GUIDELINES FOR
HEALTH MANPOWER PLANNING

A COURSE BOOK

BY

P. HORNBY
Management Sciences for Health, Kathmandu, Nepal

D. K. RAY
Division of Health Manpower Development,
World Health Organization, Geneva, Switzerland

P. J. SHIPP
Institute of Manpower Studies, University of Sussex,
Brighton, Sussex, England

and

T. L. HALL
School of Public Health, University of North Carolina,
Chapel Hill, NC, USA

World Health Organization
Geneva
1980
Comments on experience in using these guidelines are welcomed. They should be addressed to:

Health Manpower Planning
Division of Health Manpower Development
World Health Organization
1211 Geneva 27, Switzerland

ISBN 92 4 154156 3

© World Health Organization 1980

Publications of the World Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. For rights of reproduction or translation of WHO publications, in part or in toto, application should be made to the Office of Publications, World Health Organization, Geneva, Switzerland. The World Health Organization welcomes such applications.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The authors alone are responsible for the views expressed in this publication.

PRINTED IN SWITZERLAND

80/4360 – Schütz – 1000
# CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGEMENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>4</td>
</tr>
<tr>
<td>INTRODUCTION TO THE COURSE</td>
<td>5</td>
</tr>
<tr>
<td>PRE-COURSE QUESTIONNAIRE</td>
<td>7</td>
</tr>
<tr>
<td>SESSION 1: Health Manpower Planning</td>
<td>17</td>
</tr>
<tr>
<td>SESSION 2: Ten Steps to Health Manpower Planning</td>
<td>21</td>
</tr>
<tr>
<td>SESSION 3: Health Manpower Situation Report on Existing Manpower and Services</td>
<td>47</td>
</tr>
<tr>
<td>SESSION 4: Future Supply of Manpower</td>
<td>71</td>
</tr>
<tr>
<td>SESSION 5: Manpower Requirements – Quantity, Quality and Distribution</td>
<td>95</td>
</tr>
<tr>
<td>SESSION 6: Mismatches Between Supply and Requirements</td>
<td>127</td>
</tr>
<tr>
<td>SESSION 7: Solving Mismatches</td>
<td>165</td>
</tr>
<tr>
<td>SESSION 8: Organizational and Management Problems</td>
<td>189</td>
</tr>
<tr>
<td>SESSION 9: Manpower Strategy and Outline Plan</td>
<td>227</td>
</tr>
<tr>
<td>SESSION 10: Detailed Health Manpower Development Plan</td>
<td>251</td>
</tr>
<tr>
<td>SESSION 11: Implementation and Monitoring</td>
<td>271</td>
</tr>
<tr>
<td>SESSION 12: Concluding Session</td>
<td>293</td>
</tr>
<tr>
<td>END-OF-COURSE QUESTIONNAIRE</td>
<td>317</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>331</td>
</tr>
<tr>
<td></td>
<td>337</td>
</tr>
</tbody>
</table>

Note: For convenience during the course, the Learning Materials and the Exercises have been given a distinct pagination within each Session. Session 6, for instance, runs from page 165 to page 188; within that span, the pages with the Learning Materials and Exercises will be seen to carry the dual paginations 171-186 and 6.1-6.16.
ACKNOWLEDGEMENTS

A great contribution to the preparation of these guidelines was made by the collaborative effort of many staff members of the World Health Organization, in particular at the WHO Regional Office for South-East Asia, in New Delhi, and at WHO headquarters in Geneva. The participants in several national or inter-country seminars and workshops (in Bangkok in 1977, Barbados in 1979, and Kathmandu in 1980, for instance) also provided invaluable comments on earlier drafts. They are too numerous to mention individually here, but we acknowledge with gratitude their contribution to the improvement of this book.

In the final preparation of the guidelines, Mr Kiran Shrestha was the typist, Mr Krishna Man Shrestha was responsible for the graphics and Mrs Barbara Hornby coordinated the preparation and edited the manuscript.

We also wish to acknowledge with gratitude the financial contribution of the United Nations Fund for Population Activities towards the preparation and publication of the guidelines.
PREFACE

The main social target of the World Health Organization and of its Member States is the attainment by all the peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life. However, such is the present inequality in the health status of the world's people, and in the resources for health available to them, that in order to reach this declared target there must be both a redistribution of health resources to where they are most needed and a change in how those resources are used.

Of all the resources for health, the human resources are assuredly the most important, for all forms of health care depend upon a body of trained health personnel. To bring about the required changes in the development and utilization of this manpower, systematic and integrated planning is needed that takes into account the knowledge, skills and attitudes required by all categories of health personnel, the numbers needed in the different categories, and their effective deployment.

In many countries, too little attention has been paid to health manpower planning, and sometimes, when plans have been developed, they have proved inadequate. The purpose of this book is to help countries to acquire a cadre of manpower planners by presenting a basic course for the training in this field of health service administrators and educators, whether they occupy positions at the national, provincial, or local level. It is expected that some of them will become teachers of manpower planning in their turn. These guidelines are expected also to contribute to the formulation of actual health manpower plans as they provide a set of procedural steps that planners may wish to follow.
INTRODUCTION

TO

THE COURSE
SUMMARY

Manpower is the most precious resource of a country. Without trained manpower, other resources cannot be properly used and this is even more true in the health sector than in many other sectors. In many countries, not enough attention is paid to planning for manpower and in part this is due to a lack of health manpower planning specialists.

Health manpower planning consists of determining how best to produce, deploy and use manpower in the right numbers and with the right skills to perform health service functions. This course aims at strengthening health manpower planning in countries by disseminating its principles and planning methods by means of workshops. Workshop participants are from health, education and related sectors who make plans and decisions on matters related to health manpower development. This course consists of twelve half-day sessions and emphasizes group work. The training should as far as possible take place just before an actual health manpower planning exercise.
OBJECTIVE

The objective of the course is to facilitate the training of health service managers, planners and educators who can apply the principles and methods of health manpower planning. Within this objective, the Guidelines can be used for two purposes:

- To facilitate the further education of senior staff to cover the principles, methods and uses of manpower planning. After the course, these participants will be able to direct and monitor the activities of a manpower planning team so as to be able to plan strategies for the correction of discrepancies between manpower supply and manpower needs of health services, in the framework of the resources and the infrastructure available.

- To facilitate the training of other health service staff in the application of the principles and techniques of health manpower planning. After the course, these participants will be able to specify the information needed for manpower planning calculations and be able to perform these calculations.
INTRODUCTORY MATERIAL

Manpower is the most precious resource of a country. Whatever other resources there are, without trained manpower they can neither be exploited nor properly used. The role of trained manpower is even more important in the health sector than in many other sectors. The provision of health care depends primarily on trained health manpower, and salaries and wages usually consume more than two-thirds of health budgets.

Notwithstanding the great importance of manpower to the health sector, relatively little attention is paid to manpower planning. This leads to waste of resources, e.g. hastily constructed health facilities lying idle owing to a lack of trained manpower, or rapidly expanded education facilities that produce more manpower than the services can absorb. Manpower, as compared with other resources, has unique characteristics that make planning for it complex. Manpower cannot be stored for future use and is not freely substitutable as are machines because of considerations of motivation and attitude. Hence, manpower planning must be done systematically, in the light of the availability of a complex array of facilities and resources and taking account of the basic and national characteristics of different types of manpower.

One of the factors that has hindered the growth of manpower planning is the lack of trained planners. Since manpower is needed at all levels of the health services, there must be an awareness of the need of planning, and there must be planning itself at all levels - national, regional and local - although the details of planning will be different at each level. One way to rectify the shortage of planners is to train systematically in manpower planning both health service administrators and teachers, the former because they plan the use of manpower and the latter because they produce manpower.
Health manpower planning should be an integral part of health planning. The main purpose of manpower planning is to ensure the production, deployment, and use of manpower in the right numbers and with the right skills to carry out current and planned health service functions. Consequently, manpower planning must support and interact with health planning. Although manpower planning can be undertaken independently of health planning, at the same or at another time, it must conform in basic methodology to health planning.

WHO has been engaged in promoting manpower planning in recent years by means of a series of training and other activities in its regions, often with groups of experts from different countries. It has contributed to the production of materials on manpower planning, e.g., the book entitled Health Manpower Planning: Principles, Methods, Issues, edited by Hall and Mejia.

However, there has been a shortage of practical training materials for short courses to train planners and others concerned with health manpower. The material in this document aims at filling the gap; it has been prepared in collaboration with WHO Headquarters and the WHO Regional Office for South-East Asia. An initial draft was reviewed by experts and tested in seminars (e.g. the SEAR Inter-country Seminar on Health Manpower Studies, 14–23 November 1977, Bangkok). A revised version was used in a Health Manpower Planning Workshop in Nepal, March 1980. As a result, the needs and learning processes have been better understood and this is reflected in the present document. The course should be seen as merely one more step in the continuing process of developing materials and procedures to improve manpower planning.

Certain guiding principles are followed in the development and application of these guidelines.

In order to develop health manpower planning capabilities in countries, the following principles are observed in these guidelines:

1. Health manpower planning should be promoted at different levels of the health services and in educational institutions to prevent wastage
of human and other resources.

2. To train personnel in manpower planning, national training programmes are preferable to international programmes, which should be used primarily for exchange of experiences.

3. Manpower planning should be an integral part of health planning, although, at the outset, it can be undertaken separately. Manpower planning should be integrated gradually with health planning.

4. To strengthen planning processes in countries, the development of learning materials for manpower planning should be coordinated with other planning manuals, e.g. in educational planning, health planning, etc.

5. As far as possible, learning should be tied to practical experience. Learning by doing is the best way to assimilate new and systematic principles. As far as possible, training should precede a health manpower planning exercise.

6. Although the course follows a set of procedural steps, these are meant to be indicative only. The steps should be adapted to the conditions in a country.

The course as presented is not an end in itself. It is only the beginning of a process. It has to be tested in practice and revised as necessary, and its effects have to be evaluated.

The course is intended for health planners concerned with initiating, directing and conducting planning efforts rather than with collecting and analyzing information. It is designed, therefore, for:

- Project and divisional chiefs concerned with manpower planning or with plans and policies relating to manpower;

- Planning staff from ministries of health, education, and other relevant sectors;
- Teachers of public health, health administration/management;
- Personnel division chiefs;
- Planning commission staff.

They may be drawn from national and sub-national levels of a ministry's operations, but they should always be in posts concerned with taking decisions with implications for manpower.

The learning material may be used in developing and developed countries.

The learning materials have been prepared with participants from developing countries in mind. However, there is no reason why they could not be used also in developed countries. For developed countries, some of the material will have to be revised, especially the examples and the exercises.

It also may be used for training purposes in educational institutions.

The material can also be used in educational institutions, e.g. schools of public health, schools of medicine and nursing. Again, it would imply certain adaptations, especially of the exercises. Course participants are assumed to have had substantial experience in health administration or in education.

The course can be conducted in one week.

As the course consists of twelve sessions, each of which takes half a day, it could be run as a six-day block lasting one working week.

Each session of the course is divided into three elements.

The material is intended for use in a group learning setting such as a workshop or seminar. The course has twelve three-hour or half-day sessions. Each session may be divided into three sections: first, one-half hour reviewing the main elements of the material for that session and clarifying points not clear to the participants; second, one and a half to two hours in groups undertaking group work exercises arising out of the material of the session; and third, one half to one hour reporting and discussing the group work in the plenary session.
The maximum number of participants, it is suggested, should be twenty. The exercises have been structured for group work, i.e. by groups of about five participants. This is considered to be more productive than individual work.

The documentation for all sessions is identical in format. It contains the following:

- a summary of the content;
- a statement of the specific educational objectives of the session;
- the session structure;
- learning material, including practical examples, covering the topic area directly linked to the educational objectives;
- reference list of additional background reading on the session topic;
- work exercises.

It is intended that group work should be typed and distributed next day for use later in the course, as well as after the course as reference material.

To make the course country-specific, a new set of work exercises should be designed, relevant to the problems of the country in which the course is held. This should increase the motivation of the participants. This implies some preparatory work for the course, whether by its national director or an external consultant.

If the course is followed by an exercise in manpower development planning, the exercise should follow the corresponding steps in the course. The exercises for the course should obviously then be geared to the planning exercise. For example, a country report produced for the course could be used for the actual planning exercise.

The number of participants should be limited to about twenty.

The material for each session follows the same format.

Some preparatory work for each course is desirable to adapt exercises to local issues.

Health manpower planning will follow a process similar to that used in the course.
Measuring Performance

<table>
<thead>
<tr>
<th>Course</th>
<th>Short-term</th>
<th>Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension</td>
<td>Retention</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Use of what was learned</td>
<td>Effects</td>
</tr>
</tbody>
</table>

For course evaluation, which tests the comprehension of the participants, the following instruments are used:

(1) A pre-course questionnaire.

(2) A daily evaluation of the session(s) covered during the day.

(3) A questionnaire administered after the course to obtain the participants’ opinions about the value and clarity of each of the sessions.

To assess longer-term effects of the course, questionnaires are probably inadequate and interviews conducted at periodic intervals after the course may be more appropriate. All information obtained through structured interviews should be oriented toward some corrective actions. A part of the interview may consist of questions such as whether the participants have started manpower planning activities and whether these activities have had any impact. In addition, questions may be developed from the educational objectives of the course to test the use that has been made of the learning materials.
PRE-COURSE QUESTIONNAIRE

Course held from ________________________ to ________________________
in ________________________

Name ________________________

The purpose of this questionnaire is to obtain from you what you know of health manpower planning before you start the course. It is not intended to compare your knowledge with others. We would ask you, therefore, to complete this questionnaire before you begin the course and before you read any of the material in this manual, and to hand the completed questionnaire to the course coor-
dinator.

1. Age:
   - Less than 30
   - 30 - 40 years
   - 41 - 50 years
   - 51 - 60 years
   - More than 60

2. Educational background:

   Qualification
   - Certificate
   - Diploma
   - Bachelor's Degree
   - Master's Degree
   - Doctorate (Ph.D.)
   - Other

   Qualification
   - Arts
   - Sci.
   - Med.
   - Nurs.
   - Admin.
   - Econ.
   - Edu.
   - Other

3. Present job: Title: ________________________

   Principal function:
   - Management
   - Administration
   - Personnel
   - Planning
   - Finance
   - Service Delivery
   - Education
   - Other

4. Years in present position:
   - Less than 1 year
   - Between 1 yr & 3 yrs
   - Between 3 yrs & 5 yrs
   - More than 5 years
5. Previous training in health planning:

<table>
<thead>
<tr>
<th>Type of Training</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-service workshop</td>
<td>None</td>
</tr>
<tr>
<td>Seminar</td>
<td>1-2 wks</td>
</tr>
<tr>
<td>University course</td>
<td>2-4 wks</td>
</tr>
<tr>
<td>International workshop/seminar</td>
<td>1-3 mo.</td>
</tr>
<tr>
<td>None</td>
<td>3-12 mo.</td>
</tr>
<tr>
<td>None</td>
<td>12 mo.</td>
</tr>
</tbody>
</table>

6. Previous experience in health planning:

<table>
<thead>
<tr>
<th>Planning Level:</th>
<th>Planning Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>None</td>
</tr>
<tr>
<td>Regional</td>
<td>Annual</td>
</tr>
<tr>
<td>District</td>
<td>1-5 yrs</td>
</tr>
<tr>
<td>None</td>
<td>Long-term</td>
</tr>
</tbody>
</table>

7. Please read the following statements about the purpose of manpower planning. Check the appropriate column for which of these statements you feel are TRUE, which FALSE and which you DO NOT KNOW.

The purpose of health manpower planning is to:

a. Control the cost of training health manpower
   - TRUE
   - FALSE
   - DO NOT KNOW

b. State exactly how many people at each skill level will be required in the future
   - TRUE
   - FALSE
   - DO NOT KNOW

c. Train a group of people to guide the legislature to make wise decisions about health service extensions
   - TRUE
   - FALSE
   - DO NOT KNOW

d. Help ministers and directors of health to justify the cost of health service personnel
   - TRUE
   - FALSE
   - DO NOT KNOW

e. Reduce the number of people working in the health service
   - TRUE
   - FALSE
   - DO NOT KNOW

f. Create a separate and independent training system for health staff
   - TRUE
   - FALSE
   - DO NOT KNOW
8. Amongst the following statements are some which describe the effect of a LACK of health manpower planning. Identify them by putting a check in the appropriate box.

A lack of health manpower planning leads to:

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>DO NOT KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Health institutions with insufficient staff to provide planned services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Not enough equipment in the services to meet requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Majority of the health needs of the population being unmet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Staff working in posts for which they are not trained or qualified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Inadequate budgets in health training institutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Dissatisfaction among health personnel because of blocked or uncertain careers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. There are a number of different methods to determine how many staff will be needed in the future. Ultimately all these methods can be grouped into one or other of the principal methods. How many principal methods of determining future staff requirements are there? Please put a check in the appropriate box.

1 2 3 4 5 6 7 8

10. To solve mismatch problems between the supply and requirements for staff, the nature of the problem presented needs to be identified under one of five basic problem area headings such as:

1. The total number of staff employed
2. The skills/knowledge of staff

Please list the three other problem area headings:

3. 
4. 
5. 
11. To monitor progress in terms of a health manpower plan, information is needed from three separate organizational entities, both within and outside the ministry. Can you name what these are in general terms?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

12. Have you ever previously been involved in a health manpower planning activity?  
   Yes ☐  No ☐

13. Do you expect to be involved in health manpower planning activities in the near future? If yes, what do you expect your role to be? Please put a check against the most appropriate category.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Determining manpower issues and suggesting solutions and policies.</td>
<td></td>
</tr>
<tr>
<td>2. Doing manpower calculations</td>
<td></td>
</tr>
<tr>
<td>3. Providing information</td>
<td></td>
</tr>
<tr>
<td>4. Representing interested parties or professional groups</td>
<td></td>
</tr>
<tr>
<td>5. Other</td>
<td></td>
</tr>
</tbody>
</table>
SESSION 1

HEALTH MANPOWER

PLANNING
HEALTH MANPOWER PLANNING

1. Health Manpower Planning

2. Ten steps to health manpower planning

3. Health manpower situation report on existing manpower and services

4. Future supply of manpower

5. Manpower requirements—quantity, quality and distribution

6. Mismatches between supply and requirements

7. Solving mismatches

8. Organizational and management problems

9. Manpower strategy and outline plan

10. Detailed health manpower development plan

11. Implementation and monitoring

12. Concluding session
SUMMARY

Health manpower planning seeks to ensure that the right numbers of manpower are available at the right place, at the right time, and with the requisite skills and motivation to deliver health care to the population. To do this effectively, health manpower planning must support and be fully integrated with health planning. It must also recognize the diverse interests involved and seek to find solutions to manpower problems which satisfy these interests.

In the past, health manpower planning has generally been relegated to the relatively narrow role of making quantitative estimates of manpower supply and needs, and then manipulating one or both of these to bring them into balance. This course seeks to widen the scope of health manpower planning so as to include qualitative as well as a wider range of quantitative issues and to ensure a greater participation of planners in the implementation and evaluation of planned programmes.
EDUCATIONAL OBJECTIVES

At the end of this session, participants should be able to:

1. Define basic terms and concepts relating to health planning and health manpower planning.

2. Specify the principles and the components of health manpower planning.

3. Describe the principal difficulties that can lead to a reduced effectiveness of health manpower planning.

4. Describe how health manpower policies are made.
SESSION STRUCTURE

- Define health manpower planning and examine its relationship to national health planning

- Review the major factors influencing the quality and effectiveness of manpower planning

- Describe a framework for a health manpower planning process

- Review the health manpower policy-making process and its significance in the planning process
LEARNING MATERIAL

WHAT ARE HEALTH PLANNING AND HEALTH MANPOWER PLANNING?

Health planning (HP) is the process of defining community health problems, identifying resources, establishing feasible health and health care goals, and specifying technical and administrative actions to reach these goals. It is an integral part of a larger planning effort for socio-economic development. The successful achievement of health targets specified in health plans depends on many factors. They include the availability of resources, appropriate technology, the effective management of resources and the population’s participation and acceptance.

Health planning is a process that transforms a country’s resources into services that can cope with its priority health problems. It takes place in the context of a country’s health system.

The health manpower system, which for practical purposes may be considered a sub-system of the health system, encompasses all those institutions and activities concerned with the planning, production and management of health manpower resources. It transforms policies and resources into manpower, which in turn gives health care to the people.

Within the health manpower system, there is a constant flow of information, resources and decision-making between various political entities, service and educational institutions, professional bodies and consumers; this flow defines the health manpower process. Within this process a range of manpower planning, production and management activities take place. The scope of these activities is shown in Table 1.1.*

<table>
<thead>
<tr>
<th>Overall aim</th>
<th>To ensure the manpower needed by the health care delivery system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health manpower planning</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td>To provide the framework within which the health manpower pro-</td>
</tr>
<tr>
<td></td>
<td>cess takes place</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>To specify the number of teams and the composition needed to</td>
</tr>
<tr>
<td></td>
<td>improve the level of health up to a proposed level</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>Regional (sub-national) planning and local programming,</td>
</tr>
<tr>
<td></td>
<td>Health manpower project formulation, Aggregation, reconcilia-</td>
</tr>
<tr>
<td></td>
<td>tion and consolidation</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Planning and programming, Coordination, Monitoring and evalu-</td>
</tr>
<tr>
<td></td>
<td>ating implementation, Research and development</td>
</tr>
<tr>
<td><strong>Targets</strong></td>
<td>( x ) health teams of ( y ) composition in operation by</td>
</tr>
<tr>
<td></td>
<td>time ( t )</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Health manpower production</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td>To provide the manpower required</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>To produce ( x ) people of ( y ) types</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>Educational planning and programming educational objectives</td>
</tr>
<tr>
<td></td>
<td>and teaching methods</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Recruitment campaign, Definition of admission procedures and</td>
</tr>
<tr>
<td></td>
<td>syllabus, Definition of teaching methods, Evaluation of pro-</td>
</tr>
<tr>
<td></td>
<td>cess and products</td>
</tr>
<tr>
<td><strong>Targets</strong></td>
<td>( x ) trained personnel of ( y ) type by time ( t )</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Health manpower management</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td>To optimize the use of health manpower</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>To determine manpower distribution and productivity standards,</td>
</tr>
<tr>
<td></td>
<td>patterns of utilization, and non-labour inputs</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>Reorganization</td>
</tr>
<tr>
<td></td>
<td>- regionalization</td>
</tr>
<tr>
<td></td>
<td>- integration of prevention and cure</td>
</tr>
<tr>
<td></td>
<td>- country health programming</td>
</tr>
<tr>
<td></td>
<td>- primary health care</td>
</tr>
<tr>
<td></td>
<td>- health manpower project management</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Establishment and implementation of</td>
</tr>
<tr>
<td></td>
<td>- supervision system</td>
</tr>
<tr>
<td></td>
<td>- referral system</td>
</tr>
<tr>
<td></td>
<td>- continuing education</td>
</tr>
<tr>
<td></td>
<td>- recruitment and selection procedures</td>
</tr>
<tr>
<td></td>
<td>- career development schemes</td>
</tr>
<tr>
<td></td>
<td>- deployment of manpower</td>
</tr>
<tr>
<td></td>
<td>- staffing patterns</td>
</tr>
<tr>
<td><strong>Targets</strong></td>
<td>( x ) units of service of specified quality delivered to</td>
</tr>
<tr>
<td></td>
<td>defined population</td>
</tr>
<tr>
<td></td>
<td>- coverage</td>
</tr>
</tbody>
</table>
Health manpower planning -- the subject of this course -- takes place within the larger frameworks established by the current health system, on the one hand, and by efforts to improve the rationality and effectiveness of that system on the other. Health manpower planning matches national health plans and commitments with trained people. The term "health manpower" refers to those people (1) who are trained for specific functions which have the ultimate objective and effectiveness of promoting, maintaining or restoring health, and (2) who work within the general boundaries of the health sector. The main objective of health manpower planning is to ensure that enough manpower with the needed skills is produced, and then used both efficiently and effectively. To achieve this, manpower planning must seek to provide a bridge between the educational institutions and the training programmes that produce manpower and the health service organizations and institutions that "consume" manpower.

WHY HAS MANPOWER PLANNING NOT BEEN EFFECTIVE?

Manpower planning is by no means new. Almost all organizations have been and are concerned with planning for the future. However, in general, manpower planning has not yet proved its worth, for various reasons. Some of the most important of these reasons are as follows.

First, manpower is an extremely complex resource to manage because:

- individuals vary greatly in their levels of skill, attitudes toward work, motivation and behaviour;
- trained manpower cannot be produced at short notice;
- work patterns, once established, may be very hard to change, even though circumstances change;
- patterns of employee behaviour, particularly in terms of their propensity to leave, are difficult to predict; and

While manpower planning is not new, its record of accomplishments is still very limited.

Manpower is an extremely complex resource to manage.

29
persons of differing skills and work experience can only be substituted for each other to a limited degree.

Second, manpower planning and manpower development are often not synchronized with health plans. As a result, resources are not developed in parallel and trained personnel are not well used. Examples of problems arising from inadequate coordination are numerous:

- A newly expanded hospital, completed at great cost with the assistance of foreign loans, stands unused because of a lack of nursing staff.

- The gift from a developed country of a modern university hospital soon becomes a double liability: a major drain on the health budget, and an unsuitable sophisticated teaching facility, irrelevant to local needs.

- To pay the wages of the health staff, the budgets for drugs, equipment and facility maintenance are cut so severely that the effectiveness of the health service is seriously reduced.

- Three nursing schools are opened in a region where there are already enough nurses; one hospital in the region averages two nurses for three beds.

- Administrative barriers to the promotion of health workers causes morale to fall to such a low point that employee turnover rises and little work is done.

Third, there can be a lack of coordination between manpower development and programme management. Numerous factors contribute to this, including:

- limited awareness of what planning is and how it is done, which has resulted in planning being assigned low priority;
- fragmentation of health services among multiple administrations and agencies, and of training programmes among multiple and often entirely independent universities, faculties and schools;
- organizational and administrative rigidities;
- opposition of many interest groups to better coordination for fear of unwanted change;
- failure to take into account the political context during the preparation and implementation of plans; and
- the lack of participation of all interested parties, including planners, in carrying out the planned programmes.

Fourth, manpower planning has traditionally been carried out within a rather narrow mandate. It has tended to be concerned with the "numbers game," that is with projecting and matching between the total number of health workers needed and their supply. In making these projections, manpower planners have often neglected qualitative issues such as the relevance of educational programmes to service needs, manpower productivity, the downward delegation of tasks and manpower distribution.

Fifth, manpower planning, as well as health planning in general, has tended to be concerned more with the formulation of plans than with implementing and evaluating programmes, or with managing the planning process itself.

As countries have become more aware of the high cost of inadequate planning they have sought to correct many of these deficiencies. In particular, they are trying to create strong national health planning capabilities and, in that context, to coordinate their efforts to plan for health manpower development and to ensure that Planning has tended to be a "numbers game," matching supply with demand but not addressing important qualitative issues.

Planners have often neglected implementation, with adverse effects on achievements.

Recognition of these problems has led many countries to strengthen planning and integrate manpower development into their plans.
health manpower planning becomes a cyclical and continuing process. The importance of integrating health manpower planning into health planning needs particular emphasis. In many countries, health planning is already well-established. In other countries, however, health planning is still in a developmental stage. Health manpower planning in these countries needs a parallel development so that it may eventually be integrated into the health planning framework.

WHAT IS INVOLVED IN HEALTH MANPOWER PLANNING?

Health manpower planning parallels health planning in having five major steps.

Health manpower planning in many respects parallels the five major steps of health planning. These are:

1. data collection and analysis
2. situation analysis and broad programming
3. detailed programme formulation
4. programme implementation
5. programme evaluation

For simplicity of presentation, these steps are listed in sequence. In practice, however, they are carried out on an interactive and cyclical basis, so that planners may be working on several steps at one time.

Within the health planning process, manpower planners seek to identify those actions dealing with manpower that will help to ensure the orderly development of the health programme. Throughout this manual, the many points of contact between activities of manpower planners and those of their counterparts concerned with health planning in general are highlighted.

The course followed by the manpower planner in deriving manpower needs is a logical progression.
It starts with a review of the type, size and other characteristics of current health programmes and of prevalent health problems. It then proceeds through an analysis of current trends, of resource availability, and of constraints and obstacles to the attainment of objectives. The planning phase ends with the conversion of future goals into services, and of services into the manpower needed to provide them.

Figure 1.1 presents a framework for the formulation of a manpower plan. The cyclical nature of the plan process is emphasized in this figure by the path of dotted lines which lead the planner back to the different alternatives open to him for bringing supply and demand into balance. However, matching the likely manpower supply with the likely demand is only the first step in formulating a plan. Additional tests must be made to ensure plan feasibility and the availability of funds and other resources, and also to ensure that the requisite mechanisms for implementing and coordinating the planned programmes exist.

While some mention has been made in the early part of the Session of the involvement of different interest groups in the manpower process, for the most part the discussion up to this point has concentrated on the more obvious formal aspects of manpower planning. Later sessions in the course will explore these aspects in more detail. Of equal importance, but more difficult to articulate, is the process through which manpower policies arise before and during the planning process itself. It is with this crucial part of the planning process that the rest of this Session is concerned.

HOW ARE MANPOWER POLICIES DETERMINED?

Policies are both an essential input to planning as well as, ultimately, a major output. In the case of health manpower, health service policies provide broad directives for the course and elements of manpower development. Policies do not

The planning phase normally takes the planner through a logical sequence that includes assessment of the current situation, data collection and analysis, definition of objectives and a conversion of health goals into services and of services into manpower.
define the precise sequence of actions to be taken, but they provide a framework within which they can occur.

Policies are formulated by a complex process that involves the interaction of many diverse factors and interest groups, an interaction which greatly complicates the work of the planner and leads to considerable uncertainty in planning. There are three basic components which contribute to the formulation of policy: the environment, participants, and the process itself.

The policy environment consists of political, social, economic, technical and legal factors. One of the most important aspects of the policy environment is the value system held by the society. For example, belief in the free enterprise system will itself largely determine the general framework within which the health care system can develop. Within this framework, certain types of plans and actions will prosper, while others have little prospect of even being considered.

Who participates in policy-making depends on the issue under consideration. The diversity of vested interests and the rarity of consensus on many policy issues make competition for influence and power unavoidable. The balance of power among the diverse interest groups concerned with a given issue will often determine the policies that eventually emerge.

Two distinct policy-related groups can be identified: the policy-makers and the policy-seekers. The former group has the authority to make policy, although how this authority is exercised depends on whom the group consists of. Examples of policy-makers are executives, administrators, legislators and judges.

Policy-seekers in some ways represent a more complex category in that they both seek policy...
Policy-seekers have a complex role: both seeking policy decisions and helping to make them. This group expresses demands, brings certain issues to light, and mobilizes support for them. Policy-seekers include such interest groups as health professional organizations, health insurance agencies, drug manufacturers and various consumer groups. There is a strong interaction between policy-makers and policy-seekers, with the latter engaging in a wide variety of activities to bring pressure to bear on the former.

The policy-making process: a period of conflict, negotiation and compromise.

All participants, whether official or unofficial, will engage, at one time or other, in initiating, vetoing, coordinating, lobbying, making propaganda for its views, and agitating. Some groups will fare better than others in this, and those who win are more likely than the losers to be large, affluent, cohesive and prestigious, to have strong leadership, and, very important, to have some vital issue at stake. To resolve the inevitable conflicts there may be bargaining among organized groups, and coalitions may form around shared interests.

There are three stages of the policy-making process.

Even though policy-making is a continuous process with no clearly defined beginning or end, it has three principal sequential stages, possibly with movements back and forth between stages. They are:

1. Agenda setting: how a problem is included in a policy agenda and who participates in the discussions.

2. Policy formulation: how problems are defined and alternative policies compared.

3. Policy implementation and evaluation: who is responsible for these and how policies are implemented and evaluated.

Issues appear on policy agendas for many reasons, not least of which is their timeliness.

It is important to understand why some problems appear and others do not appear on the policy agenda. Some are not included because the interest groups are passive and accept existing
policies, or are inarticulate, unorganized, or lack access to the policy-makers. One factor that can affect the chance of getting certain issues on the policy agenda is timeliness. It may be politically feasible to consider a certain issue at a particular time (e.g., the use of community health workers in villages), or conversely, the issue may be far too controversial or misunderstood to be included.

For a problem to be identified as a policy problem, people must be aware of it, its seriousness must be known, someone must believe it to be soluble, and there must be commitment to seeking a solution. The chances of success can be enhanced when concerned interest groups have strong leadership, the problem has adverse consequences for many people, and the issue is well publicized.

Even when a problem has been placed on the agenda, subsequent action is by no means guaranteed. A series of steps follow as part of a decision-making process which ends in either action or non-action. The decision-making process, which may be termed policy formulation, should ideally follow the basic steps of systematic problem-solving, namely:

1. problem/issue identification together with clarification of objectives;
2. development of strategies to achieve objectives;
3. determination of foreseeable consequences;
4. comparison of consequences; and
5. selection of policies.

The above five steps are seen as a rational process, though the degree to which they are followed in practice and their eventual outcomes are very much governed by various interest groups and their relative power at the time of decision.
Different interest groups will have a differential access to policy-makers.

The policy-seeking groups try to gain access to policy-makers in many different ways. Some have greater ease of access than others. The policy-maker may be a member of the interest group or may be indebted to it; some groups are endowed with more resources or organizational skill than others; some groups are well placed in the social or economic hierarchy; and some groups, such as physicians, find decision-makers more accessible to them than to others.

Different communication mechanisms are used by policy-makers to involve policy-seekers.

As examination of policy issues proceeds through a variety of channels, policy-makers often use certain procedures for informing the public before final decisions are made. The mechanisms for this purpose consist of advisory committees or commissions, task forces or working parties, special duty groups, and public hearings. Sometimes these are used to give an appearance of concern about an issue, when in reality policy-makers are not ready to act. Thus, they can be delaying tactics or methods of pacifying specific interest groups.

At some point in policy formulation the number of alternatives is narrowed down by the rejection of some proposals and the modification or consolidation of others. Considerable effort goes toward identifying the one alternative or several alternatives which have the greatest chance of winning approval by all or most members of the concerned parties. The successive narrowing down of the number of alternatives is done by building coalitions, establishing consensus and achieving majority support. The existence of a number of pressure groups, often with inconsistent goals, creates the need for bargaining, persuasion, negotiation and compromise.

In many cases, the substance of new policies is not determined until the implementation stage.

To facilitate agreement, the translation of policy into law or administrative regulations may be couched in vague and ambiguous terms; as a result much of the eventual policy content is determined during the implementation stage. Policy-makers occasionally produce unimplement-
able laws, either intentionally or unintentionally. The unintentional reasons can be due to time pressure, failure of technical staff, or lack of contact with the relevant support staff. On the other hand, unimplementable laws can be the result of a deliberate act which acknowledges a demand without explicitly considering its merit.

During implementation, the different interest groups continue to evaluate the outcome as they affect their own interests. The policy evaluation thus generated creates pressures, in its own way, for future modification of the policies. The criteria for policy evaluation will include the following:

- impact on the defined target problem or population;
- impact on affected groups other than the target population;
- short-term and long-term impacts; and
- the resources devoted to the programme.

Those who take part in policy formulation and implementation play different roles. Policy-seekers tend to express their interests and preferences into a set of policy demands. They are more likely to succeed when they concentrate on narrow issues. An important role relates to research and advisory functions performed by interest-group leaders. Policy-makers frequently depend on and consult interest groups when preparing to make decisions. To strengthen their demands, interest-group leaders also form alliances with other groups to diversify their appeal.

The potential contribution of a planner in policy making is in policy analysis to broaden the perspectives of policy-makers and to equalize access of policy-seekers to policy-making. The provision of information and analysis by interest groups invariably has a one-sided perspective.
In such situations planners can present a balanced perspective to the policy-makers, and, if guided by consumer interests, their input can help to reduce the traditional imbalance between provider and consumer positions.

Policy issues must be resolved before detailed planning begins.

It is essential in health manpower planning that the outstanding and unresolved policy issues be solved first before proceeding with detailed planning. For example, if a major change in medical curriculum is anticipated, the overall direction of such changes should be clarified before planners discuss how many new medical schools would be needed. These issues can only be resolved by exchange of opinion between different interested parties or policy-seekers. This needs a proper organization of the manpower planning process itself so that involved parties are consulted and represented in an appropriate forum.

HMP not just concerned with numbers; it involves conciliation of complex issues and disparate interests.

Health manpower planning is concerned with much more than just numbers. It involves the conciliation of complex issues and disparate interests, not the least of which are the very staff for whom the planning is undertaken. In this light, manpower planners or HMP working groups must be prepared to be not simply technicians but must be willing also to function as a bridge across which a consensus of agreement and coordination of health manpower development can take place.
BACKGROUND READING


OTHER REFERENCES


EXERCISES

EXERCISE 1. Manpower Problems

Please list in order of importance up to ten the major health manpower problems existing in your country.

EXERCISE 2. Organizational Involvement in Planning

List the main organizations or units in the country that are engaged in health planning and health manpower planning.

Which organizations do you think should be involved in health manpower planning?

EXERCISE 3. Problems of Health Manpower Planning

In your opinion, what are the main shortcomings of health manpower planning as practiced in your country? (Even if health manpower planning is not formally practiced in your country, decisions are taken in some way on health manpower development.)
EVALUATION QUESTIONNAIRE FOR SESSION 1

Date ______________________

The following questionnaire is intended to obtain your frank and honest opinion about the session you have just attended. This will help us in improving the material and the exercises of the course. Do not hesitate to give negative responses.

1. Do you feel that you achieved the educational objectives listed at the beginning of the session? The objectives were for the participants to be able to:

   1. Define basic terms and concepts relating to HP and HMP.
   2. Specify principles and components of HMP.
   3. Describe main difficulties that can lead to reduced effectiveness of HMP.
   4. Describe how health manpower policies are made.

2. Did you read any of the learning material before the session?

3. Was the learning material:

   a. useful for doing the group work exercises?
   b. easy to understand?
   c. interesting?
4. Did you find the illustrations:
   a. easy to understand?
   b. interesting?
   c. relevant?

5. Did you find the exercises:
   a. easy to understand?
   b. interesting?
   c. relevant to national issues?

6. Did you find the time allocated:
   a. for presentation of the learning material:
   b. for exercises:
   c. for plenary discussions:

7. If you were organizing this session, what percentage of time would you allocate to:
   a. presentation?
   b. exercises?
   c. plenary discussions?

   Note that the percentages allocated to each activity when added up should equal 100 percent.

8. Do you have any other comments?

Name

There is no need to sign your name unless you wish to do so. Thank you.
SESSION 2

TEN STEPS TO HEALTH MANPOWER PLANNING
1. Health Manpower Planning

2. Ten steps to health manpower planning

3. Health manpower situation report on existing manpower and services

4. Future supply of manpower

5. Manpower requirements—quantity, quality and distribution

6. Mismatches between supply and requirements

7. Solving mismatches

8. Organizational and management problems

9. Manpower strategy and outline plan

10. Detailed health manpower development plan

11. Implementation and monitoring

12. Concluding session
TEN STEPS TO HEALTH MANPOWER PLANNING
SUMMARY

The health manpower planning process is not simply a matter of quantitative calculation, but will involve complex issues, policies and the diverse interests of different groups within and outside the Ministry of Health. These interests need to be clearly understood and represented during the course of the planning process.

This Session presents a brief overview of the entire health manpower planning process, outlined here as a set of logical steps which, for convenience of discussion, are introduced in a linear sequence. While for most planning situations this sequence will be the most appropriate one to follow, it should be recalled that the planning process itself is cyclical in nature and by definition must be adapted to local circumstances. Accordingly, the planner may in practice need to deviate from the precise steps and sequence presented here in order to maximize his effectiveness.

Health manpower planning does not end with the production of a plan. Uncertainties about the future are such that planners and implementers need to maintain a continuous dialogue after implementation begins in order to be able to modify the plan as circumstances change.
EDUCATIONAL OBJECTIVES

At the end of this session, participants should be able to:

1. Specify the procedural steps that should be followed in carrying out health manpower planning, their normal sequence, and how they would fit into national health planning.

2. Identify the organizations and institutions with which a health manpower planner should work in the preparation of a health manpower plan.

3. Describe what actions need to be taken after the plan is complete and why these actions are necessary.
SESSION STRUCTURE

Review the framework within which a health manpower planning working group must work

Determine the procedural steps necessary for a health manpower plan to be properly undertaken

Describe briefly the function of each of the steps and its relationship to other steps

Review the steps in terms of their relationship to current national practice in health and health manpower planning
LEARNING MATERIAL

WHAT IS INVOLVED IN HEALTH MANPOWER PLANNING?

Health manpower planning, like health planning, is a process which attempts to identify pathways for the achievement of certain targets within the limits of available resources and to resolve or prevent mismatches between the needs and availability of manpower. The mismatches can be quantitative, qualitative, organizational or distributional. As was mentioned in Session 1, a planner will rarely reach a solution and ultimately a plan for ensuring the absence of mismatches at the first attempt. Reaching a solution will necessarily be a repetitive process, calling for successive approximations.

Notwithstanding the cyclical nature of manpower planning, health manpower planners have to prepare a manpower development plan within certain time constraints. To do this, they follow a set of steps that enable them to achieve the desired outcome of a plan. Figure 2.1 suggests a set of steps to be followed in health manpower planning. The steps are presented in a linear sequence in this course. However, certain adjustments may be needed in the process of an actual planning activity; some of the steps, for instance, may be omitted from the proposed sequence, and it may be necessary to move repeatedly between other steps.

Ideally, health manpower planning begins when a government or organization decides to undertake it in conjunction with national health planning or country health programming. When such a decision is made, government policies about areas of concern and the expected outcome must be developed for the manpower planning group. The timetable of the health manpower planner and the sequence of reporting should also be established at the outset.

Planning is a cyclical process which seeks to apply resources efficiently and in a timely manner to the attainment of defined goals.

Although planning is cyclical by nature, it is here presented as a set of logical steps to be followed in an approximately linear sequence.

Step 1: PREPARING FOR HEALTH MANPOWER PLANNING
Figure 2.1. PROCEDURAL STEPS IN HEALTH MANPOWER PLANNING

1. Preparing for health manpower planning
   - Health manpower situation report on existing manpower and services
     - Future supply of manpower
     - Manpower requirements - quantity, quality and distribution
   - Mismatches between supply and requirements
     - Solving mismatches
       - Organizational and management problems
         - Manpower strategy and outline plan
           - Detailed health manpower development plan
             - Implementation and monitoring
The group of health manpower planners should include representatives of health services organizations, health manpower development institutions, professional bodies and other interests. At the same time, a steering committee to whom the health manpower planning group would report should be convened. The steering committee should consist of high-level decision-makers who have sufficient authority to implement the plans.

Appoint an HMP working group with staff drawn from the relevant interested bodies.

The health manpower planning group as part of the prelude to the actual technical planning activities should make themselves fully aware of the country's political orientation and long-term social and developmental priorities. If the working group does not have sufficient policy direction, social and health policy issues should be clarified. It is essential that before planning begins, the health manpower planning group should understand the government's position on such critical issues as:

- long-term demographic projections,
- health priorities, and
- health resources.

The HMP working group should be made fully aware of all social and health policies and issues.

The positions of different pressure groups concerned with the health manpower development process should also be understood.

WHAT ARE THE STEPS IN THE PLANNING PROCESS?

Information about health services and manpower development must first be collected and presented. Data may be collected either by the working group or, in advance, by any other group that has access to data sources. Sometimes a manpower information document or situation report may be provided to the working group so that they can begin their planning activities further along in the planning process. It is, however, more normal for them to start with raw information which they must convert into a form suitable for the later stages of the planning process.

**Step 2:** HEALTH MANPOWER SITUATION REPORT ON EXISTING MANPOWER AND SERVICES
The HMP groups should be selective in information collection; seek only what is relevant to the questions in hand.

Data collected for the information document/situation report should always be assembled with a specific purpose in mind. It should also be relevant to the needs of planning. Often, much information is collected that is not used later. A reasonable amount of carefully selected information is worth far more than a mass of data collected without purpose.

The process of collecting data should not be allowed to become unduly prolonged.

Data must be collected within a reasonable time. In particular, every attempt must be made to use the results of recent surveys, whether or not the results have been published. Launching special surveys to collect additional data should especially be avoided, as this dramatically extends data collection time and increases costs.

The most advantageous way of collecting HMP data is to do it along with health planning data.

Expertise in such disciplines as medicine, statistics, demography and education should be represented on the team responsible for data collection and presentation. Team members should be familiar with existing data sources.

If possible, manpower data collection should coincide with a similar process for health planning. If country health programming is being undertaken, the situation report it entails will include health manpower information. Combining health planning and health manpower planning will avoid duplication of effort and the possibility of contradictory conclusions. Very little additional effort should be needed to collect health manpower planning information on top of the information needed for health planning.

HMP will require basic information under a number of different headings.

Information that should be collected during the data collection phase includes:

- background information on the country;
- the fiscal situation and trends in national, provincial and local budgets;
- present health status and trends;
- present health services and trends;
- national health plan, if it exists;
- present staffing situation and trends;
- training institutions;
- personnel policies; and
- the use of staff.

Session 3 will deal in greater detail with the nature of data collection and its consolidation into a situation report.

The future supply of manpower will be based on the availability of current staff, the rates of leaving and future additions to the staff. The existing staff will also shift from one category to another due to movements within (i.e. promotions) and between organizations (i.e. transfers). It will be depleted by departures from the organization, deaths and retirements. Additions to the staff will result from staff moving from other organizations or sectors, and the training and recruitment of newly qualified staff.

The health manpower planning working group should first attempt baseline projections of the likely availability of staff in the future, based on the situation report. The current situation, expected future losses and additions provide the basis for this estimate. Future losses will be based on the rates developed from past trends as modified by the judgements of the working group. Estimates of additions to the staff by movement from other organizations will be made through a similar approach, while data from training institutions, existing and planned, will provide estimates of newly qualified staff expected during the plan period.

Future manpower requirements may be estimated in terms of quality, quantity, productivity and distribution of staff, using a variety of different approaches:

1. The health needs approach is based on expert opinion about the amount and nature of health services needed to attain and preserve the health of the people.
Four methods exist for determining requirements. The method(s) used will depend on national circumstances.

2. The service targets approach identifies targets for the provision of various kinds of health services based on diverse criteria of needs and feasibility; these services are then converted into the manpower needed to meet them.

3. The health demands approach estimates the effective demand for services as a function of income, price, accessibility, etc.

4. Manpower population ratios, using desirable or empirical normative ratios, are based on diverse criteria.

In reality, the working group may use one or a combination of these approaches to determine manpower needs. The availability of data and the country's political orientation and economic circumstances will also influence the approach(es) adopted.

At the same time that numerical estimates of manpower needs are being made, the skills needed by different categories of health workers must be identified. How health personnel will be distributed throughout the country and among different services should also be estimated.

Step 5: MISMATCHES BETWEEN SUPPLY AND REQUIREMENTS

Mismatch problems can be of a number of different types: number of staff, distribution, skills and/or productivity.

Having projected the future supply of manpower and manpower needs, the working group can compare the two. Such comparison will undoubtedly reveal mismatches between supply and requirements. There may be too few or too many of various categories of staff; needed skills may be lacking; productivity may be low; and there may be a geographic maldistribution of staff. Other manpower problems that hinder the delivery of health care will also be identified at this stage.

Many of the health manpower problems and their solutions will be interlinked and should not be treated piecemeal. Grouping the identified problems into broad categories will facilitate the consideration of similar problems together.
Problems considered by manpower planners will be country-specific. Some problems considered in one country may be irrelevant to planners in another country; where similar issues exist, they may be addressed differently from country to country. For example, in one country manpower planners may feel it appropriate to suggest how to improve the management of training institutions, while, in another country, it may be left to the discretion of the institutions themselves.

When the working group has identified the major problems, it must decide which problems it should consider and which fall outside its terms of reference.

Once the problems have been identified and broadly classified, the working group will propose solutions to them. As a first step to proposing solutions the working group should list all major alternative solutions to a particular set of problems without considering their feasibility. The initial solutions should be developed in "brainstorming" sessions, i.e., sessions in which all even remotely possible solutions should be at least mentioned, without prematurely narrowing the field of inquiry to only those thought to be readily feasible. For example, to increase public sector physician salaries may be a very unlikely solution to the problem of government physicians spending much of their time in private practice. Nevertheless this possible solution should at least be listed and given preliminary consideration in order to ensure that commonly held beliefs on what is feasible and practical are thoroughly examined. Ultimately, all health manpower problems identified in this step will have a quantitative dimension. The number of personnel with needed skills may be lacking while those with a different set of skills may be abundant. There may be too few pharmacists in rural areas as compared with urban areas, and so on.

In any form of planning the solutions to problems are often interlinked. In health manpower

Manpower problems are often country-specific and their solutions should also be adapted to suit specific national circumstances.

Some manpower problems fall outside of the terms of reference of the HIP working group and should be excluded from further consideration.

Step 6: SOLVING MISMATCHES

"Brainstorming" is a first step to producing a list of potential solutions.
Solutions to one problem are often interlinked with solutions to other problems and this interlinking needs to be explicitly examined.

Planning, the degree of relation between solutions is usually very high. Solving a particular problem may therefore facilitate or impede the solution of other problems. For example, rapidly training and recruiting staff may, in the long run, create problems of staff morale if no provision is made for a well-defined career development scheme. The planning group will thus need to identify the effect of particular solution possibilities across the whole spectrum of health service staff.

Selection between solutions is the next phase of the process and it is normal to first concentrate on solutions which are of a long-term nature, not requiring radical changes in policy or action, and which can be absorbed easily within the projected availability of resources. For example, new training institutions would be planned within the following limitations: capital funds available; the recurrent costs to be incurred; time for construction of new physical facilities; training and recruiting of additional teachers; and a sufficient pool of qualified candidates from which students are to be drawn.

Resource-based plans are usually long-term and stable since activities are planned in consonance with a harmonious growth of resources. The effects of these actions may not be visible for a very long time. A decade may elapse between the decision to establish a new medical school and the graduation of the first students.

At the end of this stage, it will be found that many of the resource-based solutions do not quite match the targets established in the original health plans. Some of these planning targets, consequently, will have to be changed. However, some planned targets may be based on political commitments of policy-makers. These politically sensitive commitments may not be modifiable. For example, a strong political commitment may have been made to establish a health centre in every district of the country in the next two years.
Planning may suggest, however, that sufficient staff for such centres will be available only after six years.

When confronted with such discrepancies, planners must re-examine the resource-based solutions. All the targets of the national health plan should be carefully compared with targets possible from the proposed long-term solutions. Where there are differences, planners must identify which are politically of high priority. Stop-gap measures will then have to be proposed for these high-priority targets so that the commitments can be met. In some cases, quality of services may be sacrificed. For example, the promised health centres may be built but be only minimally staffed until enough health workers can be trained. In others, resources may have to be diverted from other programmes.

In making proposals for the solution of health manpower problems, each proposal at this stage must be scrutinized rigorously to ensure that in fact it is feasible. Constraints in the situation may make some solutions impossible to achieve. Other solutions may simply face obstacles that can be circumvented and are thus feasible.

The different manpower development solutions proposed by the working group will have certain organizational and management implications. These implications should be examined and, if necessary, the solutions modified to avoid creating new long-term problems. The major long-term implications to be assessed can be classified in five broad categories:

1. Coordination between health service development and manpower development. Each should not pursue its own independent path.

2. Educational planning for the training of health staff. Curricula and training methods should be relevant to the needs of services.

Target-based planning in some cases will override resource-based planning.

Solutions need to be tested at this point for feasibility in terms of constraints and obstacles.

Step 7: ORGANIZATIONAL AND MANAGEMENT PROBLEMS

Further tests of potential solutions need to be made in terms of their long-term implications.
3. Effective management of health staff.

4. Career development prospects for the health staff.

5. Continuing education which supports career development and maintains and supplements the skills of the health staff.

It is often found, for example, that certain personnel policies block paths of advancement. After a number of years, these policies cause great dissatisfaction among staff. Some modifications of personnel policies can easily prevent the problem. By examining such long-term implications of the proposed solutions the working group will help to avoid such situations and, by so doing, may contribute significantly to the harmonious and coordinated growth of health services and manpower development.

Step 8: MANPOWER STRATEGY AND OUTLINE PLAN

The working group should now be ready to consolidate the whole manpower development strategy. By this point, long-term solutions will have been considered. In addition, the short-term effects of such solutions and their implications on the numbers, quality and distribution of staff will have been identified. The working group should now prepare the outline plan of the strategy to be followed. The manpower development strategy will encompass the sequence of actions to be taken to resolve mismatches between the supply of and requirements for staff.

An outline plan needs to be prepared to provide a basis for discussion and consensus with decision-makers.

By developing an outline plan and presenting it to the steering committee, the working group can obtain policy guidance before finalizing the detailed plan. This review serves two purposes:

- The members of the steering committee may have information that the working group does not have. Such information may lead to modification of the plan.

- Decision-makers on the steering committee will be participating early enough to contribute actively to the development of the manpower plan.
In this step, the resources needed, including the development budget and recurrent budgets, are estimated only approximately. If funding difficulties arise, the steering committee may determine priorities among the manpower development programmes contained in the outline plan and these will be applied in modifying the plan appropriately.

When the steering committee approves the outline plan, the working group can develop the detailed plan. At this stage, the working group may be expanded to include persons who will be engaged in implementing the programmes and in budgeting. The working group may split into sub-groups, each charged with developing the detailed plan for a particular programme or aspect of the overall plan.

However the working group chooses to undertake this final stage of plan development, continuous communication must be maintained between groups and with staff from the personnel, finance and budget departments, and other concerned bodies. Frequent coordinating meetings should be held. Adequate secretarial support will be essential at this step.

The solutions developed earlier will be broken down into two types of programme activities: developmental and ongoing. The developmental activities are aimed at improving the manpower system's potential; they are usually intensive and short. Expanding training institutions, and changing working procedures are examples of developmental activities. Ongoing activities are those that are usually performed routinely to maintain the system's potential.

The schedule on which each activity will be performed should be determined. Networks of activities can then be developed. This will enable the group to decide which activities are critical. Milestones, or intermediate and final target dates, will also be established.

Statements of resource needs in the outline plan should be rough estimates only.

Step 9: DETAILED HEALTH MANPOWER DEVELOPMENT PLAN

The HMP working group should be expanded during detailed plan development to include programme managers and finance staff.

The detailed plan should include programme developmental and ongoing activities clearly separated.

A schedule of activities should also be incorporated into the plan.
All the detailed programme activities will then be converted into resource requirements. Human, physical and other needs will be identified; the organizational patterns for the developmental activities must be outlined; and the costs of various activities must be estimated so that programme budgets can be developed. It is advisable to prepare separate budgets for developmental and ongoing activities, i.e., developmental and recurrent budgets. Too often, little attention is paid to the recurrent budget, with serious results. For example, a development budget establishing a training institution may be prepared, but the repercussion on future recurrent expenditures to run the institution may be ignored. Preparing separate budgets ensures that both types of expenditures are considered.

The plan document should now be written and refined. This requires that, at the outset, all members of the working group must agree on the outline of the document. Its structure, of course, will vary from country to country depending on needs. It should nevertheless contain a summary of the major proposals. Many of the tables and much of the detailed information may be presented as appendices (annexes).

The detailed health manpower plan should contain:

- the policy basis of the plan;
- the health service goals and targets;
- the problems of health manpower development;
- a listing and critical analysis of potential solutions;
- a breakdown of preferred solutions into their component activities;
- a set of scheduling networks to show the sequence of activities;
- the resources and time needed for each activity;
- the organization of teams to undertake the activities; and
- guidelines on the type of monitoring and frequency of evaluation and re-planning of the proposed programmes.
WHAT NEEDS TO BE DONE AFTER PLAN PREPARATION?

A plan, which is an instrument specifying a set of actions necessary to achieve a target, deals with the future. However, the future is fraught with so many uncertainties that even the most able planners will be unable to foresee all possible future events. For example, student unrest that interrupts training programmes can hardly be predicted. Since such events upset projections, a manpower planner must allow for the possibility of unexpected developments occurring and be prepared to modify the plan as circumstances dictate.

Step 10: IMPLEMENTATION AND MONITORING

Uncertainties about the future during plan preparation will mean that the plan will need later modification.

Manpower planning is not finished when the final plan is produced. It must continue throughout a plan's implementation. As situations change, the plan should be adapted accordingly. To do this, the working group should devise ways for manpower planners to continue to interact with those responsible for implementing the plan. The plan document itself should specify how monitoring information should be used and what arrangements need to be made for the planning process to continue during implementation.

Planners should be involved in the implementation stage in order to facilitate re-planning or plan modification.

If the full potential of the planning process is to be realized and the plan used as an effective tool of management, decision-makers in the ministry must not just accept plan changes but rather expect them. It is for this reason that emphasis needs to be made in the detailed plan document on re-planning after plan implementation commences.

Methods of monitoring, evaluation and re-planning need to be emphasized in the plan document.
EXERCISES

EXERCISE 1. Procedural Steps for Health Planning and Health Manpower Planning

Elements of health planning and health manpower planning exist in every country. In your country, planning may have been formal, systematic and structured, or informal and irregular. In either case, some sequence of events will have taken place leading to a plan of future activities. List the activities or steps involved:

1) for preparing the health plan;

2) for preparing the health manpower plan.

Show how the steps for each type of planning are interconnected to steps in the other type.

EXERCISE 2. Organizing Health Manpower Planning

Assume that national health planning has been recently undertaken in your country. The Ministry of Health is now organizing a health manpower planning exercise to follow this up.

a. Draw up the terms of reference of the HMP working group.

b. Identify the institutions, organizations or agencies which should be represented in the HMP working group. State why.

c. Specify what other organizations or institutions the HMP working group should contact. Give reasons for your selection and indicate at what stage and in what way those organizations would be involved.

d. Assuming that a steering committee would be formed to provide an overview of the working group’s activities, specify who should be members of that committee.

e. Draw up a planning schedule, including the approximate duration of each of the steps.
EVALUATION QUESTIONNAIRE FOR SESSION 2

Date__________________________

The following questionnaire is intended to obtain your frank and honest opinion about the session you have just attended. This will help us in improving the material and the exercises of the course. Do not hesitate to give negative responses.

1. Do you feel that you achieved the educational objectives listed at the beginning of the session? The objectives were for the participants to be able to:

   1. Specify the sequence of procedural steps in health manpower planning.
   2. Identify the organizations and institutions which should be involved in HMP.
   3. Describe actions to take after plan is completed.

2. Did you read any of the learning material before the session?

   Not at all  Poorly   Fair   Well   Very well

3. Was the learning material:

   a. useful for doing the group work exercises?
   b. easy to understand?
   c. interesting?

   Not at all  Somewhat  Fair  Moderately  Very

   A little  A fair amount  Most of it  All of it
4. Did you find the illustrations:
   a. easy to understand?
   b. interesting?
   c. relevant?

5. Did you find the exercises:
   a. easy to understand?
   b. interesting?
   c. relevant to national issues?

6. Did you find the time allocated
   a. for presentation of the learning material:
   b. for exercises:
   c. for plenary discussions:

7. If you were organizing this session, what percentage of time would you allocate to:
   a. presentation?
   b. exercises?
   c. plenary discussions?

   Note that the percentages allocated to each activity when added up should equal 100 percent.

8. Do you have any other comments?

   Name _______________________________________

   There is no need to sign your name unless you wish to do so. Thank you.
SESSION 3

HEALTH MANPOWER

SITUATION REPORT
PREPARING A SITUATION REPORT
SUMMARY

This session describes how to produce a Health Manpower Situation Report (HMSR). The HMSR document is complementary to the description of the overall health situation which includes a health planning report. The structure of the HMSR should closely follow both the structure of the health planning report (to make cross-referencing easier) and the level of detail it uses (so that the manpower aspects of each item in it are available).

A manpower planning study, like any other planning study, has the overall aim of collecting information for the planning decisions which must be made. The approach described in this session offers a way of identifying the information about current manpower, staffing and training in the country worth collecting. It suggests a method of ensuring that resources are not wasted in collecting the information which may be interesting but of little practical value.

The HMSR is intended to provide information on:

- current staffing levels;
- trends in staffing levels;
- other information on the characteristics of present staff, e.g. leaving rates, age structures, performance; and
- training.

The manpower planner has to decide how much information on these topics should be included in the HMSR. This decision must be made in the light of how important the information is, whether it is already available or how much it would cost to collect.

Alternate ways of presenting HMSR information can be used. The process of identifying how the information should be presented is in itself useful as it serves to identify more precisely what information is actually needed.
EDUCATIONAL OBJECTIVES

At the end of this session, participants should be able to:

1. Specify the nature and purpose of a Health Manpower Situation Report (HMSR).

2. Specify the minimum essential manpower data to collect for an HMSR.

3. Construct a framework for an HMSR for use in National Health Planning and Health Manpower Planning.
SESSION STRUCTURE

Formulate the structure of a Health Manpower Situation Report

Establish the desired scope and level of detail of information in the Health Manpower Situation Report

Specify what portions of this information it will be practicable to include in the Health Manpower Situation Report

Decide how this information is to be presented and set out dummy tables

Use these tables as instructions for the collection and tabulation of manpower data
LEARNING MATERIAL

WHAT IS A HEALTH MANPOWER SITUATION REPORT?

Manpower information is normally needed at two stages of a national health planning (NHP) process:

(a) early in the process when reviewing the country's current health situation. (The health planning report usually begins with a section setting forth the health situation and emphasizing its more important aspects; an important element of this section should be a review of current health manpower resources.)

(b) at a later stage, in considering the relative benefits and costs of alternative policy options. (These choices are reviewed and some are adopted in the health manpower plan; at this stage, the focus is on projected health manpower resources.)

This session concentrates on the manpower information required early in the health planning process to review the country's current health manpower situation. (This information will also be used later as a basis for projecting what will happen in the future.) This review of the current health manpower situation is usually known as the Health Manpower Situation Report (HMSR). Its purpose is to depict the country's current health manpower situation so as to complement the health situation described in the health planning report.

HOW SHOULD THE HMSR BE ORGANIZED?

It is important that the structure of the HMSR should reflect, or at least follow closely, the structure of the introductory section of the health planning report. That section...
should contain the manpower information inespect of any health programme considered in
the review of the current health situation.
For example, if the malaria programme, family
planning services, and the regional disparities
in health services are all to be emphasized in the
health plan, the manpower planner should empha-
size these aspects of health manpower as well.
It is preferable to combine the two reports and
produce one document; manpower information may
then be included in each section or topic of
the health planning report.

HMSR requires main-
taining close contact
with health planners.

If the health planning report and the HMSR are to
be produced at the same time, the manpower
planner must promptly establish and maintain
close contact with health planners. He will then
be aware of items to be covered in the introduc-
tory section of the health planning report and
what aspects of those items will be highlighted.
This will help him plan to collect corresponding
manpower information. If manpower planning
begins after the health planning report is pro-
duced, the manpower planner's task will be some-
what easier, for he will already have a structure
to follow.

HOW DETAILED SHOULD THE HMSR BE?

The scope and level
of detail of the HMSR
is a matter of judg-
ment but should
usually parallel that
of the health plan-
ning report.

The scope and level of detail presented in the
HMSR is a matter of judgement. First, the detail
should correspond fairly closely with the intro-
ductive section of the health planning report.
If the health planning report gives detailed
information by programme, service, client group,
region, etc., the HMSR should also contain that
detail.

Beyond this, other necessary decisions include:

(a) What information will be provided about
current staff levels? (If it is available,
a breakdown by grade, function, age, sex,
full-time/part-time (FT/PT) would be
valuable.)
(b) What information will be provided about current trends in these factors? (If the average age of staff in a particular category is decreasing rapidly and the proportion of part-time female staff in this category is increasing, both changes are potentially important and should be covered by data.)

(c) What qualitative manpower information should be provided? (Although staffing levels in a particular category are in accord with the target, for example, the turnover rate may be high. Experi- enced personnel are thus replaced by newly trained staff. This leads to a situation where posts are filled but few staff have the necessary experience to perform their tasks well.)

WHAT TYPES OF INFORMATION SHOULD BE INCLUDED?

The basis for judging what to present among these different types of information must be:

(a) What topics are important considering the content of the health planning report, the potential problems the manpower information reveals, and, most important, the potential value in using the desired information?

(b) What information is already available? What is the cost of collecting extra information?

The items of information to be included in the HMSR once decided upon, are usually grouped under five main headings:

(a) Level at which services are provided.

This information can be used to highlight shortages or imbalances in providing health care. Some items may already be included in the health planning document. Examples include the follow-
ing (staff numbers may be expressed in FTE's* actually delivering health services to the population):

- crude manpower to population ratios (e.g., number of staff per 10,000 population);

- ratios of manpower to target (or client) population (e.g., number of midwives per 10,000 women in the 15-45 age range, or number of midwives per 100 births annually);

- manpower to equipment ratios (e.g., hospital nurses per 10 beds, radiographers per x-ray machine, health workers per rural health centre);

- geographical distribution (e.g., numbers or population ratios of health staff in each region or type of location according to manpower type, specialty, client group, etc.).

(b) Characteristics of staff in post.

This information gives a more detailed picture; it may highlight symptoms of potential difficulty (e.g., a large proportion of older staff nearing retirement, or of young and relatively inexperienced staff, indicates poor age distribution; too many or too few supervisors may reflect an imbalance in the grades). Examples of variables include numbers of FTE staff, numbers of staff by employment status (full-time, part-time), sex, age, primary function (service, administration, research, teaching).

*FTE = full-time equivalent personnel. This unit is used to adjust for the frequent situation in which staff do not work full-time at a specified task or job. For example, physicians in a given maternal and child health programme may contribute, on an average, only three hours daily to this activity. Without taking this into account, tabulations of the number of physicians so employed would give a distorted picture. Accordingly, the total number of hours allocated to an activity is divided by the average number of hours a full-time person is expected to (or actually does) work. The result is expressed as FTE personnel.
(c) **Staff productivity.**

Productivity information shows how well staff are used and how productive they are. Well-trained and fairly distributed staff contribute nothing as such; only when staff work on relevant problems can they promote and maintain good health. Possible indicators of this important but elusive dimension include:

- numbers and types of services provided per unit of time and as a function of personnel type and mix (e.g., inoculations per day, X-ray films per month);

- assessment of relevance of services to major health problems;

- proportions of time spent on service activities, on support activities, and on other activities.

(d) **Rates of movement.**

This information can show trends in staff levels, and possible reasons for low productivity. Examples:

- leaving rates for any of the groups listed under (b) (e.g., by grade, FT/PT, sex, age);

- different types of leaving rates (e.g., change of job, marriage, pregnancy, retirement, death or dismissal);

- recruitment rates for any of the groups listed under (b) (e.g., by grade, FT/PT, sex, age);

- recruitment rates for each main source except training courses (e.g., from employment elsewhere, from domestic activity).

(e) **Training.**

Usually, training institutions are by far the most important source of new staff; therefore they are considered separately. Examples of training information include:

- types of training available (e.g., courses in different nursing specialties);
- numbers of applications for admission and, if relevant, their sources, broken down into "applicants from outside the health service" and "applicants from within the health service";

- annual enrolment capacity (the number of places filled each year, and how many additional places could be available);

- drop-out rate (total of trainees voluntarily leaving training, plus those failing examinations);

- destination (e.g., first job after qualification).

Not all items of manpower information will be used; the planner should limit his list to the truly important.

The above list includes many more items of information than are likely to appear in any HMSR. The examples given cover a wide range of possibilities, and so the particular information needed must be carefully selected. Identical information should be reduced to the simplest terms. If, for example, all staff in a particular grade have the same qualifications, are all full-time, and are all men, the number in the grade will be sufficient to cover these other items as well. Other items may be irrelevant, or data may change too rapidly to be useful.

Before proceeding to collect and analyse data it is essential to verify that they are indeed relevant to the problems under consideration.

Most of the discussion on this point has been directed at data requirements and the linkage of the HMSR to health planning. The amount of relevant data that could be collected far exceeds the capacity of even those countries with highly developed statistical and planning capabilities. Before collecting any data, the prudent planner will first determine whether the proposed information will aid in understanding the health manpower situation, identifying potential problem areas, or suggesting possible solutions. Only if the data pass this test of relevance should the planner collect the information.
HOW SHOULD HMSR INFORMATION BE PRESENTED?

In collecting manpower information, it is very desirable to work within the existing framework of classifications, divisions, etc., which are readily recognized in the ministry and in the country. For example, the geographical areas chosen should, as far as possible, be consistent with existing administrative, topographical, political, or economic divisions. There are two reasons for this:

(a) information from sources external to the health sector is more readily available and is also more easily recognizable (and acceptable) by senior administrators;

(b) information collected outside the health field (e.g., demographic data or economic data such as levels of unemployment or income per capita) is easier to use.

Indeed, if information from sources outside the health sector is important, these sources often determine the groupings or classifications imposed on information collected from within the health services.

Although the headings of the HMSR should closely follow those in the health planning document, the manpower planner must still decide how to arrange and present his material under each of these headings. For example, if one section of the health planning document reviews family planning services, the manpower planner, after presenting an overview of the whole service, may deal with the detail of each grade in turn (e.g., physicians, nurses, district family planning officers, family planning supervisors, health assistants, health aides). Or he may deal with factors which cover several grades, such as geographical distribution of all grades or age distribution of all grades.

There are two reasons for carefully considering the detailed structure of the HMSR at this stage.
The first is to ensure that useful manpower information is easily available to the readers of the health planning document. The second is that, if the structure of each section of the HMSR can be settled early, data to be collected can be specified, as can statistical material to be set out in tables or other diagrams. The structure can therefore be used as instructions for statistical or clerical staff. When seeking information from other groups in or out of the health service, the structure can specify the form and level of detail of the information needed.

The basic approach to organizing or structuring the way that manpower information is presented is described below.

Each factor (geographical, grades, qualifications, etc.) is used as the basis for further subdivision of the national data. For example, a chapter of the HMSR on family planning staff would contain one section on each geographical area in the country. Within each of these sections would be a subsection for each grade of staff. Each subsection would be further subdivided by the different qualifications of each grade, and so on. This example is represented diagrammatically as follows:

```
FAMILY PLANNING STAFF
   | Geographical
   |   |
   | Grades
   |   |
   | Qualifications
```

The advantage of this approach is that any level of detail contained in the original data can, with sufficient effort, be extracted from the tables in the report. Its main disadvantage is that it presents in a cumbersome form a mass of detail that may be difficult for the reader to comprehend.
Generally, however, the presentation of manpower information that achieves the best balance between level of detail and ease of comprehension uses a modification of this approach. The example given above for family planning staff would then be shown diagramatically as follows:

```
FAMILY PLANNING STAFF

Grades

Geographical    Qualifications
```

The statistical material corresponding to this diagram that would appear in this section of the report would be set out as in Tables 3.1 and 3.2.

**Table 3.1. GEOGRAPHICAL DISTRIBUTION OF STAFF**

<table>
<thead>
<tr>
<th>Grade</th>
<th>N. Region</th>
<th>E. Region</th>
<th>W. Region</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>I</td>
<td>235</td>
<td>23.0</td>
<td>150</td>
<td>9.5</td>
</tr>
<tr>
<td>II</td>
<td>252</td>
<td>24.7</td>
<td>402</td>
<td>25.4</td>
</tr>
<tr>
<td>III</td>
<td>534</td>
<td>52.3</td>
<td>1029</td>
<td>65.1</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Best to modify this approach.

Example of the combined approach.
### Table 3.2. QUALIFICATIONS OF STAFF

<table>
<thead>
<tr>
<th>Grade</th>
<th>Qualifications</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I</td>
<td>271</td>
<td>156</td>
</tr>
<tr>
<td>II</td>
<td>42</td>
<td>478</td>
</tr>
<tr>
<td>III</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>All grades</td>
<td>313</td>
<td>634</td>
</tr>
</tbody>
</table>

Each table in the section includes a total column which shows the reader the common origin of the numbers presented.

A diagram for each chapter of HMSR is desirable. It ensures presentation of the relevant material and helps in the design of the presentation itself.

The HMSR should be planned by drawing at least one of these diagrams for each chapter for the following reasons:

(a) It ensures that the basic statistical reference data the manpower planner wishes to cover in the HMSR will be presented;

(b) It helps to design a way of presenting the manpower information that will be readily understood by the reader;

(c) It provides a specification for the manpower information to be collected and the corresponding tables to be produced.

An approach to the collection of manpower information which is sometimes used, but which is not recommended, is to collect information about each factor in turn, without reference to the others, e.g., if the information in the HMSR on
family planning staff had the following structure:

```
FAMILY
PLANNING
STAFF

Geographical
(Administrative
area, urban/
rural)

Numbers
by
Grade

Qualifications
(Level, country)
```

This approach has the advantages that the information is relatively easy to collect and present, and each table or diagram is fairly small. But it has the major disadvantage that it usually does not provide enough detail. Statistical data on problems that relate to more than one factor, e.g. geographical distribution of different grades, cannot be conveniently presented, and if the information is collected by each factor separately this more useful level of detail will not be available in any case.

Finally, the manner in which data in the HMSR is presented is critical to ensuring that the issues become clear to decision-makers and planners alike. Thus it is essential to exclude from tables any irrelevant detail. The basic rule here is that no row or column should be taken out of the table if it weakens or destroys the comment or argument which follows. If it does not have this effect, it should be taken out.

Data presentation is critical. Tables should be reduced to only those elements that contribute to the point being made.
The following tables are shown as examples of bad and good presentations. The need for the information presented in the tables arose from a general feeling within a Ministry of Health that while most doctor posts in medical institutions were filled, i.e. officially held with the doctor drawing the corresponding salary, there was a significant number of posts in which the doctor concerned was not physically present to carry out his tasks (i.e. the post was filled but not manned). Information was collected and the following table drawn up and presented.

Table 3.3. MANNING LEVELS OF DOCTORS BY REGION AND GRADE

<table>
<thead>
<tr>
<th>Posts Sanctioned</th>
<th>Posts Filled</th>
<th>Posts Filled on Deputation (Secondment)</th>
<th>Posts Filled but not Manned</th>
<th>Posts Filled and Manned</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>TOTAL</td>
<td>510</td>
<td>100</td>
<td>412</td>
<td>81</td>
</tr>
<tr>
<td>EAST</td>
<td>74</td>
<td>100</td>
<td>59</td>
<td>80</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>326</td>
<td>100</td>
<td>267</td>
<td>82</td>
</tr>
<tr>
<td>WEST</td>
<td>58</td>
<td>100</td>
<td>45</td>
<td>78</td>
</tr>
<tr>
<td>FAR WEST</td>
<td>52</td>
<td>100</td>
<td>41</td>
<td>79</td>
</tr>
<tr>
<td>GRADE I</td>
<td>50</td>
<td>100</td>
<td>44</td>
<td>88</td>
</tr>
<tr>
<td>GRADE II</td>
<td>164</td>
<td>100</td>
<td>113</td>
<td>69</td>
</tr>
<tr>
<td>GRADE III</td>
<td>296</td>
<td>100</td>
<td>255</td>
<td>86</td>
</tr>
</tbody>
</table>

This first table is a poor presentation. While it contains the numbers which identify the size and location of manning deficiencies, it also contains many other numbers as well which are
irrelevant to the main point and confuse the reader. The table was subsequently redrawn and presented as follows:

<table>
<thead>
<tr>
<th>Region</th>
<th>Posts Sanctioned No.</th>
<th>Posts Filled and Manned No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>510</td>
<td>350</td>
<td>70</td>
</tr>
<tr>
<td>EAST</td>
<td>74</td>
<td>62</td>
<td>84</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>326</td>
<td>214</td>
<td>66</td>
</tr>
<tr>
<td>WEST</td>
<td>58</td>
<td>46</td>
<td>79</td>
</tr>
<tr>
<td>FAR WEST</td>
<td>52</td>
<td>31</td>
<td>58</td>
</tr>
<tr>
<td>GRADE I</td>
<td>50</td>
<td>42</td>
<td>84</td>
</tr>
<tr>
<td>GRADE II</td>
<td>164</td>
<td>93</td>
<td>57</td>
</tr>
<tr>
<td>GRADE III</td>
<td>296</td>
<td>217</td>
<td>73</td>
</tr>
</tbody>
</table>

The second table focusses the reader's attention and clearly identifies that manning problems exist, most sharply in the Central and Far West regions and in the Grade II staff. The first table contained the same numbers, but it also contained many other numbers as well which have been excluded from the second version without affecting at all the point being made.
EXERCISES

EXERCISE 1. Preparation of an HMSR

One of the most important aspects of an HMSR is the way the material is presented so that important factors in respect of a particular category of staff are given due prominence and are not buried in irrelevant detail. This exercise provides an opportunity to plan the collection and presentation of information relating to a particular category of staff.

1. Select a category of staff likely to be important in the next national health plan. This could be:
   
   (a) a type of health worker (e.g., doctors, auxiliary health workers);

   (b) all health workers in a particular type of place (e.g., an administrative region, all rural areas);

   (c) all health workers giving service to a particular client group (e.g., expectant mothers and young children, the old); or any other major staff category of potential importance.

2. What major aspects, such as geographical distribution, demand, qualification/skills, loss rate, volume of training, productivity, etc., do you think are likely to be of interest with regard to your selected group of staff and why (see page 3.3)? You may find it helpful to use the information categories presented in the learning material as a check-list. Do you think some of the factors you have chosen will be more important than the others? Divide your list into two or three groups according to level of importance of the desired information. Each important factor should provide a separate section of the HMSR. Based on these groupings, rough out a structure for
a section of the HMSR dealing with this staff. You may find it convenient to represent this structure diagrammatically as shown in the learning material.

3. Your HMSR presentation must be backed by statistical data at various points. Using your structure, suggest two statistical tables you think should be included in the presentation. Support your suggestions with statements indicating how the proposed information could contribute to decision-making.

4. Outline the data to be collected in order to produce the statistical tables you have suggested. How do you think these data could be best collected and how costly and time-consuming would this be? For example, which items are already available, which could be collected easily, and which would need a special survey of other methods of collection?

EXERCISE 2. Linking the HMSR to Health Planning

For a Health Manpower Situation Report (HMSR) to be of most use and give a good return for the effort invested in it, it should complement and enhance the situation analysis produced in the initial stages of health planning. This means that there must be sufficiently close contact between those working in the two areas. This exercise asks you to consider how this important relationship should be developed and maintained. Assume your planning group has been charged with the task of producing an HMSR for your country's health plan.

With which individuals should you seek to establish contact? How would you justify this choice in terms of their level, function, tasks, work load, or any other factors that seem important to you?
EVALUATION QUESTIONNAIRE FOR SESSION 3

Date____________________

The following questionnaire is intended to obtain your frank and honest opinion about the session you have just attended. This will help us in improving the material and the exercises of the course. Do not hesitate to give negative responses.

1. Do you feel that you achieved the educational objectives listed at the beginning of the session? The objectives were for the participants to be able to:

   1. Specify the nature and purpose of a Health Manpower Situation Report.
   2. Specify the minimum essential manpower data to collect for an HMSR.
   3. Construct a framework for an HMSR for use in National Health Planning and Health Manpower Planning.

2. Did you read any of the learning material before the session?

   Not at all  |  Poorly  |  Fair  |  Well  |  Very well

3. Was the learning material:
   a. useful for doing the group work exercises?
   b. easy to understand?
   c. interesting?

   Not at all  |  Somewhat  |  Fair  |  Moderately  |  Very

93
4. Did you find the illustrations:
   a. easy to understand?  
   b. interesting?  
   c. relevant?

5. Did you find the exercises:
   a. easy to understand?  
   b. interesting?  
   c. relevant to national issues?

6. Did you find the time allocated
   a. for presentation of the learning material:  
   b. for exercises:  
   c. for plenary discussions:

7. If you were organizing this session, what percentage of time would you allocate to:
   a. presentation?  
   b. exercises?  
   c. plenary discussions?

Note that the percentages allocated to each activity when added up should equal 100 percent.

8. Do you have any other comments?

Name

There is no need to sign your name unless you wish to do so. Thank you.
SESSION 4

FUTURE SUPPLY
OF
MANPOWER
MANPOWER FOR THE FUTURE
SUMMARY

A manpower supply projection starts with an estimate of the current supply within a defined geographic, institutional or other area. This estimate is then adjusted to take into account anticipated additions to and losses from the supply in the future. These include intersectoral movements, and it is often useful to indicate the major sources of entrants and the reason for loss.

Four major sets of factors affect the rate of movement into and out of the manpower supply. They are specific to the professional category under consideration, to the individuals concerned, to the job, and to the political/social/economic context of the country or region. The main factors affecting manpower movements must be identified if projections are to be accurate and policies for change are to have effect.

Some factors are outside the control of the decision-makers in the health service, and their future effects must be forecast. Others can be controlled by the implementation of health manpower policies. The formulation of the correct manpower policies can be greatly aided by manpower supply projections. Information on recruitment and leaving rates is important, both as a basis of manpower projections and to monitor the implementation of manpower policies.

One of these projections, the Baseline Projection, calculates what will happen if no new initiatives are taken by the health service managers - the "undisturbed future." This projection is used as a baseline or reference supply estimate, against which projected manpower needs and alternative supply projections can be compared. From these comparisons, the planner can determine whether the supply must be modified, and, if so, the likely costs and effects of his major options.

The baseline projection, like any projection, is subject to the uncertainties of the future. "Sensitivity analysis" can help the planner identify the most likely sources of uncertainty so that their effects may be reduced as much as possible.
EDUCATIONAL OBJECTIVES

At the end of this session, participants should be able to:

1. Specify the three main components of a manpower supply projection.

2. List the primary sources of information used for each component.

3. Identify the main factors affecting gain and loss rates for the principal manpower categories.

4. Specify which of these factors are controllable and which are not.

5. Describe two methods of estimating manpower losses.

6. Prepare supply projections for a given type of manpower.

7. Conduct a sensitivity analysis of a manpower projection.
SESSION STRUCTURE

Review process for making baseline estimates of the current supply of health manpower

Identify the main flows of manpower into and out of the health sector, and the primary factors affecting these flows

Determine the degree to which each of these factors is amenable to control as a result of actions taken by the health and/or education sector

Review the policy options available to affect the controllable factors

Outline procedures necessary for developing alternative projections

Assess the accuracy of supply projections through the use of sensitivity analysis
LEARNING MATERIAL

WHAT ARE SUPPLY PROJECTIONS?

The word "supply" has various meanings according to the adjective that qualifies it. Examples include: "current supply," or manpower available at present; "future supply," or manpower likely to be available for service at some future time; "active supply," or manpower that is employed in the field for which it has been trained; and "potential supply," which includes both the active supply of manpower plus those qualified to work in the field under consideration but who are not now employed. Mostly, without further qualification, the word "supply" refers to those who are employed in the occupation or category under consideration.

To assess whether the future levels of health manpower will be adequate to achieve future health objectives, some projections (estimates) of the future supply of health manpower are essential. Several types of projection are used. The baseline projection is an estimate of the likely supply of manpower at some future time, assuming no new changes are made in the manpower system. A baseline projection is usually the first comparison with a projection of likely manpower needs, and indicates whether manpower production and supply policies will need to be modified. Alternative projections estimate the likely supply of manpower on the basis of making certain changes in present policies and other factors that could affect manpower gains and losses. These alternative projections are paper exercises used to test how various changes in policies will have an impact on the future supply of manpower and on the feasibility of bringing supply and demand projections into balance.

The term "manpower supply" generally refers to the number of people who are professionally active in occupational category, but it can have other meanings.

Supply projections are essential to manpower planning. The baseline projection assumes no significant changes in supply policies beyond those already in place, while alternative projections assess the impact of various policy options on manpower supply.
Supply projections are generally made for one or more years. The choice of a projection period will depend on various factors, including especially the length of the plan period and the amount of time necessary to see the effects of changed supply policies.

Supply projections are usually made for one year or more, the length of time depending on factors such as the length of the planning period, how long it takes policy changes to have a noticeable effect on supply, the degree of precision sought, and the period for which one must estimate needs. Without further specification, and given the rather long period needed to make supply changes, projections must usually be made for at least five years. For some professions such as medicine, where there is a long interval between instituting changes to affect the production of physicians and seeing their effects, projections may need to be made for up to 20 years or more. Moreover, when major changes in the rate of training are planned, supply projections may have to be extended well beyond the target year to avoid a subsequent surplus or deficit. In manpower planning even rough calculations are valuable for establishing the limits of practicable changes.

Projected supply: current supply plus anticipated increments minus anticipated losses.

A manpower supply estimate is conceptually simple: people who are employed in a defined occupation and in a defined geographic area, institutional system, etc., are counted or their numbers are estimated by other means, and their characteristics noted. This current supply is then modified, year by year, to take into account anticipated increments to any losses from the current supply, to derive the projected manpower supply.

Figure 4.1 presents the main sources of increments to the manpower supply and the usual reasons for losses.

Figure 4.1. MANPOWER SUPPLY

- New trainees
- People returning to work
- People transferring from jobs elsewhere in the health sector
- People transferring from other sectors
- People coming from other countries

INCREMENTS
Current manpower in a particular manpower category or job classification

LOSSES

- Deaths
- Normal retirements
- Early retirements (disability, illness, family reasons, etc.)
- Transfers to other jobs in the health sector
- Transfers to other jobs outside the health sector
- Temporary losses due to study leave, extended vacations, etc.
- Emigration
Manpower (referred to as "staff" for the rest of this session) may be recruited to serve in the particular health programme or unit under consideration from either outside the health sector or elsewhere in the health sector. Staff may also leave the staff category under consideration for posts elsewhere in or outside the health sector. Internal movements are important since expanding one part of a health service can drain other parts. Overall balance within a health service is important, and is provided for in planning by including internal flows in manpower projections.

External movements should be classified to show the important sources of recruits and destinations of leavers (often corresponding to reasons for leaving). These are, mainly:

- private health sector (for recruits and leavers);
- other employment sectors (for recruits and leavers);
- not in paid employment (for recruits and leavers);
- other countries (for recruits and leavers);
- school/university (for recruits only);
- retirement, death, dismissal (for leavers only).

Information on "sources of recruits" is, for the most part, readily available, especially since new graduates of training programmes tend to represent the largest single source of supply increments. Such information is often not available, however, about the "destination of leavers", and a special study may have to be made to identify the major reasons for loss. When information on losses is sought the primary objective is to estimate their size, and the secondary objective to discover the distribution of losses by major destination category such as "other jobs", "other countries", "early retirement", "study leave", and "losses due to death, disability and illness".

Movements of staff affecting supply may be internal to the health sector or external to it.

External movements should be classified according to source or destination.

Information on the sources of new recruits is usually available, though information on the destinations of leavers or reasons for loss may be more difficult to obtain.
WHAT CAN WE CHANGE AND WHAT MUST WE PUT UP WITH?

The whole purpose of undertaking supply projections is to help identify what changes, if any, need to be made to current policies and programmes. It is therefore important even at this early stage, to recognise what in practice can be changed to alter manpower supply, and what cannot.

The rates at which staff flow into and out of the supply pool are affected by the following four main groups of factors:

a) Professional/technical characteristics of staff and their training, e.g., general educational qualifications, professional qualifications, prior experience. Entrance to some health professions often demands specific prior experience or qualifications.

b) Personal characteristics of staff, e.g., sex, age, full- or part-time, length of service, marital status. Many studies have shown that leaving rates depend very much on the first three characteristics and to some extent on the other two.

c) Job characteristics, e.g., functions, tasks, pressure of work, location, salary, professional status, promotion opportunities. These characteristics determine how attractive a post is to incumbents and prospective recruits.

d) Social, economic, and political factors affecting the country or region, e.g., the annual real growth in per capita income, economic prospects, unemployment rates and trends, indications of political and social stability or instability. These and many more similar factors affect the labour market for staff of health and other sectors, and the attractiveness of training for health jobs. They also affect the allocation of funds for sectoral expansion and manpower development.
These four groups of factors can be classified according to whether they are:

a) wholly or mainly outside the control of decision-makers in the health sector.*
   For example, economic factors are normally only marginally affected by health service decisions alone, as are most demographic factors such as average age at marriage and/or starting a family, or general educational levels. These are examples of uncontrollable factors.

b) wholly or mainly under the control of decision-makers in the health sector. For example, most characteristics of health service posts can be changed (within limits set by professional bodies or staff associations), and some personal characteristics of staff (proportion of women, of young staff, etc.) can be changed by selection procedures. These are controllable factors.

Factors listed under (a) above require forecasts to estimate the likely extent of their effects while factors under (b) require policy decisions taken within the health sector designed to achieve planned supply or staffing targets in the light of the forecast uncontrollable factors.

The effects of uncontrollable factors must be accepted because they cannot be changed, but it is important that they should be forecast as well as possible. It might be said that the task of health service managers is to adjust the factors they can control so as to nullify the negative effects or take advantage of positive effects of the uncontrollable factors, in trying to attain health planning targets. Manpower projections are useful aids in this task. It is important, therefore, to recognize which factors significantly affect recruitment and leaving rates.

*In this book, for the sake of convenience, the "health sector" should be understood as including that portion of the education sector concerned with the training of health manpower, unless the contrary is indicated.
WHAT DATA IS NEEDED FOR A SUPPLY PROJECTION?

At this point the planner will proceed to assemble his information on current supply and on likely increments and losses in coming years.*

It is important to measure recruitment and leaving rates in order to monitor the effect of policy decisions against plans, and as a basis of manpower projections. Recruitment rates are usually quoted as the number of individuals (or their full-time equivalents or FTE) taken into employment within a given time period (month, quarter or year). Recruitment targets are normally set in the same way.

Leaving rates are normally measured by:

a) census method: the number of staff leaving from a particular category within a given interval (usually a year) is given as a percentage of the average number of staff in the category during the period, i.e.,

annual leaving rate% = \frac{\text{number of leavers in a year}}{\text{average number in post during the year}} \times 100

Two methods exist for measuring leaving rates: census and cohort methods.

*You should review the later part of Chapter 4 of Hall and Mejia on methods of data collection and presentation. Especially relevant are pages 92-102 (current supply), 102-107 (losses), and 107-114 (future increments). The procedures outlined there will be particularly useful when supply projections are to be made of broad categories of manpower, though they may have to be modified significantly when the emphasis is instead on personnel in a given institutional setting (e.g., hospitals), a given job classification (e.g., Grade II nurse auxiliary), or a relatively small geographical area such as a health district.
b) cohort method: the number of staff in a particular category remaining from a group who joined at about the same time is given as a percentage of the size of the original group. Thus after one year 70% of the original group may remain in service, after two years 50%, and so on.

The cohort method giving annual leaving rates is much more convenient for monitoring and is much easier to use in manpower projections. It becomes inadequate for use in projections if more than about 50% of staff leave within the time interval used (normally a year). The cohort method can be used for projections whatever the leaving rate, but monitoring information becomes detailed and complex and manpower projection calculations become extensive and unwieldy. It finds its most appropriate use where natural cohorts occur, i.e. in large batch entries to training courses.

Estimation of probable losses may present special problems regarding both data availability and their interpretation. Among the two methods of estimating losses the census method is not very useful for most developing countries since most of the health staff is too young yet to experience much attrition from causes such as death and normal retirement. The cohort method is much more useful in this respect for projecting losses, especially where much of the loss is due to reasons other than death or normal retirement, but very often the data required may be too difficult to obtain.

**HOW IS A BASELINE PROJECTION PREPARED?**

Once the planner has the requisite estimates, supply projections can be developed for the occupational category(ies) under consideration. As will be discussed later in greater detail, the first one will likely be a baseline projection, to be followed by selected alternative projections that explore the

*Baseline and alternative supply projections can now be developed.*
4.8

Start with a list of all significant sources of entrants to the manpower supply and reasons for losses. Effects of different policy options on supply. As a starting point, make a list of all the significant sources of entrants to the manpower supply and of reasons for losses. Possible entries to this list are given below:

<table>
<thead>
<tr>
<th>Sources of Entrants</th>
<th>Reasons for Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training institutions</td>
<td>Retirement/death/dismissal</td>
</tr>
<tr>
<td>Qualified staff returning from temporary retirement</td>
<td>Early (and perhaps temporary) retirement for personal reasons</td>
</tr>
<tr>
<td>Transfers from the private sector</td>
<td>Transfers to the private sector</td>
</tr>
<tr>
<td>Transfers from other employment sectors</td>
<td>Transfers to other employment sectors</td>
</tr>
<tr>
<td>Immigration</td>
<td>Emigration</td>
</tr>
</tbody>
</table>

Estimate the likely magnitude of manpower gains and losses, either with single values or maximum and minimum range values.

Next, estimate from whichever sources of information that seem relevant the likely number of entrants for each source and number or percentage of losses for each reason. In some cases, the available information may be sufficient to allow the planner to use single value estimates for the various gains and losses anticipated, as, for example, 100 new graduate nurses produced annually, or about five nurses lost from active service each year due to death or illness. In other cases, detailed and accurate information may not be available, in which case the planner should set down maximum and minimum estimates of the needed data inputs, thus establishing a range within which the likely true value will lie. By way of illustration, suppose that the likely number of nurses who will emigrate is very uncertain. In recent years, the annual emigration has fluctuated substantially, but, in general, the numbers leaving are substantial and show a slight tendency to decline. This source of loss might be considered at least partially controllable in response to health sector policies, but, since the planner is now working on a baseline projection, no consideration is given to the possible impact of such policies. Instead, the planner develops his
maximum and minimum estimates of loss due to emigration (say, 5-9 nurses per year), and then selects for his initial calculations an intermediate value such as 7 nurses/year.

For a number of the categories on the list of potential sources of gain or loss either it may be impossible to develop maximum and minimum estimates or it hardly seems worthwhile to do so since the likely gain or loss is so small that it does not warrant separate attention. It makes little sense to list individually sources of loss that account for one or several nurses per year when other loss categories account for hundreds. For both the above situations -- where values cannot be readily estimated or they have little effect on supply -- the planner may choose to aggregate a number of gain sources or a number of loss groups together. This is, in effect, the basis of the cohort method of estimating supply flows, as has been described earlier in this session. The cohort method determines the aggregate loss flows experienced by cohorts of graduates or other entrants over time, and applies these rates to past and future cohorts of these staff.

Where there are adequate data for developing estimates for each likely source of gain or loss, this is the preferred choice. With the more detailed view of the dynamics of supply flows which this approach provides, the planner will find his task easier when policies have to be designed later which could modify supply. He can then look at each source of gain or loss individually, assess the potential impact of alternative policy options, and work through the implications of applying them. However, where such precision is not realistic, the planner should opt for an aggregate method such as that based on the empirical experience of past cohorts of graduates.

As an example, suppose that planners wish to project the supply of nurses in public sector employment in a geographical region five years hence. The region under consideration is estimated to have a current (1980) supply of employed nurses

When available data are insufficient to develop detailed gain and loss estimates, or when specific gain or loss sources account for trivial flows, planners should consider aggregating estimates.

The disaggregated approach to specifying gains and losses is preferred when available data are adequate to the task; otherwise a more aggregate approach should be used.

Example: supply of nurses in public sector employment.
of 500. The following estimates of the current annual flows of entrants and leavers are made:

Table 4.1. CURRENT GAINS - LOSSES

<table>
<thead>
<tr>
<th>Entrants to public sector employment</th>
<th>Leavers from public sector employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>New graduates from regional schools</td>
<td>80</td>
</tr>
<tr>
<td>New graduates from other regions</td>
<td>11</td>
</tr>
<tr>
<td>Immigration</td>
<td>4</td>
</tr>
<tr>
<td>Transfers from other regions and the private sector</td>
<td>18</td>
</tr>
<tr>
<td>Transfers to other regions and the private sector</td>
<td>24</td>
</tr>
<tr>
<td>&quot;Early&quot; retirement for family or other personal reasons</td>
<td>9</td>
</tr>
<tr>
<td>Nurses returning from &quot;temporary&quot; retirement</td>
<td>6</td>
</tr>
<tr>
<td>Emigration and other sources of loss</td>
<td>7</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

According to these estimates there is at present an annual net gain of about 65 nurses working in the public sector of the region. If this continued unchanged over a 5-year period, an extra 325 nurses would be available.

List agreed developments which could modify gain and loss flows, and estimate the anticipated magnitude and timing of their effects on supply.

However, situations are rarely static. Thus, the planner should next list all the agreed developments over the coming five years that could have a significant impact on the above estimates. In other words, what developments are already under way or agreed for implementation which could modify one or more of these gain and loss estimates? This list might look like the following, much abbreviated for simplicity:

- A new nursing school was opened one year ago with an entering enrollment of 20 and a plan-
ned final enrollment target of 30; by 1983 there should be an additional 15 graduates and once enrollments stabilize in 1986, the annual output should be 25, of whom about 21 are expected to remain in public sector employment.

- The economy of the subject region is improving considerably faster than that of the surrounding regions, a development that is likely to increase the number of nurses coming into the region as well as reduce the number of leavers.

- Recent changes in the requirements for licensing of nurses trained abroad make it very likely that no immigrant nurses will seek employment in the country.

Numerical estimates of the corresponding changes in recruitment and leaving arising from these developments must be made over the five-year period and then the gains are totalled together, and the losses totalled separately, to give the expected annual gains and losses. The previous "gain-loss" table (Table 4.1) is thus modified to that shown in Table 4.2. In this table, in order to simplify the example:

a) deaths and retirements are assumed constant over the five-year period; deaths are normally very few, and may be assumed constant, but retirements would be calculated more exactly from the numbers of staff now within five years of retirement;

b) the remaining leaving groups are assumed constant in number over the five-year period, whereas it is more probably the percentage of total staff in post which will remain constant. This number would be calculated during the projection itself.
Table 4.2. GAIN/LOSS PROJECTIONS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAINS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current graduates</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Graduates from new school</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>From other regions</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Effect of economy</td>
<td>--</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Immigrants</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Effect of licensing rules</td>
<td>--</td>
<td>-2</td>
<td>-4</td>
<td>-4</td>
<td>-4</td>
</tr>
<tr>
<td>Nurses returning</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>119</td>
<td>121</td>
<td>137</td>
<td>142</td>
<td>147</td>
</tr>
</tbody>
</table>

| **LOSSES**         |      |      |      |      |      |
| Deaths and retirement | 14 | 14   | 14   | 14   | 14   |
| Other regions/private sector | 24 | 24   | 24   | 24   | 24   |
| Effect of economy   | --   | -2   | -4   | -6   | -8   |
| Family/personal reasons | 9  | 9    | 9    | 9    | 9    |
| Emigration, other   | 7    | 7    | 7    | 7    | 7    |
| **TOTAL**           | 54   | 52   | 50   | 48   | 46   |

These total gains and losses, which are expected to occur if no further changes are made to policies and programmes, are now used in a five-year projection.
Table 4.3. MANPOWER SUPPLY PROJECTION

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply at the start of the year</td>
<td>500</td>
<td>565</td>
<td>634</td>
<td>721</td>
<td>815</td>
</tr>
<tr>
<td>+ Gains</td>
<td>119</td>
<td>121</td>
<td>137</td>
<td>142</td>
<td>147</td>
</tr>
<tr>
<td>- Losses</td>
<td>54</td>
<td>52</td>
<td>50</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td>Supply at the end of the year</td>
<td>565</td>
<td>634</td>
<td>721</td>
<td>815</td>
<td>916</td>
</tr>
</tbody>
</table>

As a matter of general practice in preparing baseline projections, the following important points should be stressed:

- Normally the planner should be as detailed and precise as the data available to him allows. When major gain and loss estimates can be disaggregated usefully, this should be done. But when the numbers are very small and/or a reasonable basis for estimation is lacking, he should combine his estimates, use a maximum and minimum range (for later calculation of potential error) and should note somewhere for later use the nature and potential size of his uncertainties. Above all, he should not make highly detailed projections, even if this is possible, when the decisions they are contributing to require only general or approximate figures.

- The planner should be sure to take into account the dynamic relationship between the private and public segments of the health sector. If the projection is concerned with all nurses in a region, he must take into account the likely supply of nurses in the private as well as the public sector. However, if he is concerned only with the

No more precision should be attempted for the gain and loss estimates than is both feasible and desirable for the type of projections required.

The dynamic relationship between the public and private sectors should be taken into consideration if relevant to the supply problem under study.
public sector nurses, it is easy to forget the relations between the two sub-sectors. In essence, if working conditions are increasingly unattractive in the public sector he may have reason to expect that growing numbers of public-sector nurses will move to the other sector. Where there is a substantial private sector, explicit attention should be given to its possible effects on public-sector employment.

- Estimates of the current and projected supply and of likely gains and losses, should be in identical terms. For example, if the planner is estimating the supply of "employed" nurses, working the field of nursing, all estimates should be in these terms; and if he is concerned with the "potential" supply of nurses, including those who are employed and those who are qualified but not now employed, all estimates must take this supply definition into account.

- There are important differences between the way projections should be made for a limited geographic area, an institution, a specific health programme, or other narrowly delimited subject, and the way they should be made for a large region, programme, or broad category of staff. In the former case it is normally necessary to go into a fair amount of detail about organization, jobs, etc., whereas in the latter normally fairly aggregated or gross figures are sufficient.

OF WHAT USE ARE ALTERNATIVE PROJECTIONS?

Relatively few alternative projections should be prepared the first time around. These should reflect the more likely alternative supply options under consideration and should be sufficiently different from each other to justify their elaboration.

With the baseline projection complete, the planner can turn to the alternative projections. There is no magic number of such projections that should be prepared; the only guides at this point are that each should reflect one of the more important supply changes under consideration, and that there are sufficiently different assumptions in each projection to justify the effort of preparing them. The number of alternatives that can be imagined is virtually unlimited. Given the many different supply variables that could be modified, the different levels of intensity of implementation that could be postulated,
and the different rates of implementation that could be scheduled, the task of developing a wide range of alternative projections can soon become unmanageable. Accordingly, the planner will want to select a few substantially different policy alternatives, each of which bears some tangible relation to the kinds of options and developments under consideration. Indeed, if there are major uncertainties about the most likely options, the planner may use his time more efficiently by deferring work on alternative projections until he has completed his initial estimates of demand. At that point it will be easier to identify precisely those alternative supply scenarios that are apt to be most relevant to the evolving or desired manpower situation.

Whatever the timing of work on the alternative projections, the methods used are exactly similar to those used for the baseline projection. Now, however, the planner will proceed to make an extended list of those supply variables considered to be most amenable to possible health sector control. For each potential source of manpower gain or loss the list will indicate (1) the major actions which could presumably be taken to modify the values estimated in the baseline projection, and (2) the degree to which such actions could be expected to have an effect. Later sessions will consider this process in greater detail, especially as it relates to the assessment of potential constraints and obstacles, but several typical entries as in Table 4.4 provide a notion of how this list might appear.

For these and many other variables the planner will need to consult various sources of information to develop sound estimates of the impact each possible action, or set of actions, will have on gains and losses. In some cases empirical data will exist which can suggest the degree to which supply changes will occur, perhaps based on experiences in other parts of the country or reported in the literature. For most policy options, however, it will be a matter of consulting knowledgeable authorities such as administrators, educators, political authorities, professional representatives, and social scientists.

For the alternate projections, the planner lists the major supply variables subject to control and the magnitude of the changes that might be implemented.

Diverse sources of information will need to be consulted to develop the list of controllable variables and of their potential impact on supply.
Table 4.4. EFFECT OF POLICY OPTIONS ON CONTROLLABLE VARIABLES

<table>
<thead>
<tr>
<th>Source of gain or loss</th>
<th>Current best estimate, assuming no new developments</th>
<th>Postulated policy options (and their estimated effects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total nurse graduates per year in the region</td>
<td>100 per year rising to 125 per year five years after a new school starts producing graduates in 1982.</td>
<td>Expand existing nursing school by 20%. First output of 120 graduates in 1984, subject to the availability of sufficient qualified applicants.</td>
</tr>
<tr>
<td>Transfers to other regions and private section (24); leaving for family or personal reasons (9)</td>
<td>33 per year</td>
<td>Improve salaries by about 10%, provide creches for working mothers and opportunities for part-time employment, and end compulsory requirement that all hospital nurses rotate through the night shift. Estimated losses would reduce to 20 per year by 1983.</td>
</tr>
<tr>
<td>Emigration</td>
<td>7 per year</td>
<td>Improve working conditions locally as above and similar measures; institute a pay back requirement for emigrating nurses who wish to have their professional credentials validated for another country. Estimated emigration reduced to about 2 annually by 1983.</td>
</tr>
</tbody>
</table>

Variables should be aggregated in like groups when their individual magnitudes are thought to be small and/or when the data base is inadequate for making disaggregated estimates.

With the alternative projections, too, there will be many factors the effects of which are either too small by themselves or too unpredictable to warrant individual attention. The planner will then aggregate the potential impact of a set of related policy options as was done above in the case of measures designed to decrease the rate of "early" retirements from
nursing practice. By so doing he identifies a possible set of actions, estimates their aggregate impact on retirements, and indicates that his information base is inadequate for the task of estimating their individual impacts. Decision-makers will thus have the opportunity to review the separate data inputs to the supply model and modify them if desired, while avoiding the pitfalls of undue precision. Furthermore, the planner will have set the stage for a later determination of the degree to which the policies ultimately adopted had the anticipated effects.

WHAT ARE SENSITIVITY ANALYSES?

The above considerations lead naturally into the topic of "sensitivity analysis", a procedure which is useful for refining both supply and demand projections as well as for assessing their potential vulnerability to erroneous assumptions.

It will be clear from the foregoing that all projections are affected by the uncertainties inherent in the future. Not only will there be doubts about future developments, but the planner will usually be confronted with incomplete and/or inaccurate estimates of certain aspects of the current manpower supply and of the current rates of gains and losses. Under these circumstances, how can the accuracy of the projections be improved?

The first step is to identify those estimates subject to the greatest degree of uncertainty, and hence of potential error.

It will be recalled that, early in the development of a supply projection, the planner must list all potential sources of entrants to the manpower supply and, similarly, all reasons for loss. He then proceeds to estimate the likely size of each gain and loss, expressing these estimates with single values where the data base was
The planner needs to review his supply model estimates and revise them as appropriate to reflect the amount of uncertainty he has about each one. The product of this review will be a set of optimistic and pessimistic estimates of factors affecting supply.

adequate and as a maximum/minimum range of estimates where data were lacking. For the initial baseline projection it was suggested that in these latter cases the planner should use an intermediate value between the limits of the maximum and minimum estimates. Now the planner should return to this list of gain and loss estimates, review it carefully, and for each entry ask himself the question: Although this estimate represents my best judgement of the likely effect of this factor on manpower gains or losses, by how much could I be wrong? Could the gain (or loss) be off by 10%, by 50%, by 100% or more? He should re-examine each gain or loss estimate in turn, taking first an optimistic but realistic view of the future (where any error in judgement works to the advantage of the health service), and then a pessimistic but realistic view of the future (where any error would work in the opposite direction). To be useful, both views must remain within the boundaries of realism; they should assume that things will go well or badly, as the case may be, but not unreasonably so. By then inserting the new values for each source of gain or of loss, the planner can make successive recalculations of the projected supply to identify those supply factors which have the greatest effect on the accuracy of his results. Usually only a few recalculations of supply will be necessary; once the optimistic and pessimistic value of each input estimate has been established, the planner can generally pick out, by simple inspection, those with the greatest potential for changing the answer. He may even choose to make one projection using all the optimistic values and one using all the pessimistic ones, thereby setting the outer limits of the potential supply. Since it is highly unlikely that all the optimistic, or all the pessimistic, estimates will come to pass, these outer limit estimates will probably be well outside the range of the true value for supply.

By knowing which are the most sensitive factors affecting supply, the planner can proceed to collect additional information as a basis for improving his estimates.

The purpose of the above exercise is to identify the sources of greatest potential error. The results of each calculation will show the degree to which the final projection is sensitive to erroneous estimates of the input value; hence
the process whereby this is determined is called sensitivity analysis. With the results of this analysis in hand one can now consider whether anything can reasonably be done to improve the estimates of those factors most subject to error. In our earlier example regarding the projection of the supply of nurses, if the number of applicants to nursing schools was found to be a sensitive factor, the planner might wish to obtain additional information on this topic to supplement that collected initially.

In practice, sensitivity analysis tends to identify two types of factors with substantial effects on the reliability of projections:

a) Factors that affect the largest flows of joiners and leavers. For example, suppose very few experienced nurses are recruited as compared with the number of new graduates entering direct from training programmes. Large percentage errors in estimating the number of experienced recruits will have a small effect on the projected supply, whereas only a small percentage error in the supply estimate of graduates may be equivalent to the nurse staffing in an entire hospital. Sensitivity analysis will identify two types of factors with the greatest potential for distorting projections: those that affect the largest flows of joiners or leavers and those that have double impact, on both joiners and leavers.

b) Factors which have an opposite effect on the number of joiners and leavers. For example, an increase in nurse salaries might increase the flow of recruits into the health service while at the same time reducing the number of nurses who seek employment elsewhere. This factor has a double effect on the number of nurses employed, and so errors of estimation will have a double effect on the final results. Sensitivity analysis can be used to assess both controllable and uncontrollable factors. In either case the planner will be unsure of the precise degree of error, and, in the case of controllable factors, there are additional uncertainties regarding the way the proposed policy or action would be implemented, e.g. fast or slow, aggressively or timidly, with strong administrative and logistic support or without, on a broad or a narrow basis. Sensitivity analysis is appropriate for the assessment of both controllable and uncontrollable factors. It can be used to equal advantage in baseline projections and alternative projections, as well as in projections of manpower requirements.
Here the sensitivity analysis can help assess the consequences of deficient implementation as well as unrealistic assumptions about the impact of each proposed policy on supply. In this way, sensitivity analysis offers the planner a powerful tool for identifying those policies or other actions most likely to have a significant impact on supply. With this knowledge the planner will be able to suggest what components of the plan should be given priority attention, to refine the scheduling and sequencing of actions so as to ensure the greatest effect, and to identify those aspects of the plan that will need the closest monitoring so that the validity of critical plan estimates can be empirically tested at the earliest opportunity.

BACKGROUND READING


OTHER REFERENCES


EXERCISES

EXERCISE 1. Preparation of a Baseline Projection

1. Select three categories of staff likely to be important in health manpower planning in your country. If possible, select one category under each of the following headings:

   a) a professional group employed wholly or mainly in the health sector, e.g. doctors, nurses;

   b) a non-medical professional group employed within the health sector, e.g. statisticians, sanitary engineers;

   c) a non-professional group, e.g. cleaners, clerical staff, drivers.

   Select one of these categories for further consideration.

2. a) List in approximate descending order of importance the main sources of gains and destinations of losses for your assigned group of staff, based on your own knowledge of the situation (p. 4.2).

   b) For your assigned group of staff, list the main factors that affect the rate of gain from each of these sources and the rate of loss to each of these destinations (p. 4.4).

   c) In your estimation, which of the factors in (b) are controllable and which uncontrollable by health service administrators and educators (p. 4.5)?

3. Complete a baseline (reference) projection as in Table 4.3 (p. 4.13), using your best estimates where necessary. How do the staff-in-post figures vary over the projection period?
4. Where you are uncertain of some gain or loss rates, try other possible values in the projection and see how much difference this makes to the answers. (This is a sensitivity analysis, p. 4.19.) What items of information should be made more accurate if possible?

5. If you have time, do one or two other projections using optimistic or pessimistic values of gain and loss rates.

EXERCISE 2. Preparation of Alternate Projections

In this exercise, you are expected to have produced a simple baseline projection for the category of staff you selected in Exercise 1.

1. What sources of information are available in your country relating to the controllable factors and how reliable are they? How confident are you that this information can be used to predict the likely effects of policy changes designed to modify supply? Are existing data deficiencies likely to be a serious source of uncertainty in the supply projections?

2. What types of policy options are available to move the controllable factors in preferred directions? What kinds of statistics should be monitored to track the success of implementing these policies?

3. Review the list of uncontrollable factors affecting recruitment and leaving rates which you produced in the previous session. You may find it convenient to rearrange the list to show, for each of the uncontrollable factors:

   a) what sources of recruitment it will affect;

   b) what destinations of leavers it will affect.
4. In the light of this list, do you think the effect of these uncontrollable factors alone would cause the recruitment rate for this staff category to increase or decrease by a great deal/moderately/not at all, over the next five years?

Do you think they would cause the leaving rate for this category to increase or decrease a great deal/moderately/not at all over the next five years?

What do you judge to be the net effect of these changes in recruitment and leaving: would it increase or decrease the numbers in the selected category a great deal/moderately/not at all?

5. Are there any health policies or plans (controllable factors) already scheduled for implementation which will affect the numbers of staff in the selected category within the next years?

If so, what is the new estimate of the change in numbers in the selected category over the five-year period?

(Although for the purposes of this exercise, the estimates are necessarily qualitative, in an actual health manpower planning exercise, numerical results would be produced and the results would be more specific.)

EXERCISE 3. Undertaking a Sensitivity Analysis

Since a baseline projection attempts to take account of the uncontrollable factors over the period of the health plan (which usually covers five to ten years), it is inevitably subject to some uncertainty. It is important for the manpower planner to be aware of how large this uncertainty is and where it principally arises, i.e. where the results of his calculations are especially sensitive to the judgements or assumptions he has made. The purpose of this exercise is to carry out such a sensitivity analysis.
With this information, the manpower planner can also consider what could be done to try to reduce this uncertainty, and so judge whether the attempt to reduce it would be worthwhile.

1. In your judgement, which two of the list of uncontrollable factors are likely to give rise to the largest error in the conclusion you produced in Exercise 2? In making your decision you may wish to consider:

   a) which factors have the largest effects on the main sources of recruitment and leaving;

   b) which factors have opposite effects on recruitment and leaving, so that a change will increase one and reduce the other.

2. In the light of your level of uncertainty about the chosen factor, what are the most optimistic and pessimistic levels of these factors you envisage?

   How big an error (excess or deficiency) might these cause in your conclusion in Exercise 1?

3. What steps might you take to reduce your uncertainty about the chosen factor?

   How effective are they likely to be?

   Would the effort be worthwhile?
EVALUATION QUESTIONNAIRE FOR SESSION 4

Date

The following questionnaire is intended to obtain your frank and honest opinion about the session you have just attended. This will help us in improving the material and the exercises of the course. Do not hesitate to give negative responses.

1. Do you feel that you achieved the educational objectives listed at the beginning of the session? The objectives were for the participants to be able to:

1. Specify the 3 main components of a manpower supply projection.

2. List the primary sources of information used for each component.

3. Identify the main factors affecting gain and loss rates for the principal manpower categories.

4. Specify which factors are controllable and which are not.

5. Describe 2 methods of estimating manpower losses.

6. Prepare supply projections for a given type of manpower.

7. Conduct a sensitivity analysis of a manpower projection.

2. Did you read any of the learning material before the session?

Not at all | A little | A fair amount | Most of it | All of it
---|---|---|---|---

3. Was the learning material:

   a. useful for doing the group work exercises?

   b. easy to understand?

   c. interesting?

Not at all | Somewhat | Fair | Moderately | Very
---|---|---|---|---
4. Did you find the illustrations:
   a. easy to understand?
   b. interesting?
   c. relevant?

5. Did you find the exercises:
   a. easy to understand?
   b. interesting?
   c. relevant to national issues?

6. Did you find the time allocated
   a. for presentation of the learning material:
   b. for exercises:
   c. for plenary discussions:

7. If you were organizing this session, what percentage of time would you allocate to:
   a. presentation?
   b. exercises?
   c. plenary discussions?

   Note that the percentages allocated to each activity when added up should equal 100 percent.

8. Do you have any other comments?

Name ______________________________

There is no need to sign your name unless you wish to do so. Thank you.
SESSION 5

MANPOWER REQUIREMENTS
QUANTITY, QUALITY
AND
DISTRIBUTION
MANPOWER REQUIREMENTS - QUANTITY, QUALITY AND DISTRIBUTION

1. Health Manpower Planning

2. Ten steps to health manpower planning

3. Health manpower situation report on existing manpower and services

4. Future supply of manpower

5. Manpower requirements-quantity, quality and distribution

6. Mismatches between supply and requirements

7. Solving mismatches

8. Organizational and management problems

9. Manpower strategy and outline plan

10. Detailed health manpower development plan

11. Implementation and monitoring

12. Concluding session
SUMMARY

Future health manpower required is the number of people needed to staff present and proposed health programmes, less the number no longer needed because of discontinued programmes or improved productivity. Four main methods of estimating manpower requirements are described. Each one has advantages and disadvantages which make it more or less appropriate than the other methods to any given planning circumstance. The method or combination of methods selected will depend on such factors as: type of manpower being planned for; a government's orientation toward and responsibility for health services; planning capabilities; data availability; degree of control exercised by a government over the health sector; size and role of the private sector; and level of development of a country.

The four methods of estimating manpower requirements each have different information needs, reflecting different rationales for their use. The simplest method, in terms of information needed, and of calculation, is the Manpower/Population Ratio method. In common with the other methods, it needs basic demographic and manpower supply data.

For the Health Needs and Service Targets methods, information on staff is a critical requirement which must be determined either by direct measurement or by obtaining the opinions of knowledgeable staff.

The Health Demands method requires basic information on the use of health services as a function of demographic, economic, geographical and other variables. Some variants of this method can be very complex while others are well within the capabilities of developing countries.

The precision attainable and needed for a given projection of health manpower requirements will depend on various considerations, including data availability, planning capability, and the degree of public sector control over plan implementation. These judgements should be made by planners in consultation with health administrators.
EDUCATIONAL OBJECTIVES

At the end of this session, participants should be able to:

1. Describe the four basic methods to estimate manpower requirements.

2. Select and use the method or methods that best fit specific planning needs and circumstances.

3. Specify the main kinds of information needed to determine manpower requirements using each of the four methods.

4. Evaluate current estimates of manpower requirements in their own country, and assess their validity.
SESSION STRUCTURE

Review concepts which underline different methods of estimating manpower requirements

Assess advantages and disadvantages of each and their relevance to the country

Determine information needs and their use in each of the methods

Review manpower requirement calculations arising from the more commonly used methods

Select between methods for determining requirements in different types of operational situations
LEARNING MATERIAL

WHAT DOES HEALTH MANPOWER DEMAND MEAN?

The previous session discussed the measurement and projection of the health manpower supply; this session examines the other side of the coin—health manpower requirements. Requirements or demand are concepts that may be confusing, especially in planning, where people with different backgrounds and interests are trying to define the future. A proposed terminology useful for health manpower planning is given here for your reference.

Demand, in a restrictive technical sense, refers to the total amount of various types of health services that a given population seeks and has the means to purchase at the prices that prevail at a given time. From this demand for health services can be derived the demand for health manpower, i.e. the numbers and kinds of health personnel needed to staff the demanded health services. The statement, "... means to purchase at the prices that prevail at a given time," refers to any organization, group or individual, that may "buy" health services; they include especially governments, insurance companies or programmes, and private individuals.

Need or requirement represents an estimate based on professional judgement of the number of health workers or amount of services necessary to attain and maintain a particular level of health care.

"Demand" is the term most often used in general manpower planning. However, since this may cause confusion in health manpower planning—which uses the word for a specific methodological approach to planning—the more neutral word "requirements" is used in most of this manual.

The terms, manpower "demand" and manpower "requirements," are technically different but are often used interchangeably.

To avoid confusion, the term "requirements" is used for the most part in the text.
HOW ARE MANPOWER REQUIREMENTS DETERMINED?

Many different methods have been used to estimate manpower requirements, indicating that no one method is superior to all others. By taking certain liberties one can classify virtually all of these methods under four substantially different approaches to the estimation of requirements, each of which is based on its own set of assumptions, its own data base, and its own view of the role and responsibilities of health planning, and produces its own unique results. Accordingly, a critical choice that planners must make early in their efforts to assess manpower requirements is the method to use. Figure 5.1 briefly defines the four methods,* and shows how each converts health plans into health manpower requirements.

**Health Needs Method** is based on biological needs of the community.

The Health Needs method uses the biological needs of the community to estimate manpower requirements. The community's health care needs are identified and quantified using judgements on desirable standards (norms) of good health care. The planner tries to answer the question as to how much and what types of manpower are needed to provide optimal health care to the community. Sometimes, the "optimal" health care is replaced by "minimal" health care when the resources of the country are relatively scarce. The norms, in this approach, are usually established by health professionals.

**Service Targets Method** is based on targets of service provision.

In the Service Targets method, targets for the provision of health services are set, usually by health authorities, and based on a number of factors including health needs, economic demands, the delivery system and the various types of

---

- Definitions of the four methods and their characteristics, pp. 63-74
- Selecting a method, pp. 79-80
- Summary of the advantages, disadvantages and limitations of each method, pp. 82-83.
Figure 5.1: SCHEMATIC REPRESENTATION OF FOUR METHODS OF ESTIMATING MANPOWER REQUIREMENTS

HEALTH NEEDS. Estimated by experts taking into account the health services needed to attain and preserve good health.

Population to be served, either in the aggregate or disaggregated, according to age, sex, location and/or other characteristics.

HEALTH DEMANDS. Estimated by taking into account the effective demand (actual use) for services as a function of wants, price, accessibility, etc.

SERVICES TARGETS. Health service targets specified by experts taking into account priorities, health wants, and technical administrative and financial feasibility of providing health services.

Health services to be provided (numbers, kind, quality).

Health services needed (numbers, kind, quality).

Services converted into manpower by use of empirical or normative staffing and productivity standards.

Manpower required, taking into account numbers, kind, levels of qualification, distribution, etc.

Services converted into manpower generally by use of empirical staffing and productivity standards.

MANPOWER/POPULATION RATIOS. Population to be served converted into manpower requirements directly by means of desired, empirical, or normative ratios, based on diverse criteria.
services - preventive, ambulatory, emergency, and in-patient care. As in the health needs approach, this method uses norms or standards of the services required by the community and the services produced by health personnel. The Health Needs method may be considered as a particular case of the Service Targets method, in which the norms for services required are set by professional judgement.

The Health or Economic Demand method estimates staff requirements from expected changes in structure, income and health attitudes of the population. This method asks how much and what kinds of health services people actually use and the costs of obtaining these services. Current utilization rates of services by different age, sex and income groups provide a measure of the met or effective demand. These rates are then projected on future changes in the structure of the population. The planner can also take into account the unmet demand for services.

The Manpower/Population Ratio method is the simplest method to apply and the manpower requirements are estimated by the size of the population alone. The desirable ratios are established on the basis of:

- current situations,
- international comparisons,
- recommended standards,
- ratios observed in a favoured area of the country, and
- extrapolation of past trends.

The ratios are then applied to future estimates of population size to derive future manpower requirements.

WHICH METHOD SHOULD BE USED?

The above descriptions of the four methods focus intentionally on their differences and minimize
their broad areas of overlap. Rather than view them as separate methods it is better to see them as a series of overlapping methods on a continuum that starts with meeting professionally determined needs for health care and ends with meeting demands and wants. Accordingly, while the planner may choose to base his estimates of requirements primarily on one method, say that of health needs, he will almost inevitably be using elements of the other three methods. The following statements explain this.

- When using the "needs" method, planners take into account available resources, preferences of the public for services, the extent to which the public uses the services well, and the degree to which the health sector can be made to provide the "needed" services. Once manpower needs have been calculated, they can be expressed as a manpower/population ratio, based on the need for services.

- When using the "service targets" method, planners take into account the need for health care, the relative effectiveness of different types of services, and the likely use people will make of the services (or demand). Here, too, the resulting manpower needs can be converted into a manpower/population ratio, based on the service targets method.

- When using the "demands" method, planners consider the relative need (as determined by health professionals) of the different types of demanded services in order to assign priorities to them for allocating funds. The demand for manpower can then be converted into a manpower/population ratio, based on demand for services.

- Lastly, the manpower/population ratio method itself even if not based on, and hence a derivative of, one of the other three methods, almost always takes into account some notion of the major needs and demands for services, and of the ability to pay for and provide them.

The choice of the planner, therefore, is not a mechanical one of matching a planning problem with

The four methods have broad areas of overlap and should be viewed as extending along a continuum rather than as mutually exclusive entities. Whatever method is selected, planners will likely have reason to use elements of other methods to complete their analyses.
Projected requirements of full-time equivalent personnel will have to be corrected to take into account time taken up in non-service activities.

Support staff requirements can be estimated either using one of the methods described earlier or, as is often done, by establishing a ratio between staff concerned with the direct provision of services and those responsible for providing supporting services.

The first three methods discussed will result in estimates of the full-time equivalent (FTE) staff needed for specified functions or services. To determine the actual number of staff needed an allowance has to be made for the time spent by staff on other activities not directly concerned with health care services. They include administration and reporting, supervision, travel, continuing education, sickness, absenteeism, and leave. Once estimates have been made of the ratio of time spent on these latter activities to time spent on health care services, the planner can increase the estimated FTE requirements by an appropriate factor to derive an estimate of the total staff needed.

For the most part the four methods described above are used to determine the need of direct health-care staff. They are not often used to determine the need of support services staff, including administrative staff. This is usually calculated separately by means of ratios of support staff to direct-service staff, which may be determined either empirically by task analysis or activity analysis, e.g.,

- one secretary/clerk to every three doctors providing ambulatory care;
- one cleaner/sweeper to one health centre.

Ratios such as these enable estimates of direct-service staff requirements to be converted into the numbers of additional support staff needed. However, it is important that the underlying rationale and
dynamics of this service staff to support staff ratio are understood to ensure that any subsequent changes in the organization or orientation of the health care programme can lead to corresponding changes in the support-staff ratios used.

Many factors will influence the selection of one or more of these methods or of their many variants. Sometimes one or more of them cannot be used because not enough information is available. At other times, the staffing situation or the staff functions being considered may themselves suggest that one method is more suitable than another. Furthermore, the health manpower planner must work within the constraints of trying to provide as accurate an estimate of future manpower requirements as is feasible and justifiable: feasible in the sense that the manpower planner must produce plans within the limitations of available planning time and resources, and justifiable in that the precision of the calculations must correspond with data resources, the degree of future uncertainties, and the ability to use the estimates to bring about change. The interplay of all these factors will guide the choice of planning method(s), as will a review of the accuracy and utility of methods used in the past to make manpower requirement estimates.

HOW ARE THE METHODS APPLIED?

The Manpower/Population Ratio method usually requires the least information of any. In its simplest form, the total staff requirements are determined by applying the desired staff-to-population ratio to the population base to be served. For example, if the desired ratio is 4 physicians to 100,000 population, the population base, say 5 million, is then used to determine the number of physicians needed, in this case 200.
Three main data requirements: current manpower supply, normative ratio to use, and projected population.

The ratio method needs three basic sets of data: the existing supply of manpower of the type under consideration, the normative ratio to be used, and the projected population. These data are usually needed also by the other methods and so the following discussion applies also to them.

An estimate of the current manpower supply is necessary for the reasons noted in Session 4, and hence no further discussion is needed here, except to point out the obvious condition that if the current supply is unknown, the planner cannot determine what changes, if any, would be necessary to satisfy his projected estimate of requirements.

Deciding on distribution of staff within a country can be difficult.

For most countries, population estimates and projections will be routinely provided by a government agency, and these official estimates should be used wherever possible. In some places planners may not be able to obtain official estimates for certain years or regions of interest, and in such cases, they will have to make their own estimates — estimates which will be complicated by the variable rate of population growth around the country. This variation by itself poses little difficulty to a national census bureau in projecting regional population trends. The difficulty arises when significant migrations take place between regions or to and from other countries. Migration data are always difficult to obtain, and planners will have to make the best judgements they can on the basis of the data available.

A statement of staff requirements using the ratio method can be conveniently prepared in the following tabular form:
Table 5.1. POPULATION CHANGE

<table>
<thead>
<tr>
<th>Population (1976 census)</th>
<th>1980</th>
<th>Target years in the plan period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population estimate in</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>census year</td>
<td>million</td>
<td></td>
</tr>
<tr>
<td>Population estimate for</td>
<td>11.04</td>
<td></td>
</tr>
<tr>
<td>current year</td>
<td>million</td>
<td></td>
</tr>
<tr>
<td>Population estimate for</td>
<td>11.26</td>
<td>11.48</td>
</tr>
<tr>
<td>each year of</td>
<td>million</td>
<td></td>
</tr>
<tr>
<td>plan period</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Population growth rate used (as specified by census bureau) = 2% / year

Table 5.2. MANPOWER REQUIREMENT

<table>
<thead>
<tr>
<th>Staff type: Physicians</th>
<th>1980</th>
<th>Target years in the plan period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current supply of</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>active physicians</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current physician/</td>
<td>1:100</td>
<td></td>
</tr>
<tr>
<td>population ratio</td>
<td>000</td>
<td></td>
</tr>
<tr>
<td>Target physician/popu-</td>
<td>-</td>
<td>96</td>
</tr>
<tr>
<td>lation ratio* (1:---)</td>
<td>000</td>
<td>000</td>
</tr>
<tr>
<td>Physicians needed</td>
<td>-</td>
<td>117</td>
</tr>
<tr>
<td>Annual increment needed</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>over previous year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The target 1985 ratio is 1:80 000. It is assumed that the ratio will improve in five approximately equal increments between 1980 and 1985, since otherwise a massive increase would be necessary by 1981, with only small increases afterwards. Alternatively, smaller increments might be assumed in the earlier years and larger ones later when the activities designed to increase physician supply have had time to have their full effect.
To translate these national manpower requirements into regional distributions of staff virtually the same tabular form would be used but the populations considered would be those of the regional administrative units (district, province, state). Ratios might also be varied to take into account different regional characteristics, e.g., urban/rural, affluent/poor.

The Health Needs method relies much more on information that the health ministry would be expected to collect than does the ratio method. The first stage in this method is concerned with summarizing current information on the causes of morbidity and mortality, and on desired norms of care (numbers, kinds, sequences, etc., of services) for the health conditions of particular interest.

The bases used for developing service norms should be current medical technology, the potential for the local application of this technology, and past experience with the reduction of specific disease problems as a result of planned interventions. The point of departure is the services that people need for the priority health problems; once these needs have been defined the planner can proceed to work within the constraints of the medical technology of his own country.

Health need statements may be presented in various ways, as is shown below:

- The infant mortality rate is now 80/1000; preventive and curative services possible in the country could reduce this rate to about 35/1000; to do so would require about six clinic and home visits for each infant in the first year of life, each visit to have a specified content of actions; parallel actions would need to be taken to improve the physical environment for children.

- The annual malaria parasitic index is now 1.5 and given current technology, the climate, and
contiguous malarious areas in neighbouring countries, this index could be reduced to about 1.0 within five years; to do so would require .... (specified actions which would have to be taken).

The quality of information available for the health needs method may be extremely variable. This problem, together with uncertainties about the scale of interventions needed to reduce morbidity, poses difficulties in determining precisely the types and numbers of future services required. However, from the planner's point of view, epidemiological information of this type can be an extremely useful base for more refined estimates in the future.

In developing norms for services four different types of interventions can be identified:

- health promotion (education, safe water, etc.);
- primary prevention (surveillance and the early detection, diagnosis, and treatment of incipient disease);
- treatment (of established disease, and prevention of further progression of the disease or disability);
- rehabilitation (reversal of disability and restoration of patients to the best health possible).

Manpower requirements are derived by translating desired interventions into activities or services and then into specific types of staff on the basis of productivity standards, i.e. estimates of the numbers of specified services that a health worker can provide in a given amount of time.
A formula for calculating manpower requirements for the health needs method.

In mathematical terms, the number of staff of a given kind can be determined from the formula:

\[ M = \frac{P \times I \times N \times T}{S} \]

where \( M \) = the manpower requirement in a given year;
\( P \) = the projected population at risk or the projected population to receive a specific service;
\( I \) = the average number of expected incidents of ill-health per person per year;
\( N \) = the average number of a given kind of service to be provided per incident per year per population unit;
\( T \) = the average time a service takes; and
\( S \) = the total amount of time a practitioner works a year for direct health services.

Using the formula to determine malaria field workers needed to give treatment to malaria fever cases.

By way of illustrating the use of this formula, consider the treatment aspect of the work of a local malaria field unit. The relevant norms are:

- population at risk (\( P \)) = 5 million;
- malaria incidence (\( I \)) = two cases per 1000 per year;
- the average treatment requires five visits by the malaria worker;
- the average daily staff time needed for each visit is 1.5 hours, allowing for travel time to and from the patient's home;
- the net annual working time available for treatment is 1500 hours, after deducting staff leave allowance.
The manpower requirement is, therefore:

\[ M = \frac{5\ 000\ 000 \times \frac{2}{1000} \times 5 \times 1-1/2}{1500} \]

= 50 full-time malaria workers.

While individual manpower requirements can be simply determined in this way, as an approach it is much more convenient to determine them around some organizational grouping which has a functional identity. Examples include:

- headquarters units,
- regional offices,
- district hospitals, and
- health centres.

Furthermore, in building up the case for manpower requirements, it is convenient to use a tabular format which links the activities to their programmes. Such a format allows for a simple assessment of staff participation in any programme and with any type of activity. It also makes it easier to visualize implications for staffing of changes in programmes or levels of activity. Table 5.3 is an example of the kind of format that might be used along with illustrative values.

Two elements of the information needed to complete the table (viz. time required per service activity and staff availability for service activities) need special attention. It is not uncommon for gross errors to be made in estimates of both these factors leading to correspondingly gross errors (generally under-estimates) of the manpower needed. To provide a measure of either of these two factors, two options are open:

- make intelligent guesses of the time needed on the basis of the informed opinions of experienced staff in the services; or
- undertake actual measurements.

In practical terms, organize manpower requirements around functional groups according to programme and activity.

A tabular format is useful for linking service activities to health care programmes.

Staff utilization and availability are critical measures in determining manpower requirements.

Utilization and availability can be assessed through informed opinion or measurement.
### Table 5.3. PROGRAMME/ACTIVITY MANPOWER CHART*

<table>
<thead>
<tr>
<th>Population of risk</th>
<th>Obstetrics</th>
<th>Programmes</th>
<th>Community</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre and</td>
<td>Deliveries</td>
<td>Planning</td>
<td>in disease</td>
</tr>
<tr>
<td></td>
<td>Postnatal</td>
<td>&amp; abortions</td>
<td>Family</td>
<td>Commu-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Planning</td>
<td>munity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>1200</td>
<td>2600</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>360</td>
<td>1600</td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Visits (clinic)</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacc./immunization of pregnant women and insertion of IUDs</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of incidents</td>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of service activities per incident</td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time required per service activity in hrs.</td>
<td>(T)</td>
<td>1/6</td>
<td>1/6</td>
<td></td>
</tr>
<tr>
<td>Total time required in hrs</td>
<td>(N)</td>
<td>2.00</td>
<td>53.7</td>
<td></td>
</tr>
<tr>
<td>Attendance of deliveries and abortions by midwives</td>
<td>(1)</td>
<td>1</td>
<td>1</td>
<td>720</td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(T)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home visits by midwives</td>
<td>(1)</td>
<td>0.4</td>
<td></td>
<td>720</td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(T)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td>480</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunizations</td>
<td>(1)</td>
<td></td>
<td>1</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCG vaccination</td>
<td>(1)</td>
<td></td>
<td>1/4</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Health education activities</td>
<td>(1)</td>
<td></td>
<td></td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>1973</td>
</tr>
</tbody>
</table>

(Staff Requirement) \[ W = \frac{P \times N \times T}{S} \]

Such measurements are discussed in Session 7 with regard to the use of nurses and midwives. However, whichever of the methods of making measurements are used, some time, money and organization will be necessary. For this reason, it is desirable for the manpower planner to assess what accuracy is required in the light of the quality of the other information available to him. The quality of measurement and the time it takes will vary according to the accuracy sought.

Major elements of the Service Targets method are similar to those used for the health needs method. The differences are in the way targets are developed. Refer to the example given earlier of an objective of reducing the infant mortality rate from 80 to about 35 per 1000. According to the health needs method the initial objective is set at the maximum feasible amount of reduction, and standards of service (and hence of manpower) are set accordingly. Some compromises will eventually have to be made with an objective which, although theoretically feasible, is not attainable in practice, but nevertheless this objective is the point of departure. By contrast, the service targets method will use other criteria, besides that of biological need for care, for establishing targets for the provision of services and, consequently, of manpower. These other criteria will be concerned with such factors as the public demand for services, political views, costs, efficiency of service delivery, likely effects, segment of the population benefitted, access, and administrative feasibility.

The information needed by the service targets method is:

- population estimates and projections; and

- current and projected estimates of productivity, the likely demand for services, administrative capabilities and constraints, political priorities, costs, and, somewhat less than the health needs method, information

Data needs for Service Targets Method very similar to Health Needs Method, but with less emphasis on morbidity and mortality patterns.
on morbidity and mortality patterns, and on the relations between these patterns and the provision of health services.

For the fourth method, based on Health Demands, manpower requirements are derived from estimates of the likely future demand for services based on projected changes in the characteristics of the population. There are various ways of doing this, but only one is discussed here. The demand for services is based on a current pattern of service use by definable population groups. The future demand for medical care is derived, therefore, from the expected change in the size of these population groups and the proportionate change in services that this might imply in the future.

Three types of information are needed for this approach to determine manpower requirement:

- information on the current demographic and economic characteristics of the population, such as sex, age, income level, residence (urban/rural, etc.) as well as the projected changes in these characteristics for the planning period;

- estimates of the current and projected productivity of manpower in different types of work situations;

- information on the current use of services available according to diverse population characteristics.

Table 5.4 provides a simplified example of the projection of doctor visits based on the health demands approach. In some models far more detailed estimates can be developed of the number of visits made by persons defined according to age, sex, residence, income, educational level, eligibility for health care benefits, and other criteria.
Table 5.4. EXAMPLE OF DEMAND PROJECTION BASED ON CONSTANT UTILIZATION RATES BY A CHANGING POPULATION (HYPOTHETICAL DATA)*

<table>
<thead>
<tr>
<th>Population income category</th>
<th>Population in income category (millions)</th>
<th>Per capita utilization of doctor visits (average values)</th>
<th>Number of doctor visits (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low income</td>
<td>10</td>
<td>1.0</td>
<td>10</td>
</tr>
<tr>
<td>High income</td>
<td>4</td>
<td>2.0</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>1.3</td>
<td>18</td>
</tr>
<tr>
<td>Target year (projected values)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low income</td>
<td>9</td>
<td>1.0</td>
<td>9</td>
</tr>
<tr>
<td>High income</td>
<td>9</td>
<td>2.0</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>1.5</td>
<td>27</td>
</tr>
</tbody>
</table>

*The definitions of low and high income used in the base and target years are the same.

From the above it is evident that the health demands method can vary from being relatively simple and applicable in many developing countries, to being quite complex and requiring far more data than are available in most countries, developed or developing. The decision whether this method is appropriate or not will depend in large part on the size of the private sector and on how the public sector views its responsibility for the provision of health services, i.e., anticipating demands but not seeking to shape them, or seeking to shape and direct the course of the health sector.

The health demands method can vary greatly in complexity and data requirements; it can be very useful in some kinds of planning situations.

Each of the methods presented in this session provides a basis for the estimation of future manpower requirements. The resulting estimates provide estimates of requirements, but the level of detail and precision required will vary widely.

can vary from being very detailed and precise, to being quite general. The degree of precision required will vary from one situation to another, and will depend on such considerations as the degree to which the projections can be used, planning capabilities, data availability, the degree of uncertainty that exists about the future, the length of the planning period, and the level of detail used in the supply projections. Judgements on these matters must rest with decision-makers as well as with those directly concerned with planning.

ILLUSTRATION

SERVICE TARGET METHOD

The problem for a new TB vaccination programme - how many additional staff?

In this illustration, a complete calculation is made for a tuberculosis programme of surveillance and treatment which is to be augmented by vaccination of children. The staffing requirement for the old programme of surveillance and treatment remains as it was and is not discussed. The issue is the number of additional staff that must be recruited to meet the needs of the new programme of vaccination.

Describe activity target.

The target for this programme is to vaccinate with BCG vaccine 75% of all children up to the age of 14 years in five years.

Describe relevant population characteristics.

The demographic characteristics are as follows:

- population, 10 million;
- 40% in age-group 0-14 years;
- population growth, 2% annually;
- crude birth rate, 40/1000;
- crude death rate, 20/1000;
- 50% of all deaths occur in the 0-4 age group;
- very few deaths occur in the 5-14 age group;
- 2% of the population are in the 15-year old age group.
Assume that one-fifth of the target population is to be vaccinated in each of the five years. Thus, the number of the present population to be covered each year is 2 million and the number vaccinated is 600 000 i.e.

\[
\text{POPULATION 15 YEARS AND OLDER} \\
\begin{align*}
\text{NUMBER OF CHILDREN} & \quad 1.2 \text{ million} \\
0-14 \text{ YEARS OF AGE} & \quad 200 \text{ 000} \\
(40\% \text{ OF TOTAL POPULATION}) & \quad 600 \text{ 000}
\end{align*}
\]

One-fifth of total population of 10 million

Calculate number of services (vaccinations) required.

However, each year there are changes in the population.

**Births:** Each year the total number of new births =

\[
N_B = 10 \text{ million} \times \left( \frac{40}{1000} \right) = 400 \text{ 000}
\]

Deaths: 20 per thousand die each year and, of these, 50% are in the 0-4 year age group. Death rates for 5-14 are low and for practical purposes are assumed to be negligible. Thus, the number in the target vaccination group who die each year =

\[
N_D = (50\% \times 20) \times 10 \text{ million} = 100 \text{ 000}
\]

Leavers: The number who move from age 14 to 15 years is approximately 2% of the population. However, every year 75% of one-fifth of them are vaccinated and the rest move out of the vaccination group. Thus, the number who leave the target group each year =

\[
N_L = \frac{2}{100} \times 10 \text{ million} \times (1 - 0.75 \times 0.2)
\]

\[
N_L = 170 \text{ 000}
\]
Thus, approximate yearly addition in vaccination requirement over the original base estimate

\[ = 75\% \text{ of } (N_B - N_D - N_L) \]

\[ = 75\% \text{ of } 130 \, 000 \]

\[ = 97 \, 500 \text{ vaccinations per year.} \]

Thus, to achieve the specified target will require a total vaccination of 600 000 + 97 500 per year, an increase of more than 16% over the estimate when new births are not considered. These approximate calculations have provided:

- a quantitative description of the services, and, hence,

- a quantitative basis for determining manpower requirements year by year.

To translate the vaccination target into staff required, the first step is to determine how much of the service-staff time is available to provide the service (vaccination).

Firstly, estimates of non-service activities of these staff are made.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leave</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Public holidays</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Sickness, absenteeism (from past records) - on average</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Staff in service training - on average</td>
<td>2 weeks</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>10 weeks</strong></td>
</tr>
</tbody>
</table>

Thus, of 52 weeks potential time a year, 42 weeks are left when the staff member is available for service.
Secondly, supporting activities linked to the service activity are taken into account:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration and reporting</td>
<td>4 hours/week</td>
</tr>
<tr>
<td>(average)</td>
<td></td>
</tr>
<tr>
<td>Supervision</td>
<td>none</td>
</tr>
<tr>
<td>Travel time to and from village</td>
<td>4 hours/day</td>
</tr>
<tr>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td>20 hours/week</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td>24 hours/week</td>
</tr>
</tbody>
</table>

This leaves 42 x 16 = 672 hours per annum for actual vaccination assuming there is a 40 hour week.

For the purposes of this example, it is assumed that the vaccinations are carried out at community centres, and that on an average it takes two minutes to administer the vaccine, including time to settle the children and explain the purpose of vaccination to the parents. Thus:

For one vaccinator working for a year, the total number of children who could be vaccinated would be:

\[
672 \text{ hours} \times 30 \text{ vaccinators per hour} = 20,160
\]

Thus, to vaccinate 697,500 children per year (the number to meet the target) would require:

\[
\frac{697,500}{20,160} = 36 \text{ vaccinators.}
\]

In addition to these 36 vaccinators, support staff would also be needed. The need for support staff is often ignored, particularly non-medical staff, and this can affect the administration of the technical service.

Thus, to complete the picture, the need for other staff in support of the vaccinators must be determined. Such an exercise might lead to the following results.
Requirement: one doctor for entire national programme

MEDICAL STAFF
A coordinator and project director will be needed. He probably should be a specialist in tuberculosis although other public health medical officers may be suitable. It will be a full-time post.

Requirement: (36 vaccinators divided by four) equals 9 supervisors plus one supervisor to stand in when others are absent

TECHNICAL STAFF
For field supervision and coordination, one supervisor for every four vaccinators is needed, or six in all. Coverage for absenteeism needs to be provided. Given that the annual absences of each supervisor are likely to be 10% of the working time, one additional supervisor is needed who will be assigned to the programme director's office.

Requirement: statistician (0.2 F.T.E.) plus one statistical assistant

Information on the progress of the vaccination programme will have to be collected, summarized and analyzed. This will require the services of a part-time statistician and a full-time statistical assistant.

Requirement: (0.1 F.T.E.) pay roll clerk

ADMINISTRATIVE STAFF
The additional work load will fall on the payroll unit for salary, allowance calculations, and payments.

Requirement: (0.2 F.T.E.) warehouseman

GENERAL SERVICE STAFF
There will also be additional work for the supply warehouse in packaging and processing two deliveries a week to the field teams.

Requirement: (10 drivers)

To ensure movement of staff, supervisors, and supplies, ten drivers will be needed.

Total staff requirement for the tuberculosis programme as a whole is the number required
to maintain the existing programme, plus staff (shown above) for the child vaccination pro-
gramme.

This is the staff needed if the vaccination pro-
gramme is to run uniformly for the five years of
the plan. If there is a delay in starting the
programme or recruiting staff, the work load in
the remaining time will be higher and more staff
will be needed.

Finally, if the vaccination coverage is to be
maintained, there will be a continuing need for
staff to serve approximately 400 000 births a
year. In this case, a number equivalent to
slightly more than half the staff in the develop-
ment project will be needed to maintain the pro-
gramme.

BACKGROUND READING

Hall, T.L. and Mejia, A., ed. Health man-
power planning: principles, methods, issues.
(Chapters 3 and 5).

OTHER REFERENCES

planning process. Washington, D.C., U.S.A.,
Department of Health, Education & Welfare,
1976 (DHEW Publication No. (HRA) 76-14013).

approaches for determining health manpower
supply and requirements. Vol. 1: Analyti-
cal perspectives (DHEW Publication No. (HRA)
76-14511); Vol. 2: Practical planning man-
ual (DHEW Publication No. (HRA) 76-14512),


EXERCISES

EXERCISE 1. Estimating Manpower Requirements

Instructions: Match each requirement estimation problem with the proper method(s), based on the information provided. When more than one method fits, list your choices in descending order of preference.

<table>
<thead>
<tr>
<th>Estimate the requirements for:</th>
<th>Preferred method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Primary health care personnel for a province now almost entirely without care</td>
<td>Need = N; Demand = D; Targets = T; Ratios = R</td>
</tr>
<tr>
<td>2. Private dental practitioners</td>
<td></td>
</tr>
<tr>
<td>3. Laboratory technicians for government hospitals</td>
<td></td>
</tr>
<tr>
<td>4. Midwives for a public maternal care programme in a very underserved rural area</td>
<td></td>
</tr>
<tr>
<td>5. Anaesthetists for regional public hospitals</td>
<td></td>
</tr>
<tr>
<td>6. Family planning promoters for an urban population</td>
<td></td>
</tr>
<tr>
<td>7. Pharmacists for private pharmacies in a region where the current supply/demand balance appears adequate</td>
<td></td>
</tr>
<tr>
<td>8. Specialist paediatricians for regional government hospitals</td>
<td></td>
</tr>
</tbody>
</table>
9. Microscopists for the surveillance phase of a malaria eradication programme

10. Nurses for inpatient care in new government hospitals

11. Physicians to serve on the faculties of new medical schools

12. Physicians for a fee-for-service medical care programme to white-collar employees with health care benefits through their social security programme

13. Dental auxiliaries to provide basic care to primary schoolchildren in a pilot programme

14. Extension of medical assistants to a province now without any, based on the experience of using them in another similar province

EXERCISE 2. Estimating Manpower Requirements

Instructions: For each manpower planning situation indicate the method(s) you would select.

<table>
<thead>
<tr>
<th>Planning situations</th>
<th>Preferred method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Past experience suggests a reasonably satisfactory balance between manpower supply and demand</td>
<td>Need = N; Demand = D; Targets = T; Ratios = R</td>
</tr>
<tr>
<td>2. A primary consideration is that the manpower projection be economically feasible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>3.</td>
<td>Detailed information is available about manpower productivity, morbidity, and the probable effectiveness of health services</td>
</tr>
<tr>
<td>4.</td>
<td>The health problem under consideration is of relatively low priority but of high social priority for individual people</td>
</tr>
<tr>
<td>5.</td>
<td>Experience in other countries with similar development programmes has been reasonably satisfactory for the manpower category being planned</td>
</tr>
<tr>
<td>6.</td>
<td>A major objective is to provide communities with the number and &quot;mix&quot; of manpower that will provide them with at least an acceptable minimum level of health care</td>
</tr>
<tr>
<td>7.</td>
<td>As a baseline projection it is intended to ensure that the health care demands of defined populations will be satisfied to at least the same degree as they are now</td>
</tr>
<tr>
<td>8.</td>
<td>The primary concern is about manpower categories that provide direct services to patients</td>
</tr>
<tr>
<td>9.</td>
<td>The primary concern is with manpower categories that support other categories and/or provide indirect services to patients (e.g., laboratory technicians)</td>
</tr>
<tr>
<td>10.</td>
<td>Manpower is to be provided to deal with health problems for which there are well-established technologies</td>
</tr>
<tr>
<td>11.</td>
<td>A variety of services have to be provided, many of which might not be considered of high social or public concern but which satisfy individual needs</td>
</tr>
<tr>
<td>12.</td>
<td>The primary objective is to maintain the present position with minor improvements, of a specific manpower category</td>
</tr>
<tr>
<td>13.</td>
<td>Most of the services being planned are in the private sector</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>14.</td>
<td>Public control over the ways of using manpower is limited</td>
</tr>
<tr>
<td>15.</td>
<td>The government has an active manpower policy and has undertaken to extend and improve the health care system</td>
</tr>
<tr>
<td>16.</td>
<td>The health conditions being treated are extremely varied and/or are ones for which health technologies are not yet well established</td>
</tr>
<tr>
<td>17.</td>
<td>A sound model of manpower requirements for a given type of health programme in a given region has been elaborated; the aim now is to estimate the manpower requirements of the same services to a similar population elsewhere in the country</td>
</tr>
<tr>
<td>18.</td>
<td>The health sector is under a substantial degree of control</td>
</tr>
<tr>
<td>19.</td>
<td>Government manpower policies are primarily concerned with ensuring an adequate supply of manpower in response to market forces of demand, without promoting any substantial modification of these forces or of the health care system</td>
</tr>
</tbody>
</table>
EXERCISE 3. Indicate below the main methods used in recent years in your country to estimate future needs of the manpower categories specified. Comment on their suitability, noting especially any important limitations they may have for those purposes. If you do not know of any studies in any of these categories, substitute other categories that you know about.

<table>
<thead>
<tr>
<th>Manpower category (Specify further if necessary)</th>
<th>What were the stated objectives of these projections?</th>
<th>In which year (approx) were the projections made?</th>
<th>Which methods were used to make the projections of requirements? What are your views on their suitability? What do you consider to be their main limitations or constraints for manpower planning?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural primary health care workers (not physicians or nurses)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use additional sheets as necessary
EXERCISE 4. Utilization and Activity Analysis

Select one type of field worker and one type of institutional staff member and outline the contents (headings) of a table specific to these workers from which you could estimate:

- the amount of working time in a year,
- the amount of time spent on each of the major service activities, and
- the amount of time spent on the provision of each specific type of service or activity.

After preparing the table(s), complete with your own estimates of what numbers in the table might be in terms of available time, etc.

Assume you would like to determine by observation the information needed to complete the table:

- estimate how many staff you would want to study to be reasonably satisfied with the accuracy of the observation, and
- estimate how quickly such a study could be done from initiation to final conclusion.

Prepare answers to the questions in this exercise with a justification of the reasons for your views; discuss in plenary with a view to establishing a consensus about the performance of these two types of workers.
4. Did you find the illustrations:
   a. easy to understand?
   b. interesting?
   c. relevant?

5. Did you find the exercises:
   a. easy to understand?
   b. interesting?
   c. relevant to national issues?

6. Did you find the time allocated
   a. for presentation of the learning material:
   b. for exercises:
   c. for plenary discussions:

7. If you were organizing this session, what percentage of time would you allocate to:
   a. presentation?
   b. exercises?
   c. plenary discussions?

Note that the percentages allocated to each activity when added up should equal 100 percent.

8. Do you have any other comments?

Name__________________________

There is no need to sign your name unless you wish to do so. Thank you.
EVALUATION QUESTIONNAIRE FOR SESSION 5

Date_________________________

The following questionnaire is intended to obtain your frank and honest opinion about the session you have just attended. This will help us in improving the material and the exercises of the course. Do not hesitate to give negative responses.

1. Do you feel that you achieved the educational objectives listed at the beginning of the session? The objectives were for the participants to be able to:
   1. Describe 4 basic methods to estimate manpower requirements.
   2. Select and use a method that best fits specific planning needs and circumstances.
   3. Specify the main kinds of information needed for the 4 methods.
   4. Evaluate current estimates of manpower requirements in your country and assess their validity.

2. Did you read any of the learning material before the session?

3. Was the learning material:
   a. useful for doing the group work exercises?
   b. easy to understand?
   c. interesting?
SESSION 6

MISMATCHES BETWEEN SUPPLY AND REQUIREMENTS
1. Health Manpower Planning

2. Ten steps to health manpower planning

3. Health manpower situation report on existing manpower and services

4. Future supply of manpower

5. Manpower requirements—quantity, quality and distribution

6. Mismatches between supply and requirements

7. Solving mismatches

8. Organizational and management problems

9. Manpower strategy and outline plan

10. Detailed health manpower development plan

11. Implementation and monitoring

12. Concluding session
MISMATCHES
SUMMARY

Manpower requirements and supply projections can only be compared if both refer to the same manpower categories measured in the same units (usually full-time equivalents) over the same time periods. Different factors will limit the level of detail the two projections can achieve.

The process of comparing manpower supply and requirement projections, and of identifying mismatches between the two, is accomplished in three steps as follows:

1. producing a table showing both manpower requirements and supply projections in the same terms for a given staff category to identify where the mismatches are;

2. selecting the more important mismatches for further attention; and

3. exploring the mismatches by means of a systematic analysis to determine causal factors leading to the mismatch and potential opportunities for solution.

The product of this phase of the manpower planning process is a quantitative statement of the size and nature of the mismatch between manpower requirements and supply, combined with a statement of likely causal factors and areas of investigation for finding solutions.
EDUCATIONAL OBJECTIVES

At the end of this session, participants should be able to:

1. Reduce projections of supply and requirements to a common base in order to make comparisons and identify mismatches.

2. Devise and apply criteria for selecting which manpower problems should be subjected to more detailed investigation.

3. Analyze manpower problems using a systematic approach which permits isolation of causal factors and identification of possible solutions.
SESSION STRUCTURE

1. Review process for making supply and requirement projections compatible

2. Determine procedure for making supply/requirement comparisons and analyzing sources of mismatches

3. Develop criteria for selecting between manpower problems for more detailed investigation

4. Prepare a format for analyzing manpower mismatch problems

5. Apply the analytic format to investigating a particular manpower problem
LEARNING MATERIAL

HOW DO SUPPLY/REQUIREMENT MISMATCHES OCCUR?

Imbalances between manpower supply and requirements occur because either the supply of staff is more or less than anticipated or the requirement has changed from what it was previously. The imbalances or mismatches between supply and requirements can thus arise from a variety of causes, e.g., because of:

- planned expansion of health services;
- political intervention in the development process;
- low morale of staff;
- administrative breakdowns;
- inequalities in training standards;
- more trainees fail than anticipated;
- staff productivity and efficiency are less than expected;
- other training, administrative, and utilization actions that change staff performance.

A manpower planner usually is faced with problems of the supply of staff not matching the needs so that the growth of services is unnecessarily constrained. Occasionally, the supply of staff may outstrip the demand. This may occur when a project is closed down. In this situation, the planner is posed with problems of how to absorb redundant staff.

In general, a mismatch situation is such that one or more of three basic problems related to number, distribution, or the use of staff must usually be resolved, i.e.,

Changing staff number, distribution, and quality alter balance between manpower requirements and supply.

Problems of total supply/requirement imbalance are among the most common encountered in making projections.

There are 3 basic planning problem areas: numbers, distribution and skills of staff.
1. The number of staff in a particular category (doctors, nurses, etc.) is too small or too great for future programmes.

2. Staff are badly distributed for present needs, or their distribution does not suit plans for the future.

3. The training of staff, and their skills and motivation, do not accord with programme needs.

WHAT SHOULD BE COMPARED WITH WHAT?

To compare mismatch between requirements and supply, they must first be specified in identical terms.

In Sessions 4 and 5, methods of projecting future staff supply and future staff requirements were discussed. Very often the type, quality and level of detail of the information available for making these projections will vary considerably for different types of staff and between the supply and requirement sides of the picture. As a result, to make a comparison between supply and requirements necessitates modification of the projection statements so that both supply and requirements are presented in comparable terms, i.e., they:

- cover the same manpower categories, including not only type (doctor, nurse, etc.) but also the same groups as defined by qualifications, functions, hierarchy, clients served, location, etc. (e.g., all medical auxiliaries in a particular region, all malaria programme staff);

- are expressed in the same units (e.g., full-time equivalent (FTE) personnel); and

- relate to the same time period.

Only when the supply and requirement estimates agree in all these respects is it possible to compare them to establish the degree of mismatch.
For both supply and requirement projections, the planner will be limited to the level of detail established by the methods used to make the projections and the accuracy of the basic estimates. In other words, if his supply projection is available only for the total number of nurses in the country as a whole and for the aggregate leaving rate and rate of additions, then from these figures alone it will be impossible to project the number of nurses for different regions, for different functional categories, and so on. Similarly, if requirements are based on a ratio of one nurse per 5000 population, he will be unable to provide further detail for this projection on the basis of such factors as qualifications, functions, skill levels, etc.

If the levels of detail in the supply and requirement projections do not match, it is normally the case that the more detailed figure must be brought down to the level of the other by selection and/or aggregation so that both match. If, for example, a supply projection gives a figure for each year of a five-year plan but the manpower requirement is available only for the end of the planning period, then the figure for the final year of the supply projection must be selected for comparison and the other four supply projection figures ignored.* In this case, projected supply and requirements may match at the end of the planning period, but it is impossible to say whether they will match during it. Similarly, if manpower requirements for a certain group of staff have been produced for each region but the supply projections for this staff can be made only for the country as a whole, then the regional requirements must be

* Approximate values for the intervening years can often be obtained by interpolation. However, the planner must decide whether the changes that occur from year to year are apt to be arithmetic (same size of change each year), geometric (same rate of change each year but different numbers), or disjointed (as would be the case with a new school which starts graduating professionals two years into the five-year plan period).
Comparisons should be made in the maximum detail possible.

It is often disadvantageous to lose detail from manpower figures, and the manpower planner can use some devices or tricks to avoid it. The most widely used is to break a total figure down into its constituent parts by using a set of proportions. For example, if, as noted above, a regional comparison is desired but only a national supply estimate in five years' time is available, it may be sufficient to divide this national estimate according to present regional proportions or those that are expected in five years' time.

Whatever the detail of the supply and requirement projections originally produced, they must be brought to the point where they cover the same groups of staff measured in the same units and relating to the same time period(s).

**HOW ARE THE COMPARISONS USED?**

**Six steps in resolving the problems:**

- where are the mismatches?
- which problems need further study?
- what types of problems are they?

When the correct figures have been selected for comparison, the following six steps can be taken:

1. Identify the mismatches between projected supply and requirements, i.e. where are the potential manpower problems and difficulties?

2. Select relevant problems or difficulties for further study, i.e. which of them are important enough to warrant further study? Here it may be necessary to note that several problems may be related and, while none may be important in itself, they become important when taken together.

3. Decide what type of problem it is, i.e. what particular aspect of the situation needs to be corrected - training, other recruitment, leaving rates, etc.?
4. Review possible actions, i.e. what policies could be introduced or actions taken to correct the situation?

5. Identify the constraints, obstacles, and consequences of these actions, i.e. what are the benefits and costs (in the widest sense of these words) of taking these actions?

6. Assess the significance of the constraints, obstacles, and consequences of these actions, i.e. how important are the benefits and costs of taking these actions?

This session is concerned only with the first three of these steps, the second three being taken up in Session 7 which is concerned with resolving mismatches.

We now consider in more detail each of the first three steps in turn.

WHERE ARE THE MISMATCHES?

First, to identify the mismatches between projected supply and manpower requirements, set out the data on manpower requirements as a series of tables, each of which covers a major staff group. For example, one table may be on staffing in rural clinics, another on an immunization programme, a third on water supply, and so on. Each distinct group of staff is given a separate line in the table, and there is a column for each year of the forecast. If requirements are specified for each year of the five-year plan, each column of the table will be filled in. If the requirement is given only for the end of the five-year plan, only the last column of the table will be filled in. If only a total estimate covering several lines of the table is available, then the component estimates which are not available will be left blank. When this is finished, the data from the baseline supply projection for the same
staff is entered on the same diagram. Compari-
sions can be made only between numbers in the same
 cell or entry in the table. Table 6.1 is an ex-
ample of such a table.

Table 6.1. COMPARISON OF MANPOWER REQUIREMENTS AND SUPPLY
FOR A FIVE-YEAR PLAN FOR ONE PROGRAMME

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GRADE A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region 1</td>
<td>34/33</td>
<td>37/36</td>
<td>42/40</td>
<td>45/41</td>
<td>50/43</td>
</tr>
<tr>
<td>Region 2</td>
<td>27/27</td>
<td>30/27</td>
<td>32/27</td>
<td>36/27</td>
<td>39/27</td>
</tr>
<tr>
<td>Region 3</td>
<td>40/35</td>
<td>45/40</td>
<td>50/44</td>
<td>55/47</td>
<td>60/50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>101/95</td>
<td>112/103</td>
<td>124/111</td>
<td>136/115</td>
<td>149/120</td>
</tr>
<tr>
<td>GRADE B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region 1</td>
<td>-/102</td>
<td>-/110</td>
<td>-/120</td>
<td>-/130</td>
<td>-/142</td>
</tr>
<tr>
<td>Region 2</td>
<td>-/90</td>
<td>-/91</td>
<td>-/96</td>
<td>-/102</td>
<td>-/117</td>
</tr>
<tr>
<td>Region 3</td>
<td>-/111</td>
<td>-/120</td>
<td>-/130</td>
<td>-/142</td>
<td>-/162</td>
</tr>
<tr>
<td>TOTAL</td>
<td>318/303</td>
<td>340/321</td>
<td>370/346</td>
<td>400/374</td>
<td>450/421</td>
</tr>
<tr>
<td>GRADE C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region 1</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>912/-</td>
</tr>
<tr>
<td>Region 2</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>841/-</td>
</tr>
<tr>
<td>Region 3</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>1005/-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-/1812</td>
<td>-/1972</td>
<td>-/2104</td>
<td>-/2300</td>
<td>2758/2500</td>
</tr>
</tbody>
</table>
This is an example of a table for three personnel grades (A, B and C) in three regions (1, 2 and 3) for a five-year plan. Since all the detail for Grade A is available, comparisons between projected supply and requirements for this grade can be made in each region in each year, as well as the total for the country. For this grade of staff, the baseline supply projection shows an increasing staff shortage, particularly in Region 2 towards the end of the planning period, when no increase in Grade A can be expected if current policies continue. For Grade B, the supply projections are available for each region in each year of the plan, but the manpower requirement estimates are available only for the country as a whole. The figures show a 5% shortage in year 1, increasing to a 6.5% shortage in year 5, but the projected regional distribution of Grade B staff cannot be determined. In this case it might be sufficient to divide the total requirement for Grade B staff in each year among the regions in the same proportion as the requirements for Grade A staff shown in the upper portion of the table, and to compare these estimated requirements with the equivalent supply projections. Regional requirements are available for Grade C personnel for the end of the planning period only, and supply projections are available for each year of the plan, though only as national totals. The only comparison possible here is the total figure in year 5 (which shows a projected shortage of 9.3% if present policies continue) unless proportions are used to divide the national figures between regions or the final figures between years.

WHICH PROBLEMS MERIT FURTHER STUDY?

Because of their sensitivity or complication, some of the mismatches, once identified, will merit more detailed attention to clarify the nature of the issues involved. However, since further analysis will take time and use up planning resources, only the more important problems or difficulties should be considered in this way.
Various criteria can be used to determine which issues to examine.

The second step in the process is thus to determine which problems warrant further study, given the constraints of time available and effort involved. The situations to consider when making this selection include those in which:

- the percentage mismatch is large, e.g., even if the group is relatively small in size, the actions to be taken to resolve the mismatch will probably have to be quite drastic;

- the size of the group is large, e.g., even if the comparison shows a relatively small shortage, it may require new plans to recruit and train many staff;

- the staff group concerned has been given a lot of public attention, and is likely to be the focus of attention for those reading the report (these groups of staff should have been identified and highlighted in the Health Manpower Situation Report, covered in Session 3);

- several types of staff work together as a team and a relatively small shortage of one type can affect the performance of all the other types of staff;

- several types of staff work independently but on the same health problem, and relatively small shortages in each can combine together to produce a serious effect.

The manpower planner must judge how many issues can be examined in detail.

Taking these factors into account, the manpower planner must judge how far his resources will extend and which of the mismatches he has identified can be selected for further attention.

WHAT IS CAUSING THE MISMATCH?

In Step 3, the type of problems which have led to the mismatch are identified.

The third and final step in measuring mismatches is to identify in specific terms what type of problem has led to the mismatch. The mismatch may well be caused simply by a large change in
requirement, but nevertheless it is normal to look first at the mismatch as a problem in supply and only as a last resort to see it as a problem in requirements. On this basis, any manpower problem (viz. mismatch) should be analyzed in terms of five headings relating to the supply of staff. These are:

(1) **The total number of staff employed.** The problem may be one of too few or alternatively too many staff of a particular type. The source of difficulty in the case of too few staff may be that, for the level of staff requirement stated, training volume is too low or recruitment is not proceeding quickly enough or, yet again, staff are leaving the service at too fast a rate. Alternatively, if the problem is an expected surplus of staff, then training, recruitment or redeployment of staff may be too high.

(2) **The distribution of staff.** In this case, while the total number of staff may be sufficient, their distribution may not accord with the way requirements for staff are spread around the country. This inappropriate distribution may have its roots in problems of sufficiency of incentives or of facilities or in career opportunities. The manpower planner will wish, therefore, not only to assess the extent of the maldistribution but also the causal factors leading to the observed situation.

(3) **Skill/knowledge of staff.** In many situations, it may well be that total staff and their distribution is appropriate to requirements but essential skills are missing or they are not sufficient to the needs or, exceptionally, are in excess of the needs. In such situations, the manpower planner looks to problems of coordination between training institutions and the health service and to the existence or lack of it of in-service training programmes and refresher courses as both sources of problem and remedy.
(4) Work organization and staff productivity. The calculated requirement for staff is likely to have been based on current patterns of work, concepts of the productive time available, and the tasks that can be completed in a given unit of time. Apparent shortages of staff may well arise simply because work organization or staff productivity have not reached the expected standard or because a higher level of productivity becomes necessary and for this a search needs to be made for the sources of non-productive work time, or low productivity.

(5) Duration of the problem. The degree of permanence, length of time, or anticipated speed of occurrence of a mismatch has significant influence on the type and range of solutions open to the manpower planner. For this reason, the manpower planner needs to identify at this problem identification stage whether the problem is a short- or long-term one or poses a mixture of both short- and long-term issues.

The manpower planner will find it extremely useful to consider every manpower problem under each of these five main headings to get as wide a view as possible of the potential changes that may be made to alleviate or solve the problem.

This approach provides a basis for a systematic analysis of the likely causes of the mismatches.

Through this approach a systematic analysis of potential causal factors leading to the mismatch can be made. A sample table suggesting a step-by-step review under each of these headings is shown in the Illustration to this Session (Table 6.2). This table provides a series of headings which are intended to direct the manpower planner down different lines of inquiry. It is not possible to make a table which will apply to all countries because the significant problem sources will vary from one country to another and will very much depend on a variety of external factors such as the pattern of health service operation or whether there is a private health
sector of any size, or whether the terrain allows easy transport between regions, and so on. Each national manpower planner must produce his own set of analytic tables to fit the conditions in his country. Having produced it, he has a valuable tool for analyzing problems and setting the groundwork for finding solutions.

It remains only to be said that typical manpower problems do not necessarily consist of difficulties under only one heading at a time, but may well consist of elements of all of them. It is this very complexity which strengthens the need for separating out the elements of the problem under different headings, not only to identify causal factors but also areas of potential action to overcome the mismatch.

ILLUSTRATION

ANALYZING MANPOWER MISMATCH PROBLEMS

This analytic table is intended as an example of the type of table a manpower planner might construct to aid his analysis of manpower problems. It will vary in format from country to country, depending on the situation and conditions prevailing. The table is constructed in the form of a series of key words to guide the analysis. Thus, for example, the first statement in the table can be translated as follows:

Is it a problem of numbers employed? If yes,
  - is it a problem of the number of joiners?
    If yes,
    - is it a problem of the number of experienced recruits joining? If yes,
    - is it a problem of the number coming from the private sector? And so on.
Each of the key words in the table suggests a different line of inquiry and allows the manpower planner to proceed in a systematic fashion through all the possibilities relevant to his country's situation.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>AREA OF INVESTIGATION FOR PROBLEM</th>
<th>SOURCE AND/OR SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Numbers employed</td>
<td>1. Joiners</td>
<td>1. Experienced recruits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Training output</td>
<td>1. Enough schools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Enrollment size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Training losses</td>
</tr>
<tr>
<td></td>
<td>3. International training</td>
<td>Number of:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Available qualified students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Graduates returning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Students sent</td>
</tr>
<tr>
<td></td>
<td>4. Recruitment losses</td>
<td>1. Graduation/recruitment coordination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Competition from other agencies</td>
</tr>
<tr>
<td>2. Leavers</td>
<td>1. Job changes</td>
<td>Number going to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Private sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Other sectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Other countries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Other posts in health service</td>
</tr>
<tr>
<td></td>
<td>2. Discontinued employment</td>
<td>Number leaving for:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Marriage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Illness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Retirement</td>
</tr>
<tr>
<td>PROBLEM</td>
<td>AREA OF INVESTIGATION FOR PROBLEM</td>
<td>SOURCE AND/OR SOLUTION</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>2. Distribution of staff</td>
<td>1. Location of staff</td>
<td>1. Temporary assignments</td>
</tr>
<tr>
<td></td>
<td>2. Specific localized distribution</td>
<td>2. Permanent staffing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Incentive sufficiency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Administrative capability</td>
</tr>
<tr>
<td></td>
<td>2. Countrywide distribution</td>
<td>5. Career/skill benefits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Available facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Organization of staff movement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Inequality of service conditions</td>
</tr>
<tr>
<td>2. Location of work</td>
<td>1. Institutional locations</td>
<td>1. Population mobility</td>
</tr>
<tr>
<td></td>
<td>2. Population distribution</td>
<td>2. Quality of services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Relevance of services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Local staff mobility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Institutional hours of operation</td>
</tr>
<tr>
<td></td>
<td>2. Excess skills</td>
<td>2. Adequacy of in-service training</td>
</tr>
<tr>
<td></td>
<td>2. Appropriateness</td>
<td>3. Capacity of in-service training</td>
</tr>
<tr>
<td></td>
<td>1. Wrong skills</td>
<td>4. Extent of refresher courses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Staff status and career prospects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Coordination between training institute and service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Other resources availability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Accuracy of job descriptions</td>
</tr>
<tr>
<td>PROBLEM</td>
<td>AREA OF INVESTIGATION FOR PROBLEM SOURCE AND/OR SOLUTION</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4. Work organization/productivity</td>
<td>1. Output per unit of productive time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Equipment facilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Preparatory time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Service demand or working time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Speed of present equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Range of functions of present equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Pre-packed kits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Work plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Operational procedures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Working hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Quality and relevance of services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Appointments system</td>
<td></td>
</tr>
<tr>
<td>2. Percentage of productive time</td>
<td>1. Support activities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Support staff availability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Support activity organization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Extent of administrative requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Distribution of administrative functions</td>
<td></td>
</tr>
<tr>
<td>3. Total working hours</td>
<td>1. Length of working day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Length of working week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Holidays, leave and absenteeism</td>
<td></td>
</tr>
<tr>
<td>5. Problem duration</td>
<td>1. Short-term</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Temporary problem only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Part of a long-term problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Long-term</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. No immediate difficulties</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Contains some short-term issues</td>
<td></td>
</tr>
</tbody>
</table>
EXERCISE

EXERCISE 1. Identifying Manpower Problems

With information on the calculated requirements for different categories of staff over the period of the national health plan and baseline projections of the supply of staff over the same period, it is possible to begin to identify where the two are seriously out of balance. Each example of such a mismatch poses a problem for the manpower planner and he must decide how important the problem is to his work, i.e., how much of his time and effort he can devote to attempting to deal with it.

Having identified the important problems, he must now decide what types of problems they are (numbers, distribution, quality, etc.) and therefore what type of manpower policy could be considered in order to solve them. Manpower difficulties can be solved or at least alleviated in several different ways.

The purpose of this exercise is to evaluate some of the major health manpower problems in your own country.

1. Select a category of health manpower which could give rise to serious difficulties in the next health plan. If possible, select a staff category that has already been covered in Sessions 4 and 5.

2. Specify the type of specific quantitative comparisons between supply and requirements that you would want to make which make practical sense given the way in which these staff are employed in the Health Service.

3. In your judgement indicate the type(s) of problem(s) this staff category is likely to pose. Please consider the possibility of every problem category listed in the analytic table shown in the Illustration. For example,
if the number of physicians per 1000 population in rural areas is too low, this could be viewed as:

(a) a shortage in the number of physicians (in rural areas);

(b) an imbalance in the distribution of physicians (e.g., adequate supply overall, but an urban/rural imbalance);

(c) inappropriate training (providing medical assistants for rural areas might be much more effective than attempting to meet most medical needs with physicians); and so on.

Each different view of the problem suggests different possibilities for taking action to deal with it.

4. Identify which, if any, of these problems should be the subject of further and more detailed investigation and specify what criteria you used or what reasons you had for making this selection.

5. Draw up a table, using as a guide the analytic table in the Illustration, and list, using your own judgement, the causal factors leading to the expected or observed manpower problem. Include also in this listing your estimate of the significance of each factor as compared to the other factors you listed.
EVALUATION QUESTIONNAIRE FOR SESSION 6

The following questionnaire is intended to obtain your frank and honest opinion about the session you have just attended. This will help us in improving the material and the exercises of the course. Do not hesitate to give negative responses.

1. Do you feel that you achieved the educational objectives listed at the beginning of the session? The objectives were for the participants to be able to:

1. Reduce projections of supply and requirements to a common base to make comparisons.

2. Devise criteria for selecting which problems should be investigated in more detail.

3. Analyze manpower problems to identify causal factors and possible solutions.

2. Did you read any of the learning material before the session?

3. Was the learning material:

   a. useful for doing the group work exercises?

   b. easy to understand?

   c. interesting?
4. Did you find the illustrations:
   a. easy to understand?  
   b. interesting?  
   c. relevant?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Fair</th>
<th>Moderately</th>
<th>Very</th>
</tr>
</thead>
</table>

5. Did you find the exercises:
   a. easy to understand?  
   b. interesting?  
   c. relevant to national issues?

<table>
<thead>
<tr>
<th></th>
<th>Too little</th>
<th>Less than needed</th>
<th>About right</th>
<th>More than needed</th>
<th>Too much</th>
</tr>
</thead>
</table>

6. Did you find the time allocated
   a. for presentation of the learning material:
   b. for exercises:
   c. for plenary discussions:

7. If you were organizing this session, what percentage of time would you allocate to:
   a. presentation?  
   b. exercises?  
   c. plenary discussions?

Note that the percentages allocated to each activity when added up should equal 100 percent.

<table>
<thead>
<tr>
<th></th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
</table>

8. Do you have any other comments?

Name ____________________________

There is no need to sign your name unless you wish to do so. Thank you.