance Nucleus

1 mural chalkboard (60 x 90 cm)  
1 mural chalkboard (100 x 150 cm)  
1 bulletin board (40 x 60 cm)  
2 metal file cases (4 drawers)  
2 desks (70 x 120 cm, 2 drawers)  
2 upholstered chairs  
1 cash box  
3 wastebaskets

Accounting

1 desk (70 x 120 cm)  
2 upholstered chairs  
1 cabinet (146 x 90 x 35 cm)  
1 file cabinet (45 x 70 x 130 cm, 4 drawers)

**ADMINISTRATION**Director's Office and restroom

1 desk for Director (80 x 160 cm, 4 lock drawers)  
1 chair for Director  
2 upholstered chairs  
1 cabinet (90 x 35 x 146 cm, with lock)  
1 wastebasket

Secretary's area

1 desk (75 x 120 cm)  
2 upholstered chairs  
1 typewriter table (100 x 50 cm)  
1 typewriter  
1 file cabinet (45 x 70 x 130 cm, 4 drawers)  
1 wastebasket

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Office for Professional Paramedic and Terreno

- 2 desks (70 x 120 cm)
- 4 upholstered chairs
- 2 cabinets (90 x 35 x 146 cm)
- 2 wastebaskets
- 1 clothes rack

**DIRECT SERVICES**Infant Examination Box

- 1 wound care and examination table
- 1 footstool (43 x 40 x 30 cm, 2 steps)
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 wastebasket
- 1 glass case (150 x 60 x 40 cm, with lock)

Adult Examination Box

- 1 wound care and examination table (180 x 60 x 90 cm)
- 1 footstool (43 x 40 x 30 cm, 2 steps)
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 wastebasket
- 1 glass case (150 x 60 x 40 cm, with lock)
- 1 one-side negatoscope (63 x 45 x 16 cm)

Maternity Examination Box

- 1 gynaecology examination table with tray and footstool (60 x 190 x 75 cm)
- 1 revolving stool
- 1 Burton lamp
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 three-piece folding screen
- 1 glass case (150 x 60 x 40 cm, with lock)
- 1 step-on bucket
- 1 clothes rack
- 1 2-level cabinet, including washbowl (*obra*)
- 1 wastebasket
- 1 container with stainless steel lid

### Dentistry Box

- 1 clinical desk (2 drawers)
- 2 chairs
- 1 wastebasket
- 1 step-on bucket
- 1 dentist's chair
- 1 dentistry unit with high-speed turbine, conventional motor, saliva basin and lamp
- 1 N° 1 dentistry cabinet (42 cm wide x 95 cm long x 140 cm high)
- 1 dentist's stool
- 1 dentist's *Poupinel* (25 x 25 x 30 cm)

### Infant Preparation Box

- 1 counter with light mattress (approx. 80 x 200 cm)
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 wastebasket
- 1 infant scale
- 1 scale stand
- 1 podometer
- 1 adult scale with *cartabón*
- 1 glass case (90 x 30 x 80 cm, with lock)

### Adult Preparation Box

- 1 adult scale with *cartabón*
- 1 sphygmomanometer
- 1 phonendoscope
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 clothes hanger
- 1 glass case (90 x 30 x 80 cm, with lock)

### Maternity Preparation Box

- 1 adult scale with *cartabón*
- 1 sphygmomanometer
- 1 phonendoscope
- 1 clinical desk (2 drawers)
- 2 chairs
- 1 clothes hanger
- 1 glass case (90 x 30 x 80 cm, with lock)

Vaccination and Sample-taking box (for two patients)

- 1 8-foot refrigerator
- 2 examination and wound care tables (180 x 60 x 90 cm)
- 2 footstools (43 x 40 x 30 cm, 2 steps)
- 2 sample-taking tables (60 x 40 x 85 cm)
- 2 patient chairs
- 1 counter for materials, shared (*obra*)
- 1 counter for washing materials, shared (*obra*)
- 1 step-on bucket
- 1 wall-mounted glass case (90 x 30 x 80 cm, with lock)
- 2 wastebaskets

Wound Care and Treatment Box

- 2 examination and wound care tables (180 x 60 x 90 cm)
- 2 footstools (43 x 40 x 30 cm, 2 steps)
- 2 Mayo tables
- 2 step-on buckets
- 1 Burton lamp
- 2 chairs
- 4 stainless steel wash basins
- 1 wall-mounted glass case (90 x 30 x 80 cm, with lock)
- 1 counter for materials, shared (*obra*)
- 2 counter for washing materials, shared (*obra*)

Scabies Box

- 2 wall-mounted clothes racks
- 1 clinical desk (100 x 60 cm, 2 drawers)
- 2 chairs
- 1 wound care cart
- 1 glass case (90 x 30 x 80 cm, with lock)
- 1 step-on bucket
- 1 wastebasket
- 1 clinical stool

**SUPPORT AREA**Sterilization

- 2 *Poupinel* (40 x 40 x 33 cm, double door)

Multipurpose Room

- 1 small cooker (2 burners)
- 1 table (150 x 80 cm)
- 16 chairs
- 1 cabinet with doors (90 x 35 x 146 cm)
- 1 mural chalkboard (150 x 100 cm)

Milk Delivery

- 1 file case (4 drawers)
- 1 desk (120 x 75 x 75 cm)
- 1 chair
- 1 high stool
- 1 milk cabinet

Pharmacy

- 1 desk (4 drawers, with lock)
- 1 chair
- 1 high stool
- 1 medicine cabinet

**OTHER**Medical Equipment and Instruments for 10,000 inhabitants (except dental care)

- 1 complete *Ambu*
- 2 stainless steel boxes (20 x 10 x 5.5 cm)
- 2 stainless steel boxes (35 x 15 x 10)
- 8 suturing needles (4 each, N° 4 and N° 6)
- 2 dozen endovenous needles
- 1 dozen intradermic needles
- 2 dozen intramuscular needles
- 20 metal tongue presses
- 20 aluminum trays (18 x 24)
- 2 dozen subcutaneous needles
- 1 scalpel handle (fine N° 3)
- 1 scalpel handle (large N° 3)
- 2 N° 10 scalpel blades
- 2 N° 21 scalpel blades
- 2 N° 23 scalpel blades
- 1 nose speculum
- 8 vaginal speculae (medium)
- 5 vaginal speculae (large)
- 1 vaginal speculum (small)

- 1 virgin speculum
- 1 Sims hystrometer
- 2 flexible metal bands
- 20 hypodermic syringes (2.5 cc)
- 12 hypodermic syringes (5 cc)
- 12 syringes (10 cc)
- 6 hypodermic syringes (20 cc)
- 4 tuberculin syringes (1 ml, 1/100)
- 1 percussion hammer
- 1 Ginber otoscopy set
- 5 anatomic clamps (13 cm)
- 1 Pinard stethoscope
- 12 pair surgical gloves (N° 7 and N° 8)
- 4 surgical clamps (13 cm)
- 4 Bozeman wound clamps
- 3 straight Kocher clamps (14 cm)
- 1 clamp for sterile material (20 cm)
- 1 nose plug clamp
- 2 Pozzi clamps
- 1 Mayo-Hegggar needle holder (15 cm)
- 10 aluminum *riñones*
- 10 disposable phlebocclisis kits
- 2 N° 7 Nelaton catheters
- 2 N° 8 Nelaton catheters
- 2 N° 9 Nelaton catheters
- 2 N° 10 Nelaton catheters
- 2 N° 12 Nelaton catheters
- 2 N° 14 Nelaton catheters
- 2 N° 20 Nelaton catheters
- 1 N° 12 Nelaton catheter with funnel and rubber tube
- 6 sterilization drums (12 x 15 cm)
- 20 clinical thermometres
- 2 pair straight blunt scissors (14 cm)
- 1 pair straight blunt scissors (17.5 cm)
- 1 pair curved blunt scissors (17.5 cm)
- 1 pair curved Mayo scissors (14 cm)
- 1 pair Lister gauze-cutting scissors (14 cm)

Note: Part of the equipment was included under "Preparation boxes".

One set dental instruments

- 1 mouth opener
- 3 fine scalpels with handles
- 1 double-lid box for endodontic treatment
- 1 instrument box
- 1 counter-angle for Doriot hand piece
- 3 alveolus spoons
- 3 abscess spoons
- 2 left apex elevators
- 2 right apex elevators
- 2 fine straight elevators
- 2 medium straight elevators
- 2 mirrors with handles
- 2 N° 22 cement spatulas
- 1 gypsum spatula
- 6 saliva ejectors
- 2 C-1612 styluses
- 2 fine bayonet forceps
- 2 medium premolar forceps
- 2 universal molar forceps
- 2 curved-edge molar forceps
- 2 curved-edge root forceps
- 2 *fresarios*
- 1 *gubias*
- 2 double-extension Hellenab amalgam condensing instruments
- 2 N° 3 Ladmore amalgam condensing instruments
- 2 Wond amalgam condensing instruments
- 2 N° 2 White amalgam condensing instruments
- 2 amalgam polishing tools (N° 29 and N° 33)
- 6 Carpule dental syringes
- 1 water syringe
- 1 glass lamp for alcohol
- 2 DO-772 bone files
- 2 DO-543 and B-19463 *legras*
- 2 Morse tip handles
- 1 mortar and pestle for amalgam
- 1 *pera para aire*
- 1 Doriot hand clamp
- 2 BD-43 anatomic clamps
- 1 Kocher haemostatic clamp
- 1 needle holder
- 1 amalgam holder
- 1 ivory *porta matriz*
- 1 nerve extractor holder
- 1 mercury holder

- 1 mercury and alloy dispenser
- 1 instrument clamp
- 25 stainless steel curved cavity catheters
- 5 stainless steel straight cavity catheters
- 1 pair straight gum scissors
- 5 stainless steel *riñones*

#### Clothing

- 2 plastic clothes racks (scabies box)
- 30 small sheets (90 x 150 cm, white semi-fine linen)
- 12 clinical towels (70 x 70 cm)
- 24 towels (50 x 100 cm)

#### Sundries

- 1 portable stretcher
- 4 hand scrubbing brushes
- 3 floor brushes
- 4 space heaters (depending on climate)
- 1 3-battery flashlight
- 1 metal alcohol burner
- 2 20-lt covered trash cans
- 4 multipurpose extinguishers (5 kg)



### **C. Rural health centre**

The furnishings for rural health centres are similar to those used for urban establishments, so that the same basic list may be used for both.

#### **MOSS**

Rural health centres are smaller, and hence will have a smaller staff.

#### **ADMINISTRATION**

Only one office, with work space for two, a restroom and a secretary's area will be necessary.

#### **DIRECT SERVICES**

- Adult and Maternity preparation boxes are in the same space, with a divider being used to allow for more than one use.
- There is a multipurpose procedures box, with a divider being used to create two spaces for vaccination, wound care and sample taking.

#### **SUPPORT AREA**

Space is shared by sterilization and laboratory; depending on local needs, the following should be added:

- Microhematocrit centrifuge
- Reagent tapes for glycaemia testing
- Glass capillaries for microhematocrit
- 1 high stool

#### **RESIDENTIAL AREA**

Bedroom and bathroom

- 1 twin-size bed (with bedding)
- 1 night table
- 1 lamp
- 1 table
- 1 chair



### **ANNEX N° 3: Fixed personnel for rural and urban health centres**

Health centres also need support personnel; however, since staff size is not determined by the size of the assigned population, it is impossible to determine the number of staff members per inhabitant that are needed. Among others, the following personnel should be included in the support staff:

- Cleaning staff: depending on the type of physical facilities, e.g., one or two storeys, wood or other type of floor, etc.
- Driver: depending on the availability of vehicles, distance to the hospital, etc.

In each case, the director will be familiar with the needs of the establishment concerned, and his/her advice must be sought.

Following are some suggestions on how to estimate the fixed staff that will be needed for urban and rural health centres.

A list of “fixed staff” that should be included in estimates of human resource requirements for health centres is suggested. This list may be increased or reduced in the light of local requirements for urban or rural establishments.

Part of the auxiliary paramedic staff has already been included under “variable staff”, e.g., the dental aide and the aide responsible for health-monitoring activities.

#### Rural health centre

- 3 paramedic aides (shifts)
- 2 field aides
- 1 vaccination and sterilization aide
- 1 milk aide
- 1 pharmacy aide
- 2 multipurpose administrative officials

3 service employees (including *estafeta*)

1 driver (emergencies, 24 hours)

In addition, a full-time professional post will be needed for duties pertaining to the management and supervision of the establishment. This post would normally be filled by a physician or a nurse (half-time each), who would be involved in providing direct services during the remainder of the work shift.

#### Urban health centre

The following fixed staff is proposed for populations of 20,000 and of 40,000 inhabitants; the necessary adjustments should be made for establishments other than those mentioned.

Duties	20,000 inhabitants	40,000 inhabitants
- Director	1 shift	1 shift
- Nurse (supervision and administration)	1/2 shift	1/2 shift
- Pharmacy aide	1	1.5
- Milk aide	1	1.5
- Paramedic aide: Vaccination, treatment, <i>terreno</i> , sterilization, preparation	4	9
- Multipurpose administrative official	4	6
- Service aide (including <i>estafeta</i> )	3	5



# PROJECTS AND INVESTMENT PROGRAMMING DIVISION

## TABLE OF CONTENTS

*Abstract*

*Preface*

*Introduction*

*1. Background Information on the Health Sector*

*2. General considerations*

*3. Identifying the project*

*4. Diagnosis of the current situation*

*5. Identifying potential solutions*

*6. Assessing the Options*

*7. Presenting the option selected*

*Bibliography*

*Glossary*

*Annex I: Recommendations on the preparation of medical architecture*

*Annex II Standard furnishings for health establishments*

*Annex III Fixed personnel for rural and urban health centres*