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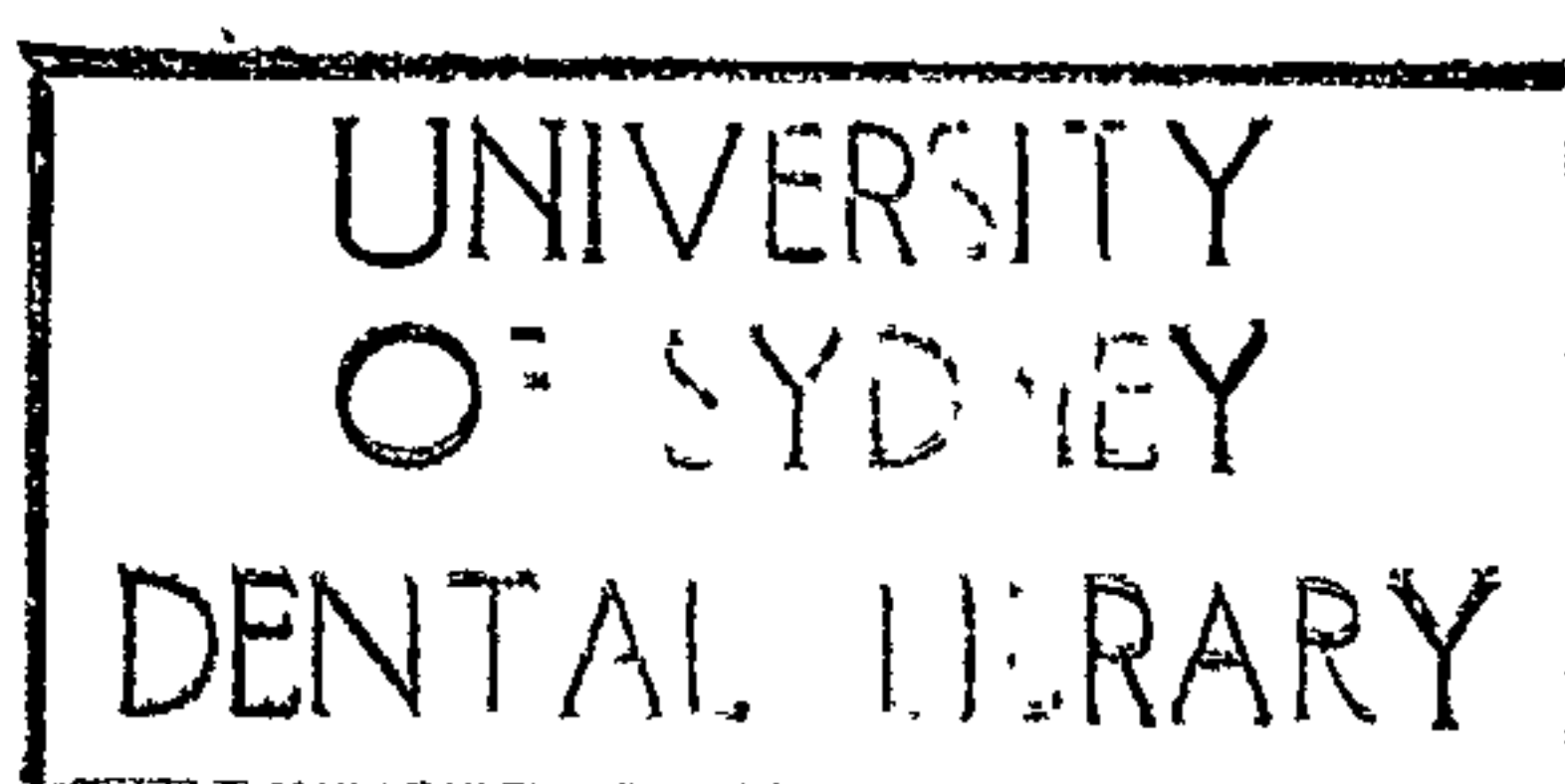
COMMUNITY DENTISTRY
A PROGRAMME DESIGN
FOR THE DENTAL FACULTY
THE ARAB MEDICAL UNIVERSITY, LIBYA

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SUMMARY

Dental education in Libya is so far concerned with the education of dentists only. One dental school produces about thirty dentists annually. The undergraduate dental curriculum is lacking in the community orientation, social sensitization and the professional development of its learners.

The objective of this thesis is to develop a community dentistry programme to rectify the curriculum deficiencies. For that purpose the thesis investigated topics and issues relevant to community dentistry:

the relationships and interdependence of development, health and oral health;

the activities of the World Health Organization including "Health for All by the Year 2000", the "Global Goals" for Oral Health and the concept of "Primary Health Care";

the need for networking all planning activities and for oral health planning to integrate its delivery systems, the manpower required and their education and training;

the epidemiological trends of oral health in the world and the implication of changes in oral health status to developed and developing countries. Also, the changes in the understanding of oral disease concepts.

To produce a community dentistry programme, this thesis also investigated changes in dental education, including its development, stages, objectives and innovations; the teaching of community dentistry as a trend in dental curricula and the need to educate the teacher in the educational advances necessary for planning courses, programmes and for managing the teaching and learning situation.

To make the community dentistry programme relevant to the country, community and its learners a situational analysis was undertaken of the country, the community's oral health and the local dental faculty - its curriculum, staff and students.

Findings from the situational analysis include significant improvements in the development and health of the Libyan community leading to pressures on and increasing expectations from the oral health services and dental education. At the same time there are indications that the major oral disease - dental caries - may be increasing in prevalence. Such possibility is supported by local findings and international experiences from comparable developing countries.

In addition, the high level of periodontal disease, lack of oral health promotion and oral disease prevention further accentuate the need for reversing the emphasis from the treatment and rehabilitation approach in dental services and dental education as the lessons from the experiences of other countries have indicated.

The suggested community dentistry programme is built on the main objectives of social sensitization, community orientation and professional development of its learners. This enables them to take a more full and active role in contributing towards the community's health and specifically oral health by recognizing the needs and solving the specific oral health problems.

The use of a systematic process of instructional design enabled the programme to relate together all its elements of teaching and learning, methods and resources, learner assessment and evaluation for continuous improvement and with learning as its central focus.

The use or guidelines on the use of educational advances was also discussed among the programme elements and included the use of objectives and "questioning", the process of learning and the choice of teaching methods and forms of assessment.

The learning objectives, as the main feature of the programme require the attainment by its learners of knowledge, skills and attitudes to enable them to undertake activities and tasks beyond the mere treatment and repair of oral disease and its consequences. The learning objectives embody the concepts of primary oral health care and provide the learners with opportunities for professional growth and personal satisfaction.

Strategies for implementing the programme and its evaluation were also worked out. These serve to counter possible difficulties in implementation and the continuous development of the programme resulting from feedback.

It is also suggested, the introduction of the programme may result in improving the undergraduate dental curriculum as a whole and could be valuable in preparing for improvements in the oral health issues of dental services and manpower development as outlined in the recommendations.

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PROLOGUE

"While the majority of dental educationists strive to produce the perfect technician, and while researchers seek a break-through in the biomedical sciences (for a caries vaccine or the like), the current impact of such activities on the oral health of the community is minor compared to the potential gains to be drawn from other strategies."

(Davis 1980)

Dedication

To my wife Halima for her care and understanding
and who interrupted her medical career to raise our
family.

To our children Murad, Marwan and Murshed for the
joy they give us.

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1. INTRODUCTION

The following introduction identifies oral health care with its delivery systems, manpower requirements and their training and education in the context of the community. It investigates the inter-relationships between development, health and oral health and presents examples of related concerns and activities by the United Nations (UN) and the World Health Organization (WHO).

Also noted is the disparate situation regarding development and health between developing and developed countries made worse by decreasing economic assistance, demographic trends and the floundering transfer of technology.

Planning is identified as a systematic process gaining wider use in health and oral health care as applies to delivery services and their manpower development. In health manpower development, the importance of the elements of management and education are illustrated by examples.

Regarding the oral health situation on the world scene, the introduction notes the divergent trends appearing in developed and developing countries, particularly from WHO oral health data. Also the implications of these trends and the new concepts in the understanding of oral diseases and of primary health care on the oral health delivery systems and dental education, especially for developing countries.

The introduction also discusses the adoption by some developing countries of western-style oral health care systems and dental education and gives examples of how others adapted these systems to their requirements and made their education relevant to the specific needs and oral health problems of their community.

Finally, the problems faced by dental education in Libya and the objectives of the author are related to the introduction and the further investigations undertaken in the subsequent sections of this thesis.

1.1 DEVELOPMENT, HEALTH AND ORAL HEALTH

All over the world efforts are constantly being made to improve the existence of mankind.

"Development implies progressive improvements in the living conditions and quality of life enjoyed by society and shared by its members. It is a continuing process that takes place in all societies; few would claim that their development is complete." (WHO-UNICEF 1978)

Governments undertake social and economic development programmes to improve the quality of life, standard of living and productivity to achieve the wellbeing of their peoples.

However, the real world situation is not so simple, between the developed and developing countries of the world there is a glaring asymmetry in their share of development and so, the wellbeing of their peoples.

"At the heart of the existing system is the problem of unequal exchange. The international division of labour encourages and even compels the developing countries to produce for, and constantly adapt to the needs of the industrial countries. This asymmetry between the 30 or so developed countries and the about 130 developing is evident in the relative access to supplies, markets, credit and science and technology. However, for many developing countries economic development means not only the betterment of their material conditions but also greater human dignity, security, justice and equality. It is a transformation of their lives, a liberation. Development is the unfolding of people's individual and social imagination in defining goals and inventing ways to approach them. Development is the continuing process of the liberation of people and societies. There is development when they are able to assert their autonomy and, in self reliance, to carry out activities of interest to them. To develop is to be or to become. Not only to have." (Dadzie 1980)

"We must realise that colorization does still exist through trade and commerce. Every time there is a big change in the trade and commerce of a country, the same process that was experienced during the years of colonization is repeated." (Barmes 1981)

Development, therefore, is an economic necessity and a socio-cultural imperative, widely sought after by governments and expected by people.

The developing countries include about 130 countries of the world's (about 160 countries. The Statistical Yearbook (UNESCO 1985) includes all European Countries, plus 8 others in the developed group with the developing countries forming the rest of the world. Population estimates for 1985 and 2000 indicate the following percentages of the world population belong to developing countries:

1985:	all population	70.8%	2000:	78.3%
	under 25 years	77.3%		83.95%
	under 15 years	79.4%		94.3%

(calculated by the author from UNESCO (1985) data).

Mahler (1980) makes a further interesting observation regarding this demographic situation:

"The underdeveloped countries cannot shed their excess population to colonies or North America as the industrialized countries of Europe could when they were passing through a comparable demographic phase."

As long ago as 1974 the developing countries pressed the General Assembly of the UN for the creation of a "new economic order" and the adoption of a "new international development strategy". Although the UN adopted these proposals, their realization is still largely left on paper (Dadzie 1980).

Development, economic and socio-cultural is essential to the wellbeing of people. However, fundamental to such wellbeing is health.

1.2 HEALTH AND THE WORLD HEALTH ORGANIZATION

Health is considered to be a fundamental human right (WHO 1978, Mahler 1980), and in conformity with the UN Charter, the Constitution of WHO affirms"

"The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition." (WHO 1968)

So, health must be pursued for itself and its promotion is a moral imperative. Although it promotes and is promoted by development, health for all is not just a by-product of development. It is the ideal and primary lever for development and also its ultimate goal (Mahler 1980).

Although "health" cannot be given by anyone to people, it can be easily taken away and the real situation as Mahler (1978) notes:

"In developed as well as developing countries health as a universal human right is far from being a reality."

Hence, "health" needs all it can get from being considered a basic human right, and if governments, communities and individuals play their roles accordingly, there may be little left as obstacles in the way of its satisfactory attainment.

Health is an intensely personal issue and of immense general concern, yet, it is not easy to define. The famous definition produced by WHO in its constitution in 1946 has proved remarkably progressive, and for its few words quite comprehensive:

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

Blum (1974) referred to this definition of health as obviously an ideal state of affairs that few of us approach even at birth. Although it is not of any practical use as a standard against which to measure health as a goal to try to achieve, it is still significant, however, for its taking into account most of the factors that are agreed on as important.

A wider conclusion on the concept of health was reached more recently at a conference of the Centre for Educational Research and Innovation of the Organization for Economic Co-operation and Development - an organization of 24 developed countries:

"The concept of health is an evolving one that depends on the level of economic development, individual income, the standard of prevention, health education and on the styles of social and cultural organization. Moreover, health is a subjective notion linked to the degree of tolerance exhibited by each individual and by each society." (OECD 1977)

This definition of health is quite flexible and seems particularly suited to oral health.

Although the sole objective of WHO is "the attainment by all peoples of the highest possible level of health" as it appears in Article 1 of its Constitution, the development dimension has only more recently been articulated:

Guided by the principle of social justice, WHO's adopted policies reflect a growing concern for the social purpose of health development and for the role of health in promoting social and economic development (WHO 1978).

In its annual World Health Assembly (WHA) in May 1977, WHO adopted a resolution for the attainment of 'health for all by the year 2000' (HFA2000). The resolution considers health a basic human right and a worldwide social goal essential to the satisfaction of

basic human need and the quality of life. It decided that the main social target of governments and WHO in the coming decades should be the attainment of all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life (WHO 1978).

Having committed its member states to achieving such a high goal as "health for all by the year 2000" to cover almost the entire population of the world and perhaps frustrated by the slow progress of realizing the new economic order internationally, WHO set out to find ways and means to guide all countries, including the poorest, to provide universal health coverage. This "new health order" stirred international consensus rather than confrontation and could prove more successful than the UN efforts with the "new economic order".

Priority programs were identified in nutrition, immunization against common diseases of childhood, appropriate health technology, sanitation and safe water for all by 1990, and the key to achieving health for all - Primary Health Care (PHC). PHC emerged as the priority program to be stressed above all in making essential health care available to the world's population (WHO 1978).

A number of national, regional and international meetings on PHC were held throughout the world in 1977 and 1978 and this culminated in an international conference which was jointly organized and sponsored by WHO and the UN's Children's Fund (UNICEF) held at Alma-Ata, USSR in September 1978 (Figure 1), which has been called the twentieth century 'Magna Carta' for health as it expressed the stirrings of an international health conscience and marked the beginning of a new international health movement. Its technical content, demand for social justice in health matters and its plea

Figure 1.

DECLARATION OF ALMA-ATA

The International Conference on Primary Health Care, meeting in Alma-Ata this twelfth day of September in the year Nineteen hundred and seventy-eight, expressing the need for urgent action by all governments, all health and development workers, and the world community to protect and promote the health of all the people of the world, hereby makes the following Declaration:

I

The Conference strongly reaffirms that health, which is a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity, is a fundamental human right and that the attainment of the highest possible level of health is a most important world-wide social goal whose realization requires the action of many other social and economic sectors in addition to the health sector.

II

The existing gross inequality in the health status of the people particularly between developed and developing countries as well as within countries is politically, socially and economically unacceptable and is, therefore, of common concern to all countries.

III

Economic and social development, based on a New International Economic Order, is of basic importance to the fullest attainment of health for all and to the reduction of the gap between the health status of the developing and developed countries. The promotion and pro-

tection of the health of the people is essential to sustained economic and social development and contributes to a better quality of life and to world peace.

IV

The people have the right and duty to participate individually and collectively in the planning and implementation of their health care.

V

Governments have a responsibility for the health of their people which can be fulfilled only by the provision of adequate health and social measures. A main social target of governments, international organizations and the whole world community in the coming decades should be the attainment by all 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. Primary health care is the key to attaining this target as part of development in the spirit of social justice.

VI

Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of indi-

viduals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process.

VII

Primary health care:

1. reflects and evolves from the economic conditions and socio-cultural and political characteristics of the country and its communities and is based on the application of the relevant results of social, biomedical and health services research and public health experience;
2. addresses the main health problems in the community, providing promotive, preventive, curative and rehabilitative services accordingly;
3. includes at least: education concerning prevailing health problems and the methods of preventing and controlling them; promotion of food supply and proper nutrition; an adequate supply of safe water and basic sanitation; maternal and child health care, including family planning; immunization against the major infectious diseases; prevention and control of locally endemic diseases; appropriate treatment of common diseases and injuries; and provision of essential drugs;
4. involves, in addition to the health sector, all related sectors and aspects of national and community development, in particular agriculture, animal husbandry, food, industry, education, housing, public works, communications and other sectors; and demands the coordinated efforts of all those sectors;
5. requires and promotes maximum community and individual self-reliance and participation in the planning, organization, operation and control of primary health care, making fullest use of local, national and other available resources; and to this end develops through appropriate education the ability of communities to participate;

6. should be sustained by integrated, functional and mutually-supportive referral systems, leading to the progressive improvement of comprehensive health care for all, and giving priority to those most in need;

7. relies, at local and referral levels, on health workers, including physicians, nurses, midwives, auxiliaries and community workers as applicable, as well as traditional practitioners as needed, suitably trained socially and technically to work as a health team and to respond to the expressed health needs of the community.

VIII

All governments should formulate national policies, strategies and plans of action to launch and sustain primary health care as part of a comprehensive national health system and in coordination with other sectors. To this end, it will be necessary to exercise political will, to mobilize the country's resources and to use available external resources rationally.

IX

All countries should cooperate in a spirit of partnership and service to ensure primary health care for all people since the attainment of health by people in any one country directly concerns and benefits every other country. In this context the joint WHO/UNICEF report on primary health care constitutes a solid basis for the further development and operation of primary health care throughout the world.

X

An acceptable level of health for all the people of the world by the year 2000 can be attained through a fuller and better use of the world's resources, a considerable part of which is now spent on armaments and military conflicts. A genuine policy of independence, peace, détente and disarmament could and should release additional resources

that could well be devoted to peaceful aims and in particular to the acceleration of social and economic development of which primary health care, as an essential part, should be allotted its proper share.

* * *

The International Conference on Primary Health Care calls for urgent and effective national and international action to develop and implement primary health care throughout the world and particularly in developing countries in a spirit of technical cooperation and in keeping with a New International Economic Order. It urges governments, WHO and UNICEF, and other international organizations, as well as multilateral and bilateral agencies, non-governmental organizations, funding agencies, all health workers and the whole world community to support national and international commitment to primary health care and to channel increased technical and financial support to it, particularly in developing countries. The Conference calls on all the aforementioned to collaborate in introducing, developing and maintaining primary health care in accordance with the spirit and content of this Declaration.

(Source: WHO, UNICEF 1978)

Figure 2. FDI-WHO Oral Health Global Goals

The proposed Global Goals

With the expectation that each country will formulate its own sub-goals or targets it is proposed that additional indicators of improved oral health be adopted and that they cover the young, the mature and the elderly.

The following global goals for the year 2000 are proposed:

- Goal 1 50 % of 5-6 year olds will be caries free.
- Goal 2 The global average will be no more than 3 DMF teeth at 12 years of age.
- Goal 3 85 % of the population should retain all their teeth at age 18.
- Goal 4 A 50 % reduction in present levels of edentulousness at age 35-44 will be achieved.
- Goal 5 A 25 % reduction in present levels of edentulousness at age 65 and over will be achieved.
- Goal 6 A data based system for monitoring changes in oral health will be established.

Goal 1 50 % of 5-6 year olds will be caries free

Recent data from highly industrialized countries indicate that between 10 and 50 % of 5-6 year olds are free of caries whereas in developing countries the corresponding range is 30-91 %.

Present trends are towards increased percentages of caries free 5-6 year olds in highly industrialized countries and reduced percentages in developing countries.

The goal is attainable because the application of available preventive materials and methods in some highly industrialized countries has already produced this percentage of caries free children, and the strong trend towards reduced dental caries levels should contribute to reaching the global target in other countries.

Only a few developing countries where caries is on the increase have fallen below that level to date and the use of the same preventive approaches is capable of returning those populations to the 50 % level and of arresting the trend towards increased caries in the others. The best results have been achieved by convincing parental groups of the importance of dietary and other preventive measures applied from birth onwards.

Goal 2 The global average will be no more than 3 DMF teeth at 12 years

Caries prevalence is equal to or less than a mean of 3 DMF teeth at 12 years of age for each of 58 developing and 7 highly industrialized countries for which there are data in the global data bank of WHO. The prevalence is more than 3 DMF teeth for each of 32 developing and 21 highly industrialized countries.

A further 11 developed countries are on the verge of reaching 3 DMF teeth as part of a decreasing caries prevalence trend, but 16 developing countries are in danger of reaching that level as their caries prevalence continues to increase.

These trends indicate that this global average is attainable by application of comprehensive programmes which can decrease the prevalence of caries in one group of countries and halt the increase in others.

(cont'd)

Figure 2 (cont'd)

Goal 3 85 % of the population should retain all their permanent teeth at age 18

Good baseline data for all countries for this goal are not available at this time, however, indirect data suggest it is a realistic target.

This age group is subject to the same caries trends as the younger groups, but the trend towards reduced periodontal disease, where oral hygiene is improving, is also relevant. The preventive measures that can contribute to the attainment of Goal 1 will have major effect on this Goal as well. Additionally, early diagnosis and treatment of carious lesions that do occur will be needed to prevent the loss of permanent teeth. Individuals at this age should have sufficient knowledge themselves of caries and periodontal disease prevention to maintain a high level of oral health.

Goal 4 A 50 % reduction in present levels of edentulousness at age 35-40 will be achieved

Attainment of this goal would mean a global level of 90 % dentate persons at age 35-44 years. At the same time at least 75 % should have a minimum of 20 functional teeth.

For 12 countries, only one of which is a developing country, the range in percentage edentulousness is now 1 to 28 at 35-44 years. Very limited data are available on edentulousness trends but what there are, are consistent with the caries trends for the younger ages.

For this group prevention of progressive periodontal breakdown constitutes the main challenge. This can be achieved with proper personal and professional attention to oral hygiene measures as has been demonstrated in a number of studies.

Goal 5 A 25 % reduction in present levels of edentulousness at age 65 and over will be achieved

For the age group 65 years and over the aim should in each country be a 25 % reduction in edentulousness. At the same time, more than 50 % should be able to retain a minimum of 20 functional teeth.

There are data for only 8 countries ranging from 28 to 80 % edentulousness for this age group. Development of standard methods and extension of preventive methods from other age groups should help bring about the desired changes in oral health status.

If this improvement in oral health is attained it will reduce the occurrence of oral sepsis and facial pain and greatly enhance the quality of life for the ageing population.

Goal 6 Establishing a data base for monitoring changes in oral health

This last Goal is of more general nature than the previous ones and may involve development of new methods for assessment of various parameters relating to oral health.

At present information is best available on the caries situation of children. Reliable data on periodontal conditions and prevalence of edentulousness are still insufficient. Every effort should be made to establish a global data bank for these and other oral conditions by the year 2000 at the latest.

for urgent national and international action for health manifested an unusual degree of consensus on the need for cooperation among countries, and within countries, among the various sectors of a country and within the health sector's different interests and disciplines.

Primary health care is a flexible concept that can be adapted to any country's specific health needs. Primary health care is essential health care based on practical scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community throughout their full participation and at a cost that the community can afford to maintain at every stage in their development in the spirit of self-reliance and self-determination (WHO-UNICEF 1978).

The PHC approach includes five principles in its philosophy and orientation:

1. Multisectoral approach
2. Community involvement
3. Equitable distribution
4. Preventive orientation
5. Appropriate technology.

It is much to be regretted that the dental profession was not officially represented at the Alma-Ata Conference, either at governmental or non-governmental level with the consequence that oral health is not mentioned in the report relating to the Conference (Leatherman 1979). Oral health stands to gain enormously from the applications of the concept of PHC and is eminently suited to the use of its principles. So far, the application of the PHC concept to dentistry has received little of the attention it deserves. Some

of the scanty literature has been contributed by Morris (1976), Rovin (1977), Mabelya and Freeman (1985), Songpaisan (1985), Dissanayake (1984) and Homan (1981).

The concept of PHC itself needs clarification as the term 'primary care' in English usage goes back to the 1920 report of Lord Dawson in England which was concerned with the provision of 'primary health centres' mainly concerned with first contact medical care. These appeared under the National Health Service in the UK represented by general practitioners, public health nurses and consulting rooms for hospital visiting consultants, plus additional facilities for health promotion activities. Since 1962, the term achieved prominence in the UK to denote general practice. There is considerable difference between this previous use of the term for first contact care and the current use of the term by WHO which emphasizes community participation and promotional and organization issues (Hetzel 1978).

Although almost all countries of the world are signatories to the Alma-Ata Declaration, health personnel education has been slow to reflect the primary health care concept in its curricula world wide. Walton (1983) found that in the UK such a situation exists in medical education and that the international implications of the UK survey and his survey of European medical education (Walton 1985) indicate that an important principle with major significance for medical education as the Alma-Ata Declaration has been accepted at government level but a glaring communication gap exists between governments and medical education. Also, that the medical school teachers most responsible for promoting this internationally endorsed principle in their own country are often not even aware of its existence.

The potential role that international consensus on health issues and improvements in health care can have on world peace is also significant. In considering "the role of physicians and other health workers in the preservation and promotion of peace as the most significant factor for the attainment of health for all," WHO's Health Assembly in 1982 appealed to member states to multiply their effort to consolidate peace in the world and gave instructions for the creation of an international committee composed of eminent experts in medical science and public health to study the contribution that WHO could make to economic and social development and to facilitate the implementation of the UN resolutions on strengthening peace and, in particular, preventing thermonuclear conflict (WHO 1982).

Other actions followed the momentous Declaration of Alma-Ata. In 1979 the Global Strategy for achieving HFA2000 was launched at the Thirty-Second World Health Assembly through the adoption of a resolution which endorsed the Declaration of Alma-Ata and invited Member States of WHO to formulate their own strategies. The UN General Assembly adopted Resolution 34/58 on health as an integral part of development and endorsed the Alma-Ata Declaration, appealing to Member States to carry out the actions called for in the Declaration.

WHO prepared guiding principles - "Formulating Strategies for health for all by the year 2000" (WHO 1979) - for formulating national policies, strategies and plans of action based on primary health care, conceived as part of a comprehensive health system and carried out in coordination with other sectors of socioeconomic development.

In 1981, a composite picture emerged from the strategies worked out by member countries and their regional groups enabling WHO to formulate them into "Global strategy for health for all by the year 2000," issued in the Health for All Series as No. 3 (WHO 1981). The main emphasis of the strategy is the development of health system infrastructures for the provision of health services, based on the primary health care approach that will reach entire populations.

The strategy was also supported by a series of publications in the "Health for All Series":

- No. 4: "Development of indicators for monitoring progress towards health for all by the year 2000" (WHO 1981). The indicators useful at national and international level were based on national and regional strategies.
- No. 5: "Managerial process for national health development" (WHO 1981) as guiding principles in the action required to support and promote the strategy.
- No. 6: "Health programme evaluation" (WHO 1981) to monitor progress in implementation of the strategy, to evaluate its effectiveness and for application in the managerial process.

The short list of indicators used for global monitoring and evaluation of the strategy is also relevant to oral health and should be more known to the dental establishment, including students. Four categories of indicators are represented: health policy indicators; social and economic indicators, indicators of the provision of health care; and indicators of health status.

The listing of the 12 global indicators implies the commitment of countries individually, as well as collectively in regional

groupings, to use at least these indicators and to provide the necessary information on them. Although to be acceptable globally, the list has to be short; many countries use additional indicators in keeping with their needs and capacities (WHO 1981). Individual countries will seek to attain, sustain or improve on each indicator.

The twelve global indicators are used to indicate the number of countries in which:

- (1) Health for all has received endorsement as policy at the highest official level, e.g., in the form of a declaration of commitment by the head of state; allocation of adequate resources equitably distributed; a high degree of community involvement; and the establishment of a suitable organizational framework and managerial process for national health development.
- (2) Mechanisms for involving people in the implementation of strategies have been formed or strengthened, and are actually functioning, i.e., active and effective mechanisms exist for people to express demands and needs; representatives of political parties and organized groups such as trade unions, women's organizations, farmers' or other occupational groups are participating actively; and decision-making on health matters is adequately decentralized to the various administrative levels.
- (3) At least 5% of the gross national product is spent on health.
- (4) A reasonable percentage of the national health expenditure is devoted to local health care, i.e., first-level contact, including community health care, health centre care, dispensary care and the like, excluding hospitals. The percentage considered "reasonable" will be arrived at through country studies.

- (5) Resources are equitably distributed, in that the per capita expenditure as well as the staff and facilities devoted to primary health care are similar for various population groups or geographical areas, such as urban and rural areas.
- (6) The number of developing countries with well-defined strategies for health for all, accompanied by explicit resource allocations, whose needs for external resources are receiving sustained support from more affluent countries.
- (7) Primary health care is available to the whole population, with at least the following:
 - safe water in the home or within 15 minutes' walking distance, and adequate sanitary facilities in the home or immediate vicinity;
 - immunization against diphtheria, tetanus, whooping-cough, measles, poliomyelitis, and tuberculosis;
 - local health care, including availability of at least 20 essential drugs, within one hour's walk or travel;
 - trained personnel for attending pregnancy and childbirth, and caring for children up to at least 1 year of age.
- (8) The nutritional status of children is adequate, in that:
 - at least 90% of newborn infants have a birth weight of at least 2500 g;
 - at least 90% of children have a weight for age that corresponds to the reference values given in Annex 1 in this volume.
- (9) The infant mortality rate for all identifiable subgroups is below 50 per 1000 live-births.
- (10) Life expectancy at birth is over 60 years.

(11) The adult literacy rate for both men and women exceeds 70%.

(12) The gross national product per head exceeds US\$500.

(WHO 1981).

In 1982 a "Plan of action for implementing the Strategy for Health for All" was accepted by WHO. It called upon member states to review their health policies in the light of Global Strategy, formulate national strategies and develop national plans of action to implement them. A publication for the 'Plan of Action' in the Series "Health for All" was issued as No. 7 (WHO 1984).

It is in this context of national, regional and international cooperation and consensus on health issues that there is fervent hope of a spillover into the areas of economics and peace and not to belie the genuine efforts of WHO and the world community at large in targeting health for all as sensational in intention and inept in execution.

In the context of health for all by the year 2000, the Oral Health Unit at WHO had already formulated its first global goal for oral health in 1979 as no more than 3 DMF teeth at 12 years of age and thereby this indicator was notable for the fact that it was the first of all the global indicators to be developed by WHO for health and oral health.

WHO developed the oral health global goals further when two years later in collaboration with a special Working Group of the International Dental Federation added four other indicators at The FDI annual meeting in Rio de Janeiro in 1981. A sixth indicator was added later to maintain regular surveillance over changes in oral health by establishing a data base by the year 2000 at the latest.

However, it was not until May, 1983, that oral health was finally recognized as part of the "strategy of health for all" by the thirty-sixth World Health Assembly of WHO.

The oral health "Global Goals" appear in Figure 2 from the FDI Newsletter No. 122, March 1982.

It is intended that these goals be used as a guide for countries in developing their own goals. Countries are being encouraged by WHO to collect baseline data as rapidly as possible so that they can then choose national goals that relate to existing levels of disease and programmes to achieve these goals compared with the levels of the base year, 1980.

"All segments of the oral health sector, including private practitioners, government officials, educators and researchers, should participate in the coordinated efforts to achieve national goals. The common objective should be to motivate the consumer to increased participation." (FDI 1982)

Periodontal health goals present more difficulty and the European Economic Community countries, the USA and the Western Pacific Region Countries have already established some guidelines.

The Community Periodontal Index of Treatment Need (CPITN) (Ainamo et al. 1982) is helping to formulate such a guideline and its adoption is providing the basic global picture of periodontal diseases. It is also hoped that so far relatively neglected dento-facial anomalies specially the most common orthodontic cases and oral mucosal conditions will be provided with some precise, widely used and reported assessments system.

1.3 PLANNING

For an ordered and rational socio-economic and health care, planning is increasingly becoming an instrument of choice. The planning process can infiltrate and coordinate the sectors of socio-economics, health, manpower and education. Within the field of education, the planning principles are increasingly applied in the preparation of curricula and programmes.

Planning can be considered as a rational human behaviour in the organization of activities, personal or public.

The planning considered here is that undertaken for the benefit of a community or society as a whole and not only the individual. Its level can be national, regional or local and span, short to long term.

This public planning usually concerns the wider issues of development, health, education and other sectors of a community.

There is no dearth of definitions of planning and they vary according to the particular situation and philosophy upheld.

Some of the more widely applicable definitions are:

- Planning is a preferred instrument of deliberate and democratically achieved social change (Blum 1974).
- Planning is the administrative instrument that provides a rational basis for decision-making (Hall, Mejia 1978).
- Planning is the basic process by which we decide what our goals are and how we are going to achieve them (Stoner 1978).
- Planning is making current decisions in the light of their future effects (Reeves, Bergwall, Woodside 1979).

- Planning is the process of preparing a set of decisions for action in the future and must precede development and change in any organization (Dowell 1981).

These definitions try to identify the concept and also throw some light on the process of planning.

The process has three major purposes:

1. defining desired improvements;
2. achieving desired improvements;
3. measuring the attainment of desired improvements

(Blum 1974).

These three parts can be amplified further to suit the particular planning situation as, for example, in health, oral health, manpower and education.

Central to all planning is the application of scientific reasoning to problem solving. Problems that are imposed on the present, imminent, anticipated or forecast in the future.

Planning is a systematic, continuous, cyclical process that uses the framework of a rational model. The process consists of a series of steps that can be followed systematically or even in some parts, simultaneously. The cycle is regarded as cybernetic allowing for interaction in a sub-cycle at any step.

In Figure 3 the process begins with identification of the problems in the "situation analysis" q.v., to define desired improvements by selecting goals and objectives; then formulation of strategies for selection of programmes to be implemented and evaluated and continues with feedback to the next planning cycle (Knox 1979).

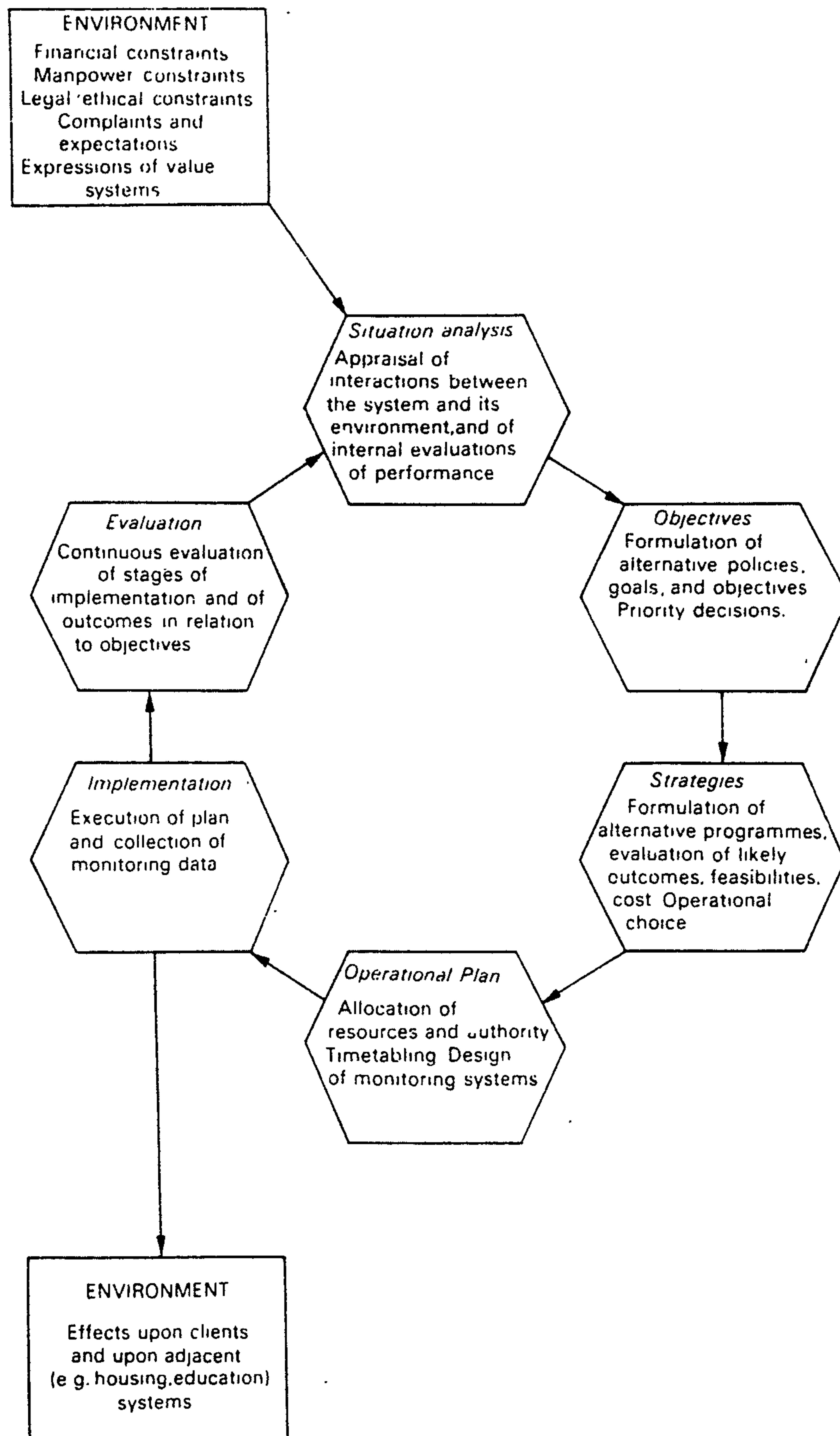


Figure 3. Cybernetic planning cycle

(Source: Knox 1979)

In planning, future uncertainty is reduced and rationality and objectivity is brought into the highly subjective areas of decision making, the setting of goals, objectives, and ordering of priorities; also in allocating human, financial and material resources.

Decision making can - and has all too often - proceeded through disjointed, incremental and "knee-jerk response" problem-solving, making cautious step by step advances in the advisable general direction for fear of making serious mistakes because of ignorance or misinformation. In spite of the virtue of safety in incrementalism, it is too slow to respond to today's rapid and urgent changes. The weaknesses of the national model can be approximated using techniques like simulation and decision theory to cope with uncertainties and the lack of absolutely accurate data (Reeves et al. 1979).

The systems approach to planning is also preferred to another style of planning which is resource oriented; striving to maximize resource availability, it does not consider that the demand for resources is, in fact, a desired demand. For example, people do not want hospitals as such, rather they want them only because hospitals are perceived as a means of producing health services which make contribution to what they really want - good health (Reeves et al. 1979).

Above all, planning reflects the value system of society and its policy environment. It is the value system that creates impetus for change when there is dissonance in society. This dissonance, a discrepancy between achievement and expectation, can also be contrived or produced by planners with covert goals and a

Machiavellian mood. The major expected activity of planning is to attain social change and its success probably requires an arousal of society's awareness of present or impending dissonance and thereby creating widespread desire for planning (Blum 1974).

Planning started in the USSR to guide economic development during a period of relatively scarce resources before the Second World War and from the outset health planning was an integral part of the overall planning process.

Development planning was adopted after 1945 by some less developed countries like India, Pakistan, South Korea and Chile. Apart from the latter, health plans were related but not integrated with the development plans. The devastation brought about by the Second World War caused much of Western Europe to adopt development planning and only much more recently the health sector has become involved (Griffith 1976).

Still more recently, planning, for long advocated by economists, has become more accepted by politicians and societies. Many governments, specially in developing countries, have special ministries or departments concerned with planning for various socio-economic sectors.

The high public and political profile of health invariably includes it in the planning process. The health sector touches everyone in the community and its cause and effect relationship with development is recognizable.

However, in spite of such importance and widespread concern, the health sector seems to be of low priority in competition with many other sectors when it comes to allocation of resources by governments, specially in developing countries.

"Government spending for health in many underdeveloped countries is less than 1 per cent of the gross national product and it seldom exceeds 2 per cent of the G.N.P. in any of them, compared with from 6 to 12 per cent of the G.N.P. in most developed countries." (Mahler 1980)

"The priorities for expenditure on health must compete with under-development in industry and its infrastructure, the worsening conditions for the rural population with migration to urban slums, unemployment and underdevelopment, continuing population growth, imported capital-intensive technology and continuing poverty and inequality. In many countries health for the people has low priority, population coverage for health care is low, medical services are directed towards the wealthier, health expenditure is skewed to urban hospital care, and decisions reflect the interest of the medical mode of health care." (Cox 1983)

The main factor behind the failure of the health system in many countries to provide the basic types of health service needed by the population as a whole is usually the low priority given to health care among the various measures taken to promote social and economic development (Hall, Mejia 1978).

In spite of the low priority given to the health sector in many developing countries, many third-world health projects return large benefits to affluent countries. Mahler (1980) cites the example of the eradication of smallpox that is saving the developed countries billions of dollars in vaccination, surveillance and quarantine at a time when smallpox eradication was not the most important health need in the poor countries where, in some, thousands of children die of malaria every year. It was undertaken because of its worldwide health importance and illustrates the interdependence of all the world's people when it comes to health problems and their solution.

The health of a population is not dependent on health care services alone, it is inextricably related to every other sector's activity, programme and plan. In health planning, close and

functional relationship must be made with the overall planning process seeking integration, coordination and compatibility - a concept referred to as "networking" by WHO.

The inputs to health are numerous; they relate to the population, their genetic and demographic make-up, lifestyle and to their environment (Figure 4).

Health is affected by agriculture, transportation, industrialization, education and housing; and health plans must take note of other plans and try to maximize their health input and minimize their ill-health effect (Figure 5).

The health care system with its preventive, curative and rehabilitative services can only contribute so much to the health status of a population. Intervention at other sectors may be more timely and rewarding in achieving health goals. The example of the spread and decline of tuberculosis is well known in the medical literature (Terris 1981, Mahler 1980).

Perhaps the implications for dental caries are also there.

The response of the health care system has largely emphasized the curative and rehabilitative services and in its endeavours has expropriated health by the people. Illich's scathing attack on the medical establishment that "it has become a major threat to health" (Illich 1981) can certainly be justified somewhat under many situations.

The responsibility for health cannot be taken away from the individual if it is to remain with society. The promotion of health and prevention of ill-health can only be a gain to the health care system.

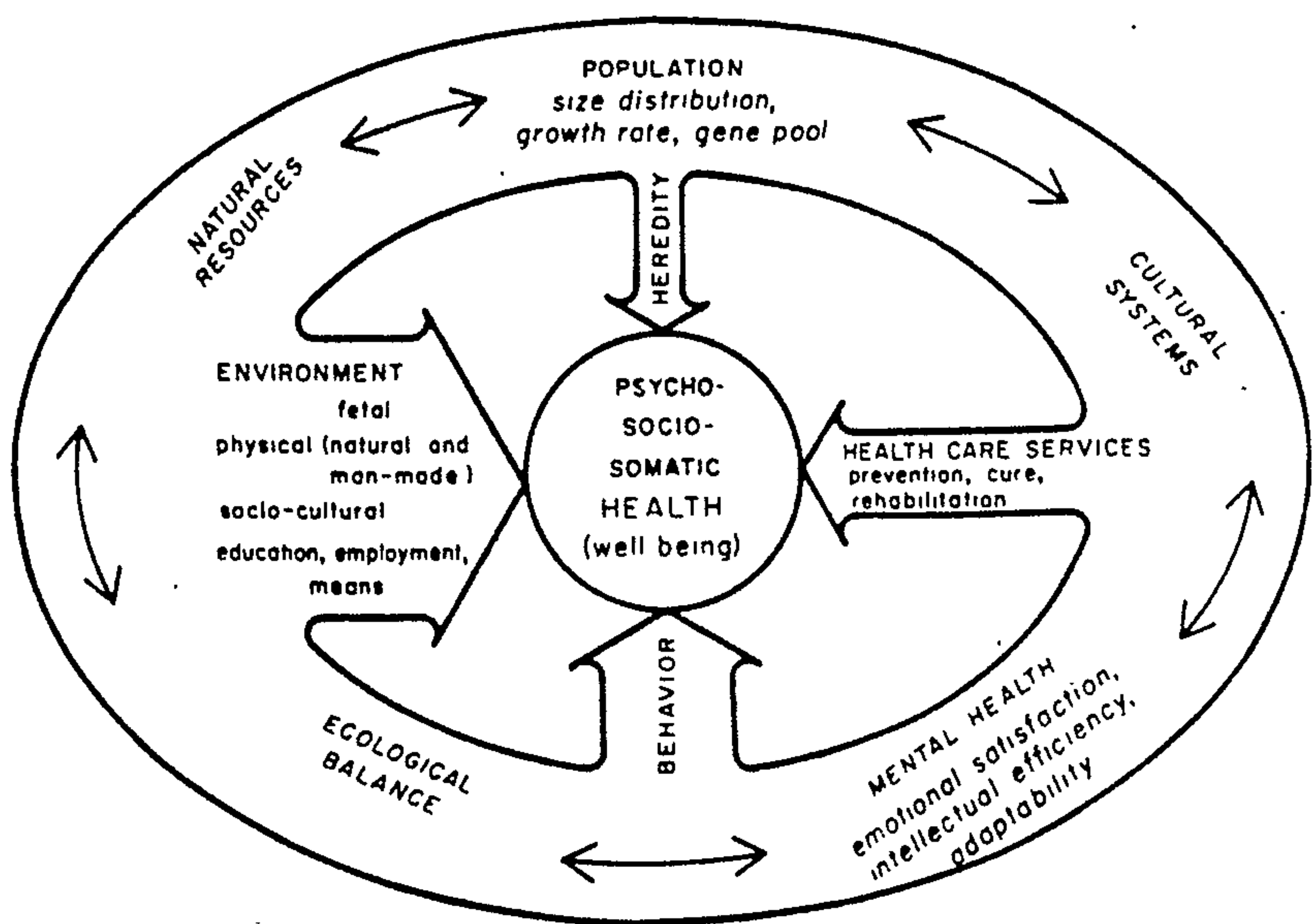


Figure 4. Inputs to health

(Source: Blum 1974)

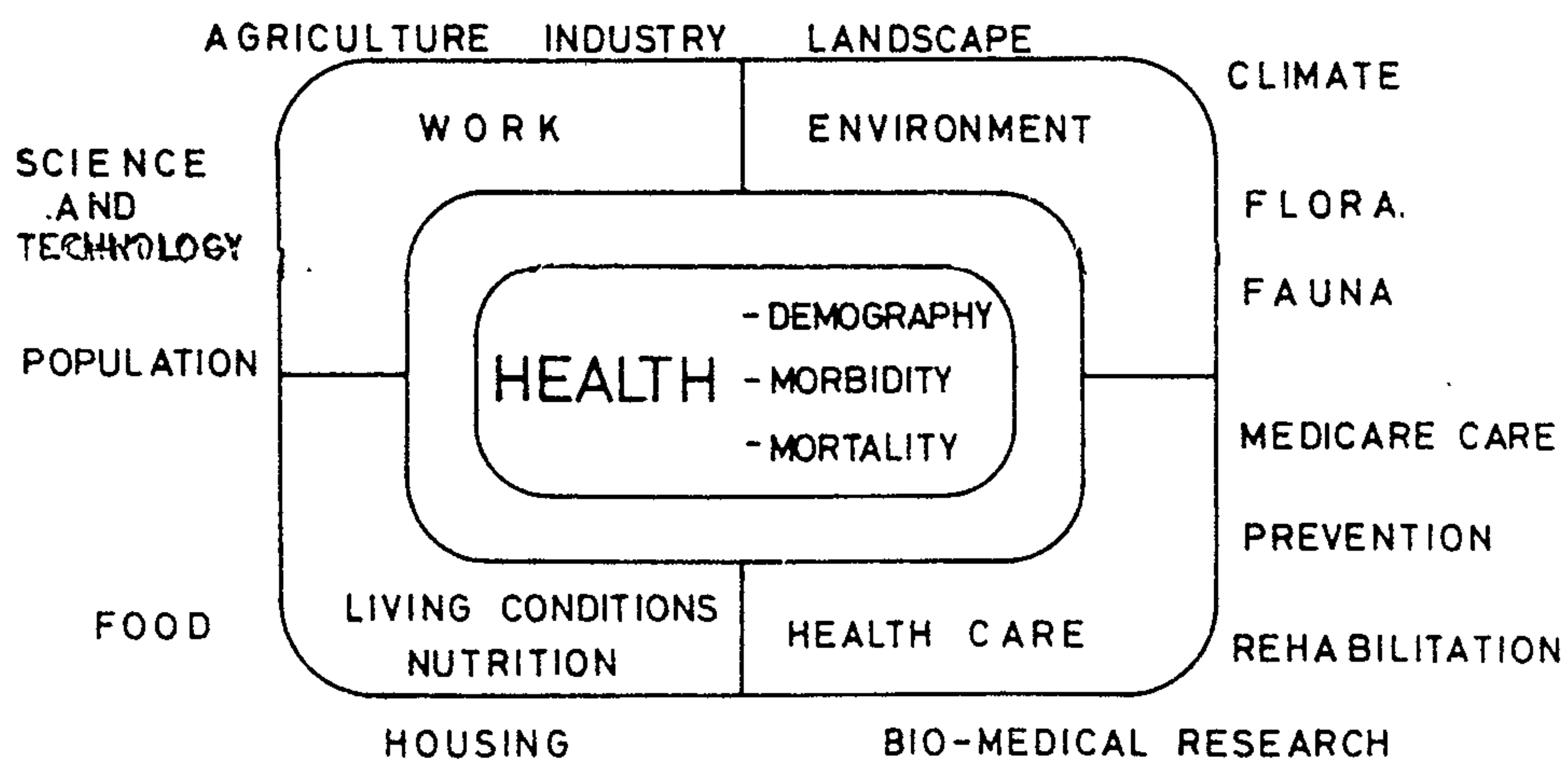


Figure 5. The goals and environment of public health systems

(Source: Knox 1979)

The complexity of interaction of the health care system with society, the sciences, the economy, governments and industry requires us to focus our attention on the major sub-systems at the interfaces with these other areas, notably health, manpower, resources, population, environment and technology (Coblentz, Walter 1977). However, boundaries will have to be drawn to limit the interaction between the health care system and the external or "environment" systems to make the planning process manageable according to the level of the process and prevailing policy.

Related to health planning is the growth of expenditure and resources allocated to the health sector. There has been a spiralling in the cost of health services in almost all countries and no matter how universal and desirable the health aspirations of any society may be, they have to be tempered by the economic possibilities and resource realities.

"There is a growing awareness that the ability of people to utilize health resources is almost limitless and yet there is a limit to the resources that can be devoted to health."
(WHO 1976)

In health care there is no ceiling on demand, and supply has the ability to create further demand and in this context the demand created by the health professionals adds appreciably to the cost of health care. This prompted the Director General of WHO to state that the major - and most expensive - part of medical technology as applied today appears to be more for the satisfaction of the health professionals than for the benefit of the consumers of health care (Mahler 1975).

Mahler (1980) further questions the wisdom of the use of high technology:

"Much of the admired technology is essentially "placebo" technology. I include in that category not only the prescription of many drugs currently in vogue but also the indiscriminate resort to coronary by-pass surgery, intensive care units, "life-support" systems, whole-body scanners and so on. In the name of "quality" medical care perhaps 80 per cent of the world's health resources are being applied to fewer than 10 per cent of the world's health problems."

There are certainly some similarities in the use of dental resources and technologies. In a symposium on dental public health and education it was revealed that 80% of the nearly 12000 dental manpower in India was in reality providing crown and bridgework for 20% per cent of the population of 650 million (Hobdell 1981).

The world economic situation has changed drastically for the worse since 1977 when "HFA 2000" was launched and as a result in many developing countries health budgets have been going down, not up. The prices of the primary products on which so many of these countries depend for their export earnings have fallen heavily, in addition to debts incurred when economic prospects seemed much brighter. This has limited the amount of foreign exchange which could be spared for imports, even of essential drugs and medical equipment. The rich countries themselves had their own struggle to balance their budgets and did not help the poorer countries enough, even when they could (Abel-Smith 1986).

Ultimately, it is society that has to decide on its objectives and priorities in health care and know when the law of diminishing returns becomes operative. Article four of the Declaration of Alma-Ata states that "the people have the right and duty to participate individually and collectively in the planning and

implementation of their health care."

With regard to health planning, a medical economist, Abel-Smith (1975), perhaps sensing the international economic recession, said encouragingly "There is nothing like the discipline of a limited budget for stimulating the discussion of imaginative alternatives to the status quo."

If the need for health planning was evident then, it is imperative now, especially for the developing countries.

Health planning requires a multidisciplinary approach to its task. It requires the use or participation of systems analysis, epidemiology, management, politics, administration, economics, information systems, research, the social sciences and more, in addition to the principally concerned health professional. Multidisciplinary understanding and sharing of common goals is vital to the success of health planning. Plans should be flexible resulting in alternative programmes to ensure successful interaction with the political process.

This background to planning and health planning with its approaches, concept and values applies to planning for oral health, its public delivery systems, the manpower required and their training and education.

The importance of relating health planning to the social, economic, environmental and political context - "networking" - is stressed. The importance of planning for oral health as part of total health to achieve integration and compatibility can not be overstressed.

Planning for oral health should strive for effectiveness that must be achieved with economy in the use of resources, for its priority in the overall development process and even in relation to other health problems cannot be perceived as high ranking.

In the weighing of criteria for deciding priorities among national health and health related problems, the commonest oral health problems may rank very low or not at all in a country as deduced by the author from a WHO (1976) Report on public dental health services.

At an individual level it may be also disturbing to note that even in a developed country like the Netherlands, university students judged the severity of dental problems below all other individual problems (Hoogstraten, Verhey 1986).

The suggestion is made that similar conditions could prevail in more countries under increasing economic hardships, in spite of the universality and commonality of oral health problems.

1.4 MANPOWER DEVELOPMENT

In planning for oral health, the planning for oral health services is the central issue and almost all countries have such a service in one form or another. However, the cognition that manpower (personnel) and their education should be an integral part of oral health planning has received little attention until recently.

The growth of oral health services in highly industrialized countries has been rapid in this century, responding mainly to a high prevalence and backlog of dental caries by treatment and rehabilitation. This demand controlled response is characterized by escalating costs, inequity in care and uncoordinated manpower development. In other words, the large and expensive oral health services have proved inadequate in meeting the oral health needs of all the people.

"Effective, integrated, planning which affects the whole population and adjusts for all major factors in the oral health or disease equation, exists nowhere. Instead, there is manpower planning in isolation, there is preventive planning in isolation, and there is either services planning in isolation or a market controlled supply and demand situation." (Barmes 1979b)

To gain a perspective of the oral health sub-system in relation to the health system in general one must consider the following:

- In highly industrialized countries oral health consumes from four to five per cent and up to 11% of all health expenditure (Barmes 1979b).
- As a rule, in Europe, oral health services represent the largest segment of the outpatient health services in any country (Kostlan 1979).

- The ratio of dentists/physicians is 1:4 in Europe, generally, 7:10 in Sweden, and 1:2 in Nordic countries (Kostlan 1979).

There is a lack of rationality and integration in most countries' oral health services, with no clearly defined goals and little evaluation.

"The need for planning, evaluating and replanning oral health services and manpower structures to meet carefully defined measurable goals and in harmony with overall health sector plans is now receiving recognition." (WHO 1980)

All countries, whatever their state of development, type of economy and level of oral health services need integrated, coordinated, rational oral health planning.

The activities and guidelines of WHO have largely reflected the development of this rational approach to oral health planning.

In 1965 an expert committee on dental health identified the following six phases in planning (WHO 1965):

- Collection of information
- Establishment of priorities
- Setting up of targets and objectives
- Consultation and coordination
- Drafting of the plan
- Periodic evaluation and adjustment of the plan.

In 1976 another WHO expert committee made up of new members, with the exception of one who was in the Secretariat of the last committee, divided the planning process "one of many that can be used to achieve the objective of facilitating the efficient and effective use of scarce resources to achieve pre-determined goals" into six steps:

- Situation analysis
- Problem identification and formulation of objectives
- Formulation and analysis of alternative strategies
- Identification of special efforts
- Strategy selection, and
- Programme formulation with provision for evaluation

(WHO 1976).

Manpower resources were identified in the first document as a major problem in the expansion of dental health services that requires primary attention to improve supply and their development and utilization warrants research.

The second report recommends that planning for dental health manpower should be an inseparable part of total oral health programme planning. In 1980 WHO's Planning Oral Health Services manual gave a practical approach that requires the following steps:

- (a) The collection of epidemiological and other relevant data for a "situation analysis".
- (b) The establishment of measurable goals for the oral health services, based on the data collected and taking into consideration all the resources available, public and private, manpower, facilities and funds.
- (c) The establishment of quantitative and qualitative manpower production goals linked with the oral health services goals.
- (d) The inclusion of an evaluation programme enabling the plan and the goals to be modified when appropriate.
- (e) A careful costing of the plan.

(WHO 1980)

This integrated, coordinated planning is promoted by WHO as its central strategy in the approach to global oral health and is based on five point programmes:

1. Preventive programmes, including health education.
2. Target group services, particularly school dental service.
3. Demand services for all non-target sectors.
4. Manpower production in amount and kind.
5. Monitoring and evaluation.

The manual provides prototype plans relevant to various situations in developing and developed countries (Barmes 1981b).

In the "situation analysis" the scope of the epidemiological data required depends on the level and detail of planning required. Data should be recent and divided into age-groups. If such data is not available, most planning situations can be satisfied by the use of WHO manual of "Basic Methods for Oral Health Surveys" (WHO 1977) and the "Guide to Oral Health Epidemiological Investigations" (WHO 1979), which includes the pathfinder survey methodology with minimum data requirements. Severe limitations of age-groups and a judicious selection of a few cities and rural areas can provide adequate data for planning from a survey of a mere 240-450 subjects per age-group or less in some situations (WHO 1980).

Planning for oral health should be divided into short, medium and long term phases with regular review and incorporated evaluation and monitoring of oral disease prevalence, manpower availability, use of services, economic resources and other relevant factors (Renson 1985).

The manpower of any country should be its most precious resource. The term itself currently in vogue, includes women too, who might even exceed men in the overall labour force or working populations like in some African countries; or in dentistry as in some European countries. Whatever other resources may exist in a country, without a trained manpower their exploitation and use can be severely compromised and so can the development of that country.

Trained manpower is particularly important in the health sector which employs a large and growing share. Mechanization and automation which greatly reduced the need for previous numbers working in other sectors like agriculture and industry have mainly passed the health sector so far.

As used by WHO the term health manpower includes:

1. Those health workers already working in the field of health services.
2. Potential health workers, i.e., those who have the requisite training or experience to engage in a particular health occupation but are not at present doing so; and
3. Prospective health workers, i.e., those who are receiving the education and training that will prepare them for employment in the health sector (Hall, Mejia 1978).

Health manpower development is a subsystem of health services development. Its scope includes all the institutions and activities concerned with its three major subsystem components. These are:

- (a) health manpower planning;
- (b) health manpower production;
- (c) health manpower management

(Hall, Mejia 1978).

The interrelationships between the health, manpower and education systems is shown in Figure 6 (WHO 1985). The scope of these three components involves a hierarchical series of targets, activities, strategies, objectives and goals, all interacting to satisfy the general aim of ensuring the manpower needed by the health care delivery system. The scope of the health manpower development process is summarized in Table 1.

There is frequent absence of well conceived health manpower systems in many countries with frequent lack of integration or even coordination between its three main elements. The planning - if it occurs - is not taken into account by training and educational institutions; there is no monitoring of health workers activities, necessary for health manpower planning and training adjustment; there is a lack of coordination between the whole manpower system and other relevant systems like general education, labour, agriculture and social security (Fülop 1980).

"Health manpower planning is a process whereby health manpower development, goals, objectives, priorities and activities are established systematically in order to ensure that current and future health manpower resources meet adequately the requirements for health delivery services to a population. It consists not merely in projecting the number of personnel required, but also in planning to provide properly designed health services with the quality and quantity of the personnel they need." (Hall, Mejia 1978)

Health manpower production is concerned with all aspects related to the basic and post basic education and training of the health labour force. Mostly under the control of the education system, it is of central importance to the health manpower development process (Hall, Mejia 1978).

"A health manpower management system consists of a set of administrative structures, procedures and processes which can be termed the elements of such a system. These elements, both individually and through their relationship with one another, provide mechanisms for the employment, retention,

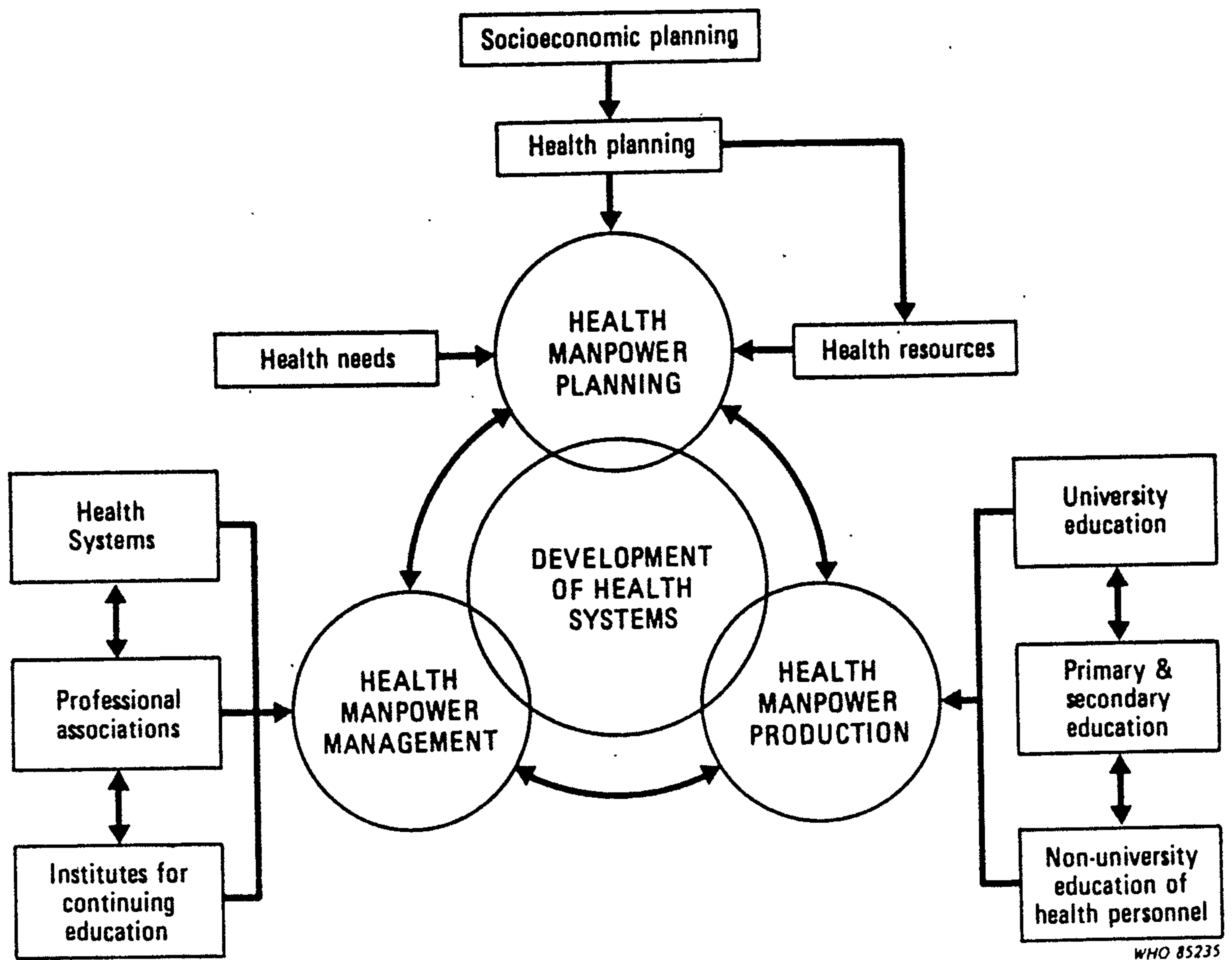


Figure 6. Interrelationships in health systems and manpower development and some of the national bodies involved

(Source: WHO 1985, TRS No. 717)

Table 1. The scope of the health manpower process

Overall aim		To ensure the manpower needed by the health care delivery system		
		Health manpower planning	Health manpower production	Health manpower management
Goal		To provide the framework within which the health manpower process takes place	To provide the manpower required	To optimize the use of health manpower
Objective		To specify the number of teams and the composition needed to improve the level of health: up to a proposed level	To produce x people of y types	To determine manpower distribution and productivity standards, patterns of utilization, and non-labour inputs
Strategy		Regional (subnational) planning and local programming Health manpower project formulation Aggregation, reconciliation, and consolidation	Educational planning and programming educational objectives and teaching methods	Reorganization — regionalization — integration of prevention and cure — country health programming; primary health care — health manpower project management
Activities		Planning and programming Coordinating Monitoring and evaluating implementation Research and development	Recruitment campaign Definition of admission procedures and syllabus Definition of teaching methods Evaluation of process and products	Establishment and implementation of — supervision system — referral system — continuing education — recruitment and selection procedures — career development schemes — deployment of manpower — staffing patterns
Targets		x health teams of y composition in operation by time t	x trained personnel of y type by time t	x units of service of specified quality delivered to defined population — coverage

(Source: Hall, Mejia 1978)

support and development of health personnel."

(WHO, 1985)

Table 2 shows some of the key elements of this management system. Fuller consideration of these elements and their detailed interaction awaits an Expert Committee on health manpower management systems to be convened by WHO (WHO 1985).

The management of health manpower is part of the management process of the health services system as a whole, using health personnel effectively and efficiently.

"Without proper management of health manpower, expensively trained health personnel are wasted. There is little value in training health personnel at great expense if, when their training is completed, they either leave the country, are poorly deployed, receive inadequate logistic and service support, or, as a consequence of the lack of a system of continuing education or career development, they quickly lose their commitment and motivation." (WHO 1985)

Analysing the trends in global health manpower development over three decades - 1948-1980 - Fulop and Raemer (WHO 1985) identified eight health manpower objectives that have been pursued over that period. These are tabulated in the order of their appearance in Table 3. The early preoccupation with numbers or quantity of health manpower was joined by that of quality, credentials equality and so on. The key concept of integrated health systems and manpower development was introduced by WHO in 1976 (WHO 1985).

Oral/health planning results in programmes that require a certain number, type and mix of trained personnel to carry them out over a certain period. If the manpower requirements are not integrated in the planning process, the results could be deficiencies, excesses, or absence of what is needed. These problems are not unknown in the oral/health services and the wastage of resources, including human, can be enormous and crippling to these services. The

Table 2. Some of the key elements of health manpower management

Main objective	Elements
Employing	Job descriptions Establishment controls Recruitment procedures Personnel records and data base Induction Distribution of personnel Utilization of support staff
Retaining	Career structures Promotion procedures Living and working conditions Pay and incentives
Supporting	Supervision Communications and consultation Collective representation Continuing education (updating of skills), Logistic support
Developing	Performance appraisal Continuing education (new skills)

(Source: WHO 1985, TRS No. 717)

Table 3. Health manpower policy objectives: approximate evolution in WHO from 1948 to 1980, by time-period and degree of importance

Objectives	Period I 1948-51	Period II 1952-61	Period III 1962-72	Period IV 1973-80
Quantity of conventional personnel	xxx	xxx	xx	x
High quality of medical and nursing education	xx	xxx	xx	
Equality of credentials cross-nationally		xx	x	
Geographical coverage in countries		xx	xxx	xxx
Efficiency of production and use of health personnel		x	xx	xxx
Planning of health manpower			xx	xxx
Relevance of health personnel		x	xx	xxx
Integration of the development of health systems and manpower			x	xxx

*The appropriate degrees of importance are indicated in the various columns, from little importance (x) to very important (xxx).

(Source: WHO 1985, TRS No. 717)

programmes will also be unlikely to achieve their objectives.

Planning also addresses the priority oral/health needs of society and unless these are reflected in the curricula taught, to influence the skills and quality of manpower produced, many of these needs could remain largely unattended.

The problem of migration and immigration of health manpower has been of national and international concern. This is reflected in the various recommendations and resolutions of the UN, several of its specialized agencies, the World Health Assembly and the regional committees of WHO. The UN alone since 1965 had adopted six resolutions concerning the outflow of highly trained manpower from developing to developed countries (Hall, Mejia 1978).

A study by WHO found that although there was migration within developed and developing countries, the main movement of skilled health personnel is from developing to developed countries. Whereas the migration of other skilled workers has slowed down, that of health manpower was increasing, giving rise to considerable anxiety and concern (Fulop 1977).

The problem of health manpower migration represents misdirected or lack of health manpower development which has already resulted in some disturbing anomalies as shown by the WHO study.

In certain countries at least half of the graduating classes emigrate immediately upon qualification; an extreme example being that of the Chiangmai Medical School in Thailand, where the entire first class of medical graduates chartered a plane to emigrate.

The number of physicians who have emigrated from the Philippines was equivalent to two thirds of the total stock of physicians of that country.

In Iran the proportion was one third. In Syria it was 40%. In Haiti the number of those who have emigrated was greater than the total stock in the country (Fulop 1977).

In the case of migrating physicians to the US during the period 1970-1973, that country would have needed 57 more medical schools to provide the gained number of physicians. The dollar value of this foreign aid to the US was already in 1967 equal to the total cost of all the health care assistance provided by the nation, public and private, to all foreign nations (Hal, Mejia 1978).

For several donor countries, the financial loss largely exceeds their national health budget and it would take eight selected countries at least five years each to replace their physicians abroad in 1970-1971. Conversely, it would take the recipient countries: Canada, UK and USA, seven years at least each to replace the immigrant physicians by those trained at home (Hall, Mejia 1978).

Failures in one or more of the health manpower management components and in their integration with the health care system has led to the paradox of developing countries exporting, what has become an international commodity, in the shape of health manpower, at a great expense to themselves and at a time when their health needs far exceed those of the recipient developed countries.

"Data from the United States indicate that a disproportionate number of FMG's (foreign medical graduates) go into teaching and research. This suggests that the flow is selective and that the donor countries may be losing their future educators, not only in the medical schools but also at the level of schools for teaching primary health workers." (Hall, Mejia 1978)

Significantly, the whole problem of health manpower migration goes back to the problem of development.

"In short, the main factor influencing migration, within and outside the health systems of both the donor and the recipient countries, is the international problem of unequal economic and social development." (Hall, Mejia 1978).

Planners for health manpower must choose the method of estimating requirements from essentially four approaches. These four main methods, represented schematically in Figure 7 (Hall, Mejia 1978) are based on manpower/population ratios, health demands, service targets and health needs. The first is the simplest method converting people into manpower directly - a reason for its popular use. The other three are converted in a series of steps before arriving at the required manpower estimate. A planner may choose to base his estimates primarily on one method, but will inevitably be using elements of the other methods due to their considerable overlap. Even the manpower/population method must take into account some notion of the major needs and demands for services and of the ability to pay for and provide them (Hornby et al. 1980).

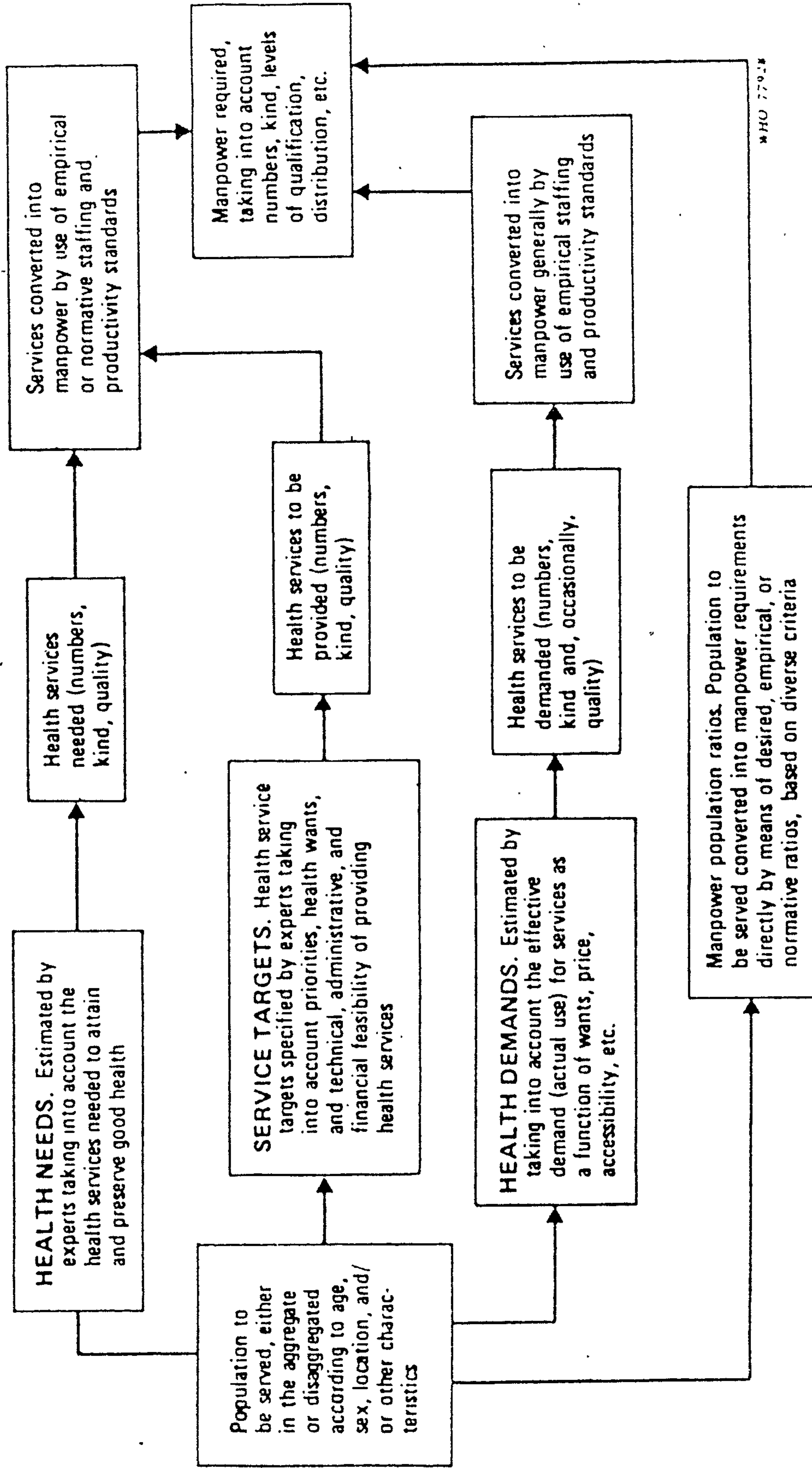
The potential advantages and disadvantages of these four approaches as well as their indications for use are shown in Table 4 (Hall, Mejia 1978).

Manpower planning generally is perhaps the most taxing of all the planning endeavours. As a process it consists of projecting future requirements and supply and rectifying the imbalance by production.

"In spite of much work in the 1960's, nearly all the manpower forecasting - whether in developing or developed countries, restricted sectorally or covering all occupations - has proved to be a failure both conceptually and as judged by the test of time." (Hall, Mejia 1978)

Needless to say, health manpower planning is no exception and as it deals, not only with humans but also with human nature - controlling demand for health services - it may be facing an even more formidable task.

Figure 7. SCHEMATIC REPRESENTATION OF FOUR METHODS OF ESTIMATING MANPOWER REQUIREMENTS



(Source: Hall, Mejia 1978)

Table 4. Advantages and disadvantages of and indications for the four principal methods used to estimate manpower requirements

Potential advantages	Potential disadvantages	Indications
— Appealing and comprehensible logic — Consistent with ethic of providing services based on need and not social or economic conditions — Facilitates study of productivity, utilization, staffing ratios, etc., since the emphasis is on the production of services and not of manpower — Encourages evaluation of health technology — Encourages allocation of resources where they will have the greatest effect — Promotes concern about quality of care — Facilitates cost estimation — Facilitates health team planning	<i>Health needs</i> — Complicated, costly, and requires extensive and detailed data — May encourage excessively detailed planning — Standard-setting frequently complicated by lack of consensus on optimum care and on health effects of care — Likely to result in projected service requirements well in excess of country's ability to provide them and/or in excess of consumer willingness to use them — Tends to be based on physician model for health services delivery	— Especially applicable to countries with: Sophisticated data systems, survey capabilities, and planning expertise — Relatively adequate health services delivery system — Active government policy towards delivery of services — Dominant public sector with relatively strong control over manpower and delivery of services — Relatively high level of public awareness and knowledge about health matters — Particularly applicable to preventive, public health, and specific health programmes (tuberculosis, yaws) based on well established technology, even in developing countries lacking the statistical expertise noted above
— Facilitates disaggregation of components of demand with most suitable method being used for each one — Facilitates study of productivity, utilization, staffing ratios, etc., since the emphasis is on the production of services and not of manpower — Usually easy to interpret the planning rationale to others — Facilitates cost estimation — Readily usable with other planning methods — Facilitates health team planning — Facilitates demand model revision as new information becomes available — Requires only modest data and planning capabilities, though amenable to more sophisticated techniques	<i>Service targets</i> — Standard-setting liable to be based more on desires than reality — May encourage excessively detailed planning, especially for components of demand not subject to much control	— Especially applicable to countries with: Dominant public sector with relatively strong control over manpower and the delivery of services — Active government policy towards delivery of services — Although useful for both preventive and curative services, more used for the former

Health demands

— Facilitates understanding of the dynamics and determinants of demand — Allows disaggregation of the various components of demand — Tends to produce economically realistic projections — Probably results in a good estimate of the minimum growth in demand likely to occur and ensures that the level of future satisfaction at least equals that of the present — Some variants of this approach are quite simple — May provide useful information for comparing the economic returns from training in health occupations with those in other fields	— Some variants require sophisticated data and can be very complicated and costly to carry out — May neglect political and societal reasons for improving health services distribution and delivery — Does not necessarily take into account the quality of services or their relevance to the health problems of the country — Some methods neglect consideration of ways to improve manpower productivity — May be difficult to interpret rationale and results to health authorities and the public — May perpetuate inequalities in the access to care	— Especially applicable to countries with: Dominant private sector (or for private sector planning) Passive government attitude towards delivery of services Relatively minor imbalances in the provision of services to different segments of the population

Manpower/population ratios

— Easy to use and interpret to others — Data requirements usually modest and data relatively insensitive to errors within the validity of the underlying assumptions — If current health situation is reasonably satisfactory, maintenance of the <i>status quo</i> is a defensible policy — Useful for providing baseline projections of the different kinds of manpower required to maintain the current situation — When ratio is end-result of application of another, more precise, method, can be useful short cut for short-range and intermediate-range planning	— Easy to select unrealistic ratios — Generally used with single occupational categories, thus discouraging examination of the adequacy of the manpower mix — Relatively difficult to estimate costs — Some methods of selecting target ratios will inevitably show a manpower shortage — Provides little insight into the dynamics and determinants of demand — With the primary emphasis on manpower, planners may neglect the potential for improving productivity, distribution, utilization, relevance of services, etc.	— Especially applicable to countries with: Reasonably adequate health conditions and health delivery systems A relatively stable health sector Limited planning resources Either an active or a passive approach towards the delivery of services Either public or private sector dominance Reasonably comparable international models to pattern their health care system on

(Source: Hall, Mejia 1978)

"In the United States six different projections of physician requirements and supplied for 1975 yielded estimates ranging from a deficit of 65 000 to a surplus of 21 700."
(Hall, Mejia 1978)

Health manpower planning can engender great differences or even animosities between the educators and the professions and also between the professional categories themselves. The oral health situation, worldwide, with rapidly changing needs and uncertain demands makes dentistry particularly sensitive to the manpower supply issue. Decreasing dentists' "busyness" due to the plummeting share of dental caries repair in dental practice in some highly industrialized communities may entice internecine behaviour amongst its professional dental groups. Signs of this are already evident in dealings with the dental auxiliaries category (Kirby 1984) and they are frequently the first to be sacrificed (Bohannan 1982). The prospects for some developing countries, with steep increases in dental caries prevalence are even graver, with projected manpower supply requirements far exceeding resources.

Dentistry, however, offers a particularly suitable field for testing manpower planning methodologies. It is more circumscribed in the oral health care delivery sites, relative numbers; personnel categories; the range of oral health conditions and offers more precise epidemiological measures of oral health status and treatment needs than those obtainable for medical conditions (De Friesse 1982).

The planning component of the health manpower development process is the integrating element joining the larger health planning and through it, the national planning for socio-economic development. It should also be integrated with the health manpower education planning which is the least developed of all the planning processes, although the production component - education and training - is

not only an integral part of the health manpower development process but also the base upon which the whole oral/health services system is built. Figure 8, modified by the author from Hall and Mejia (1978), shows where educational planning and health manpower educational planning fit in the "space" already there.

One could easily complicate the picture by suggesting that personnel education could have its own divisional components of planning, production and management. However, that is hardly warranted as the aim is to assure greater integration within the health system between health services, manpower and their education.

The health manpower can be found in only two places:

- (a) in training and educational institutions with some contribution to the health services, and
- (b) working in the health services whilst possibly undertaking some form of continuing education and/or training.

In spite of this close physical interaction, there is a great divide between the health services and health personnel education. The main reasons pertain to their separate development in the traditionally independent health and education sectors. Furthermore, the health personnel education is usually the task of the universities and colleges which are mainly autonomous and also independent of each other.

This independence is reflected in numbers and types of health personnel produced, selection criteria and curricula. All this may proceed without sufficient regard for health personnel employment, future tasks and duties or relevance to health services requirements and the health needs of society.

THE HEALTH MANPOWER SYSTEM

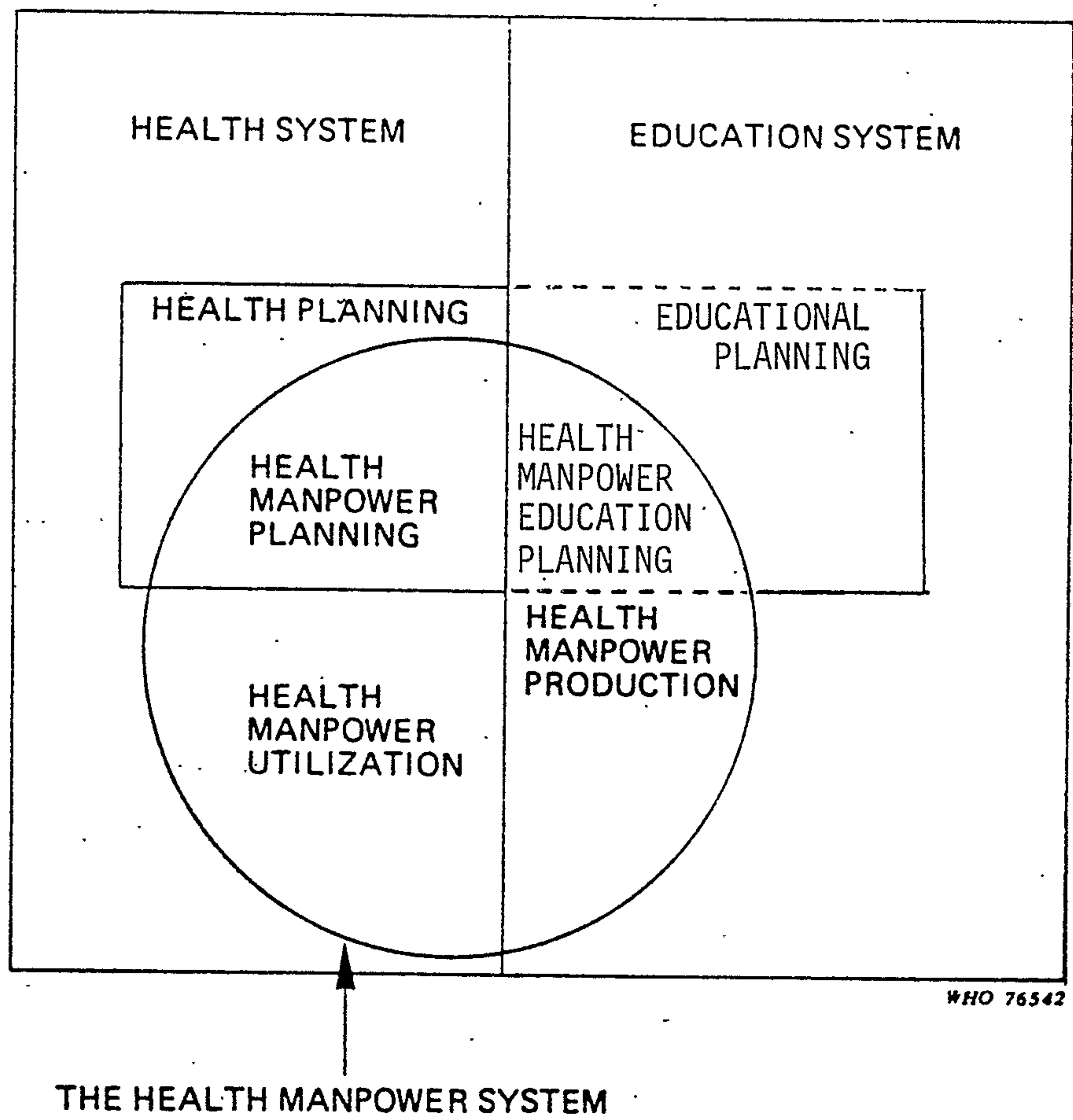


Figure 8. The health manpower system

(Source: Hall, Mejia 1978)

Universities, especially, are cumbersome institutions as they cater for the education and ~~training~~ of many other professions and disciplines besides those for the health professions. They are not unknown for their intransigence and resistance to change earning themselves the vista of "ivory towers".

These reasons have, perhaps, been instrumental in the emergence of "health universities" and "health sciences centres" which can operate more freely and undertake trends, innovations, and experiments seeking to meet the challenge for health personnel education - the health needs of society.

Assuming there is already health planning and manpower planning, the situation becomes much easier, as their goals and objectives can guide health personnel education planners and give them guidance in their task. Only then are their efforts likely to be coordinated and convergent.

As most countries have a system of health planning or programming, educational planning can support or even initiate health manpower development for it almost completely forms its production component. Hall and Mejia (1978) admit that health manpower planners have neither the competence nor the need to supervise health manpower production directly, but should give guidance to the education system in control of production. In effect, the production is rationally subcontracted to an authority of greater competence.

The operation of production or education of the health professions is thus a joint responsibility of the health care system and systems for educating the health professions. A Group of Experts (OECD 1975) in a study of the problems and processes of the health care/education interaction with the view of a partnership oriented

towards the future states:

"We reject the notion of an educational enterprise slavishly subservient to current health care practices. Equally, we reject the notion of an educational enterprise pursuing its own aims independently of the needs of society and of health care systems."

Morris (1976) warned that the future of health sciences education must not be allowed to unfold by chance.

The same pressures from society, the health professions and governments that call for a more rational health system also operate on the systems for educating the health professions. In fact, quite often, whenever problems arise at the health care services, an accusing finger is pointed at the education system. This calls for the use of a systematic approach to the planning of health personnel education using the same principles of planning described previously.

The levels of health educational planning can be at the national, regional or institutional level. Health educational institutions do not have to await an organized and formal health planning/educational planning system. The often criticized autonomy can be turned to active efforts in relating their programmes more closely to the needs of its consumers.

Many health institutions are showing the initiative that attempts to meet health needs, in industrialized and developing countries, in established and new institutions. Their innovative programmes embody the various principles of primary health care to varying degrees. A collection of case studies of some programmes edited by Katz (1980) for WHO shows a preoccupation with relevance. The programmes attempt in their design to meet the often unique health requirements of a community in the confines of their political and socio-economic setting. Here are some of these programmes with

some of their prominent features:

- Competencies include responsibility for improving sanitation, water supply and other preventive measures at Tribhuvan University, Nepal. Community involvement and control at Novisad, Yugoslavia and Kupio, Finland.
- Programme built on a specific and explicitly focus on health services of the country in the case of South Yemen.
- Responsibility for health care of part of Mexico City with a population of two million, Xochimilco, Mexico.
- Provision of health manpower for a whole region provided by the Institute of Health Sciences, Talcoban, the Philippines, and where the programme director is also the Regional Director of Health.
- Explicit learning objectives for community care as well as individuals; preventive and promotive action for health in addition to the traditional curative role and where the socio-cultural and economic factors influenced educational planning at a new medical school in Newcastle, Australia.

(Katz 1980)

There are a number of difficulties that can face educational planning at the institutional level. Some are related to the legally regulated administrative policies, structures and practices of educational systems and institutes. More important perhaps is the scarcity of skilled educational planners calling for a major effort in training teachers in planning skills and in managing the teaching/learning process (OECD 1975).

At the institutional level it is desirable to have a formal educational planning unit where all with educational responsibilities can play specific parts (OECD 1975). The institution is responsible

for designing the learning experiences and a systematic approach to curriculum design implies the use of the planning process which can also be applied to a course or programme.

There are a number of examples of health educational planning at the national level. In Algeria educational planning for public health personnel became the responsibility of the National Institute of Public Health which was also responsible for health planning and so ensuring that educational planning did not become an isolated activity as representation at the Institute includes the basic health services; the Ministry of Health, primary, secondary and higher education; paramedical education; and the consumers of health services. This Algerian experience in association with WHO is an attempt to coordinate educational planning with country programming for health. In Sweden, integration of educational and health manpower planning was well advanced. In the UK the reorganization of the National Health Service in 1974 provides for interaction of the health and educational systems, particularly at the regional level.

In the USSR, educational planning for health personnel was undertaken by a planning unit at the Ministry of Health and the planning of higher education in general was a function of the Ministry of Higher Education (OECD Europe 1975).

In planning for oral/health services, manpower and education a wider participation by the health professionals is necessary and an active community involvement in the planning processes desirable. The health professionals are expected to carry out the plans and programmes and the more their participation, the more the chances of success. The consumers have the final say by showing their degree of acceptance necessary for achieving the goals and objectives of any plan or programme.

The dental profession, especially, has a critical role to play in the relevant planning processes and their attitude can aid or hinder enormously any action related to oral health. Bezroukov (1979) advocates that the dental profession should play amore active role in the policy of the planning of dental manpower and oral health services, as well as the training and educational programmes appropriate for those plans.

1.5 ORAL HEALTH

To appreciate the levels of oral disease and the changes which occur in the oral health status in any particular situation and at a global level, there is a need for useful, widely applicable oral health survey strategy and methodology. To respond to oral health problems, first there needs to be good appreciation of the level of these problems. To plan, monitor and evaluate, there is further need to appreciate the changes and trends in oral health. A clear appreciation of these situations is provided by the use of epidemiology. The use of epidemiology has extended in dentistry from the earlier work on fluoride, its mottling effects and caries; and later from research work - also mainly relating fluoride and caries.

Earlier, the responses to impressions of problems and later exhaustive - and expensive - national oral health surveys were inadequate or prohibitive. In 1960 the Interdepartmental Committee on Nutrition for National Defence's (ICNND) studies of Russell (1963) used a simplified and inexpensive national oral health survey, but still lacked adequate precision to identify disease variations within the population or to make comparisons between countries. The studies, however, indicated that periodontal disease was more prevalent than dental caries in developing countries.

The present day epidemiological measurement methods, for example, in dental caries, are perhaps unsurpassed in the field of health epidemiology (Barmes 1979a). WHO has concerned itself with oral epidemiology since 1966. An epidemiology which without being too expensive can be used to define the global oral health problem and act as a base for broadly applicable sound decisions (Barmes 1979a).

WHO's methodology development and promotion of essential surveys from which a global picture of the main oral diseases could be constructed resulted in a publication Oral Health Surveys Manual (WHO 1971) which contained a single basic form and a small selection of supplementary indices which was all that could be achieved at that time. Recognition of oral epidemiological needs worldwide produced further publications:

- (a) Oral Health Surveys (WHO 1977); this second edition of the manual provides for two main types of survey methodology.
- (b) Guide to Oral Health Epidemiological Investigations (WHO 1979) a companion manual to the Oral Health Surveys, containing supplemental methods, criteria and record formats for the assessment of a variety of oral disease conditions.

WHO has been collecting a considerable amount of epidemiological data in a Global Data Bank in Geneva, enabling the Oral Health Unit to monitor oral health on a wide scale since 1969.

The global status and trends of oral diseases are monitored as an important output of WHO's Oral Health Programme on maps and tables that change every six to twelve months with the entering of new data (Barmes 1979b). Within a few years the Data Bank enabled Barmes (1977) to recognize two different profiles for oral diseases worldwide. For dental caries and periodontal diseases in the technically advanced nations, ranged from moderate to very high and were apparently stable. In the profile for developing countries, the traditionally low to very low prevalence levels of dental caries were showing a definite trend towards an increase - that even then were approaching the moderate level.

The increases were most obvious where urbanization was proceeding rapidly. The periodontal disease levels appeared to be as high or higher than in the developed countries.

Later Barmes (1979a) noted that although there was still a number of countries with no data and the information about periodontal diseases still sparse, the main changes were for dental caries in the group of highly developed countries, showing a stable prevalence but considerable decreases where fluoridation of water supplies and other fluoride methods were used by members of that group. By contrast, the developing countries were showing a dramatic increase in dental caries. Even where there was no substantial evidence to that increase, the indications of the initiation of the trend and the changing habits conducive to it were there.

"As for periodontal disease, there were sharp contrasts in the intensity of the disease with a tendency towards lower levels in highly industrialized populations than in developing countries". (Barmes 1979b)

Caries prevalence data built on the number of decayed missing and filled teeth (DMFT) at 12 years of age are the most available at the Data Bank and its attributes made it the first Global Goal Indicator for Oral Health to be developed and set at an average of 3.

Information from the Data Bank as of March 1983 confirms the two major trends in oral health status:

- improvement for most of the highly industrialized countries (Table 5.1)
- deterioration for most of the developing countries (Table 5.2).

The previously reported increase in caries prevalence in developing countries is continuing, especially in urban populations (Table 5.3). There are documented decreases in dental caries prevalence in large

Table 5. Changes in oral health status in some countries

Table 5.1 Caries prevalence trends in highly industrialized countries

Country	DMF teeth at 12 years			
	Highest		Lowest	
	Index	Year	Index	Year
Australia	9.3	1956	2.1	1982
Canada	7.4	1958-60	2.9	1979
			(13-14 years)	
Finland	7.5	1975	4.0	1981
Japan	5.9	1975	2.0	1979
New Zealand	10.7	1973	3.3	1982
Norway	12.0	1940	4.5	1979
Sweden	7.8	1937	3.4	1979
Switzerland	9.6	1961-63	1.7	1980
USA	7.6	1946	2.0	1980

Source: WHO global oral data bank

Table 5.2 Caries prevalence trends in developing countries or territories

Country/territory	DMF teeth at 12 years			
	Lowest		Highest	
	Index	Year	Index	Year
Chile	2.8	1960	6.3	1978
Ethiopia	0.2	1958	1.5	1975
French Polynesia	6.5	1966	10.7	1977
Iran (Islamic Republic of)	2.4	1974	4.9	1976
Israel	2.4	1966	3.7	1976
Jordan	0.2	1962	2.7	1981
Lebanon	1.2	1961	3.6	1974
Mexico	2.7	1972	5.3	1976
Morocco	2.6	1970	4.5	1980
Philippines	1.4	1967-68	2.9	1981
Thailand	0.4	1960	2.7	1977
Uganda	0.4	1966	1.5	1982
Zaire	0.1	1971	2.3	1982

Source: WHO global oral data bank.

Table 5.3 Caries prevalence in urban and rural areas in developing countries/territories

Country/territory	Year	DMF teeth at 12 years	
		Rural	Urban
Burma	1982	0.8	3.1
Cameroon	1982	1.4	1.8
China	1981	0.6	1.9
Jordan	1981	2.2	3.4
Morocco	1982	2.5	4.3
Oman	1978	0.7	2.5
Saudi Arabia	1979	1.3	2.2
Somalia	1979	0.3	1.5
Sudan	1979	0.4	1.4
Syrian Arab Republic	1980	1.3	3.4
Thailand	1977	1.6	3.0
United Arab Emirates	1981	1.2	2.6

Source: WHO global oral data bank

Table 5.4 Community Periodontal Index of Treatment Needs (CPITN)

Country/territory	Year	Age 15/15-19 years		Age 35/35-44 years	
		Sextants with calculus	Sextants with pocketing	Sextants with calculus	Sextants with pocketing
Bangladesh	1981	3.4	5.7	1.2	1.2
China	1981	35	-	-	-
France	1982	0.1	1.4	0	0
Italy	1982	2.8	-	-	-
Morocco	1982	1.9	-	-	-
New Zealand	1981	2.0	-	-	-
Nigeria	1983	4.0	5.9	4.7	4.7
Norway	1982	0.8	-	-	-
Philippines	1982	2.7	4.4	0.0	0.0
Republic of Korea	1982	3.6	4.7	0.3	0.3
Samoa	1982	4.0	5.7	0.7	0.7
Sweden	1982	3.0	-	-	-
Syrian Arab Republic	1982	1.6	-	-	-
Tonga	1982	3.7	5.5	1.4	1.4

Source: WHO global oral data bank.

(Source: WHO 1984, TRS No. 713)

areas of several industrialized communities while the prevalence of periodontal disease may be falling to moderate or even low levels (WHO 1984). "Moreover, the decrease appears to be continuing to levels well below expectations in a number of these countries" (Renson 1984), q.v. Table 6.

Although the rapid decline of dental caries in many industrialized communities has been greeted with delight, especially among those who worked hard to that end - mainly in public dental health - the main reaction among some others seems to be one of bewilderment. However, both groups can rightly ask if this trend will continue to decelerate, stop or even be reversed. Bulman (1984) notes: "Nor is it clear whether we are experiencing a transient or permanent, a local or general improvement." The continuation of the trend of increasing caries prevalence in developing countries is also uncertain. Figure 9 indicates that possibility and shows that some developing countries have reached the 3 DMFT figure for 12 year olds and Tables 5.2 and 5.3 show the figure has been exceeded in countries like Lebanon and Morocco and in urban populations of countries like Jordan and Syria.

The increasing use of WHO's CPITN is accumulating data regarding periodontal disease and beginning to provide a global picture. Table 5.4 presents data on periodontal conditions for different populations in both developing and developed countries (WHO 1984). The major contrast relates generally to low or moderate levels of periodontal disease - bleeding or calculus - in industrialized countries and high levels in developing countries. This emerging global picture is consistent with the observations on different oral hygiene practices (Renson 1985).

Table 6. Dental caries levels at 12 years

Country (1)	DMFT DATE DMFT DATE DMFT DATE						% Decrease (-) Increase (+) col 4-col 2 col 6-col 4			col 6 (9)
	(2)	(3)	(4)	(5)	(6)	(7)	col 4 (8)			
Hong Kong	1.8*	80	2.0	68	4.3	60	-10.0	-53.5	(Medical & Health Dept., Hong Kong, 1960; Wong, 1980; Law, 1982)	
Thailand	2.7	77	0.9	60			+200.0	—	(Harris, 1961; National Pathfinder Survey, 1977)	
USA	2.6	80	3.8	74			-31.6	—	(US Dept. Health & Human Services, 1981)	
Australia	2.8	83	4.8	75	9.3	56	-41.7	-48.4	(Barnard, 1956; Carr, 1982)	
Singapore	2.8	79	3.0	70	5.4	64	-6.7	-44.4	(Cadell, 1965; Goh et al., 1972; Min. of Health Singapore, 1984)	
Nigeria	2.9	73	1.2	65			+141.7	—	(Henshaw, 1975; Nutrition Survey, ICNND, 1965)	
United Kingdom	3.0	83	4.7	73			-36.2	—	(Todd, 1973; Todd & Dodd, 1983)	
New Zealand	3.3	83	9.0	73			-63.3	—	(Information from NZ Dept. of Health, 1973; de Liefde & Ritchie, 1984)	
France	3.4	82	3.5	75			no change	—	(Sitbon, 1976; Cahen et al., 1982)	
Sweden	3.4	82	4.8	72	6.2	67	-29.2	-22.5	(Petterson, 1967; Faharsman, 1972; Bohlin, 1982)	
Netherlands	3.9	82	7.5	73			-48.0	—	(Kalsbeek, 1982)	
Ireland	3.9	80	8.0	61			-51.2	—	(O'Mullane, 1982)	
Finland	4.1	82	6.9	75	10.0	56	-40.6	-31.0	(Haataja et al., 1956-7; Tala, 1983)	
Norway	4.4	82	7.4	78	10.1	71	-40.5	-26.7	(Directorate of Health Norway, 1982; Von der Fehr, 1982; Rotoland, 1978)	
Denmark	4.7	81	6.3	78			-25.4	—	(National Board of Health, Denmark, 1979; 1982)	
Colombia	4.8	80	7.1	65			-32.4	—	(Mejia Villa et al., 1971; Moncado & Herazo, 1983)	
Japan	5.9	80	5.9	75	2.8	57	no change	+110.7	(Ministry of Health Japan, 1957; 1975; 1981)	
Brazil	7.2	80	7.2	75			no change	—	(Moreira, 1977; Pinto, 1982)	

* Preliminary, unofficial data for year 1980.

N.B. The percentage change shown in column 9 is only the change between the dates given in columns 7 and 5, whereas the data in column 8 are for the changes between the dates given in column 3 and 5. Care must be taken not to compare these two changes as if they were calculated on the same basis for the overall change thus:

(a) Australia—overall change 1956 to 1983 was -69.9%, of which the change between 1975 and 1983 contributed -21.5%.

(b) Finland—overall change 1956 to 1982 was -59.0% of which the change between 1975 and 1982 was -28.0%.

(Source: Renson 1985)

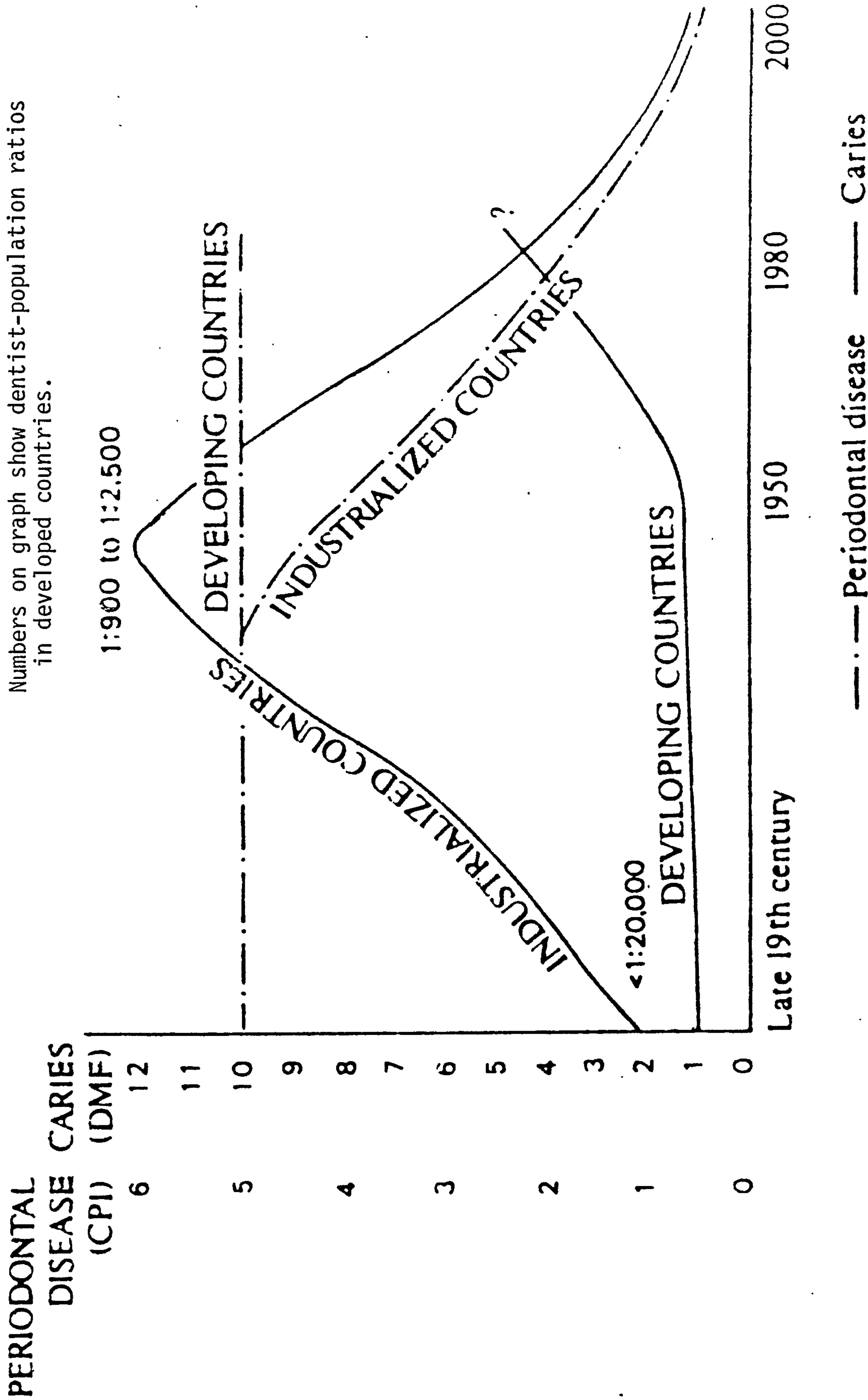


Figure 9. Oral health trends using data for children aged 12 years. Prepared by WHO in 1983. (Source: Renson 1984)

There are great difficulties in trying to detect trends in oral disease changes without the availability of the necessary data. Scarcity of data required Burt (1978) to examine tooth retention as a measure of oral health in an attempt to find reasons for any changes in dental health status over 50-100 years. Although he concluded that during that period tooth retention in industrialized nations has increased and that in the developing countries, the prevalence of dental caries was showing an ominous increase, he also concluded that "the prevalence of dental caries has not declined during the last 50 years, although there may be the beginnings of a downward trend in recent years. As yet, it is too early to tell if these recent data represent a real change in caries prevalence."

This underlines the importance of WHO's oral health Data Bank, as the experiences of a number of countries could alert others of similar conditions. Such monitoring is, of course, dependent on the input of data from all countries using the necessary frequent and unified survey and reporting methodologies. It is also necessary to collaborate further in the development and refinement of new and present indices for measurement of oral health status. It can be said that perhaps dentistry is blessed with its narrow range of main afflictions to oral health in spite of the fact that WHO's 'International Classification of Diseases - Application to Dentistry and Stomatology' lists more than 1 000 diseases and conditions!

In 1982 the first international conference on the declining prevalence of dental caries held by the International Association of Dental Research (Glass 1982) had the evidence of the decline assembled from about eight developed countries. In evaluating the evidence, Alman (1982) concluded that the composite picture represented an appreciable reduction in dental caries among children of the order of 30-50% over a period of time much less than one

generation - roughly the decade of the seventies. Also, that the combined weight of evidence concerning this real decrease was underlined by the rapid spread of fluoride availability in the preceding 10-20 years. The conference also considered the future impact of the decline in caries prevalence on dental practice, education and research.

As to what factor or factors contributed to the explanation of such a decline, a number of hypotheses have been offered. They include water fluoridation; fluoride supplements; fluoride dentifrices; expansion of available dental resources; increasing dental awareness; dental practitioners' preventive approach; dietary modifications; changes in diagnostic criteria; widespread use of antibiotics and herd immunity (Renson 1985). Bohannon (1982) warns that there is a price to pay for not knowing the answers, as accurate projection of the decline curve becomes uncertain and that recommendations for immediate sweeping changes in dental education becomes less convincing.

Whatever factors are involved in this decline, there is enough evidence of the benefits of present preventive measures and continued dental research could lead to near total eradication of dental caries (Glass 1982). Konig (1982) notes that in nearly all highly developed countries, dental caries, as a major health problem, will remain beyond the year 2000 and that research on high-risk groups and preventive methods that are more acceptable and of benefit in reducing both caries and periodontal disease are some of the new priorities and problems that remain to be solved by dental research.

Although many are concerned by the implications of the decline of dental caries prevalence in highly industrialized countries on dental education, practice and research, not enough attention is

being paid to the factors associated with its rapid rise and implications in developing countries. The increasing urbanization is constantly referred to (Barnes 1977, 1979a; WHO 1984). However, it can be expected, also, that whatever factors caused the previous increases in industrialized societies in the past are also operative in the case of developing countries now. These include dietary changes, especially the increase in sugar consumption and possibly removal from sources of naturally fluoridated waters in association with the process of urbanization; together with this, the lack of preventive and other measures to which industrialized societies have been exposed for so long.

Paradoxically, the divergent trends of the rapid decline and rise of dental caries prevalences have grave and far reaching implications, both for developed and developing countries. In the first group, the omnipotence of dental caries has, to a large extent, directed dental education, manpower supply, the types of delivery services and consumed a large share of research resources. The other group of developing countries has, to a large extent, followed the same pattern in dental education, traditional manpower type and delivery services. They are now confounded by a deterioration of the oral health status of their populations.

The increasing prevalence of dental caries compounded by an already high level of periodontal diseases in developing countries should be a matter of great concern to all. Their added burden on already strained resources with increasing demands from other priority sectors at a time when most governments are committed to achieve health for all by the year 2000 is neither warranted, nor affordable.

Developing countries should concern themselves with planning for oral health as part of total health and the larger socio-economic structure; should study closely the oral health delivery systems and experiences of developed countries and incorporate into their own delivery systems these approaches, philosophies, strategies and features that have proved their worth in containing and reversing the spread of dental caries - and periodontal disease.

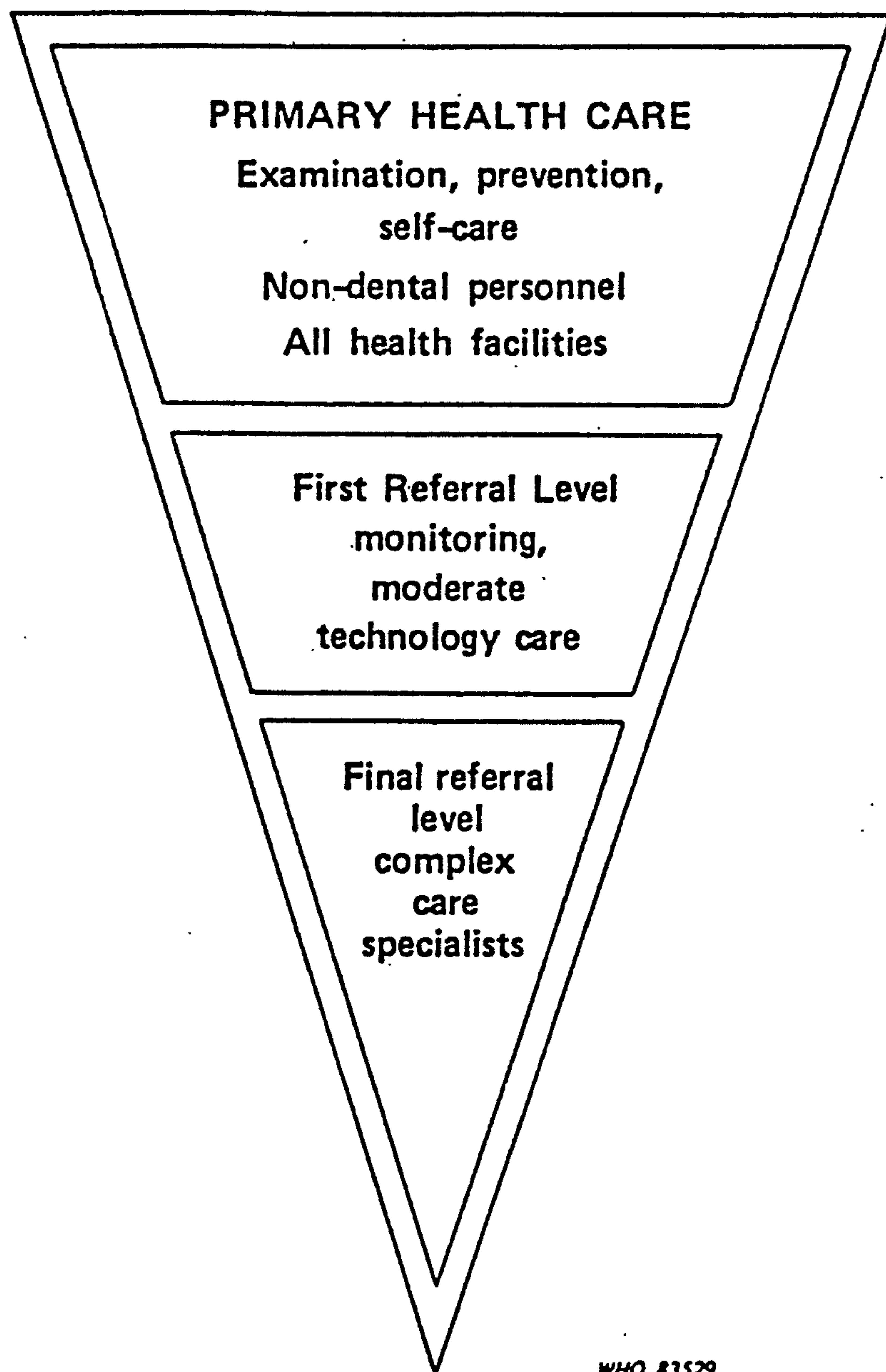
Above all, these countries must heed the warning by Barmes (1977) that continuing expansion of curative services alone raised doubts about financial feasibility even in the richest economies.

The concept of primary health care is in the view of the author particularly suitable for application in oral health care as a component of total health and its adoption could provide great chances of achieving WHO's 'oral health Global Goals' and contribute fully to 'health for all by the year 2000' in the developing world.

In fact, Barmes (1986) suggests that much, if not most, of the primary health care level tasks can be handled by non-dental personnel and the moderate technology tasks by operating dental auxiliaries leaving the 'oral physician' the high technology procedures of precision orthodontics, precision prosthetics and surgery. The 'oral physician' will be a full member of the team of physicians responsible for all health, guiding the whole oral health sector in terms of primary health care activities.

The use of the PHC concept has been adapted to oral health delivery systems in an "Alternative Community Care Model" developed by WHO, q.v. Figure 10.

The model has three levels and emphasizes community involvement at the PHC level. The other two levels use moderate and high



— prepared at WHO 1983 —

Figure 10. Oral health personnel model

(Source: Songpaisan 1985)

technology in multiple facilities (Renson 1984).

Other features of the model are its use of personnel trained in a performance simulation system and its attempt to systemize referral, quality control and overall monitoring of the system by using numerical language. The objective is to enable epidemiological evaluation of community oral health status and the quality and effectiveness of care provided. The model is being tested and adapted for use by WHO and the Demonstration, Training and Research Centre at Chiangmai, Thailand (Songpaisan 1985).

Almost all oral health delivery systems have been largely influenced and moulded by the dental profession which built its efforts under the influence of a large backlog and incidence of dental disease - mainly dental caries. The dental profession was guided by the example of the medical system, a model based on treatment of disease.

The success of the treatment model for dentistry has been in question and many pointed to its failures.

"Except, perhaps, in areas of exceptionally favourable dentist: population ratios the restorative philosophy makes too high a demand on scarce professional resources for it to answer the treatment needs of populations. However, it was originally developed to benefit individual patients who sought dental care and the evidence at present suggests that it may postpone the loss of teeth. It is hypothesized that the restorative philosophy is palliative rather than remedial."
(Holloway 1975)

The dominance of the restorative philosophy should be reexamined, whatever the level of dental caries. The resources required in dental education, clinical training and dental practice should be balanced by the proven preventive and new approaches (Meirs, Jensen 1984).

Elderton (1985) showed a number of failure characteristics in restorative dentistry which have become particularly evident in the developed world where there are many dentists and where the undergraduate dental training and dental services have reached an advanced stage. The interrelationship of these characteristics and the connection between restoration and repeat restorations are well shown in Figure 11.

Elderton (1984) has shown that the lack of standardized diagnostic procedures and criteria for determining treatment needs, as in whether a restoration should be placed or replaced, have resulted in many idiosyncratic treatment decisions among dentists.

New concepts are also emerging with regard to periodontal disease. Renson (1984) states:

"Research in recent years has led to a fundamental reappraisal of the pathogenesis of chronic inflammatory periodontal disease. Early assumptions based upon the classic experimental gingivitis studies from Denmark in 1960's led to the belief that marginal inflammation having been initiated through the accumulation of plaque would inevitably lead to progressive and continuous loss of periodontal attachment and ultimately to tooth loss. There are now good histopathological and microbiological grounds for believing that chronic inflammatory periodontal diseases may or may not lead to loss of alveolar support."

Sheiham (1984) also states that the natural history of periodontal disease progression is not as simple as has been suggested previously. He further adds that the dogma that all gingivitis must be eliminated and any periodontal pocket deeper than 3 mm must be treated should be questioned. Also the rationale for root planing should also be reexamined. Sheiham (1984) also states that the new conclusions in the understanding of periodontal diseases are relevant to developing countries in which gingivitis and shallow pocketing are common, but few people lose teeth because of periodontal disease.

The Repeat Restorative Cycle for the Developed Countries

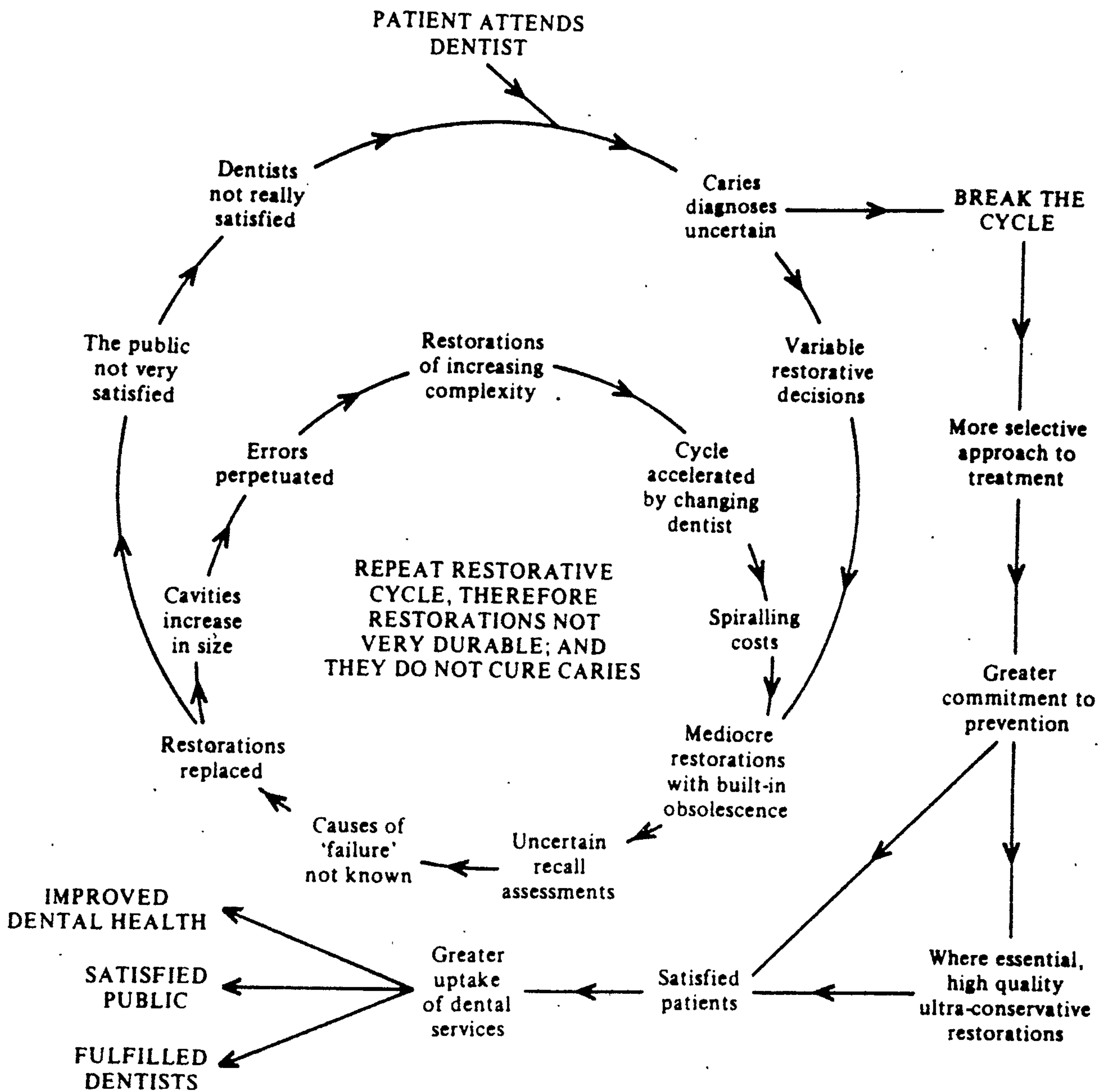


Figure 11.

Diagram showing the inter-relation of various characteristics of restorative dentistry that contribute towards the repeat restorative cycle in the developed countries. In travelling around the outer wheel, the patient and his teeth are liable to enter the inner wheel and revolve around it many times. There is a pressing need for the cycle to be broken. In countries where the dental services have yet to be developed, these wheels should never be entered; rather, the direct route should be taken to achieve improved dental health with a satisfied public and fulfilled dentists.

(Source: Elderton 1984)

Many dogmas and misconceptions related to mechanical oral hygiene procedures and practices have been exposed in a state-of-the-art review in Loe and Kleinman (1986).

For developing countries especially, the main conclusion from these changing concepts is that resources and effort should aim at attaining a level of dental and periodontal health compatible with the maintenance of functional natural dentition covering the term of natural life. Costs and heroic efforts beyond that should logically go towards increasing the average life expectancy of the community, not their teeth. One should always keep in mind the close relationship between oral health and total health.

There certainly have been sufficient warnings from international figures in the oral health field regarding the developing countries following into the footsteps of developed countries in basing their delivery systems and dental education on treatment and particularly the restorative philosophy.

Barnes (1976b) thought it possible that DMFT at age 12 in developing countries may rise to a figure of 8 and periodontal disease remain moderate in the absence of preventive programmes. The dental manpower needed then will be 2.8 million for total population coverage using treatment and rehabilitation. Following a preventive approach these countries would need a quarter of that dental manpower number, about 700 000. At that time - 1979 - the share of the developing countries of the world's dental personnel estimate of 580 000 was 91 000.

Renson (1984) states:

"It is evident that oral health problems in developing countries are now at a stage when reasonable resources devoted to prevention would obviate the need for huge expenditure in the future on restorative and rehabilitative services."

Moller (1979) states:

"...in developing countries ... The adoption of traditional western-style oral health care delivery systems, which may be entirely inappropriate to the local circumstances, has resulted in the establishment of expensive and inefficient services in many parts of the world."

Criticism of the treatment philosophy is not limited to that of dental caries alone. Frandsen (1980) states:

"Treatment oriented dental/periodontal care systems face major difficulties. The costs are gradually becoming prohibitive even to affluent societies, and the concentration of treatment rather than disease control appears to foster unlimited needs for care."

Some developing countries, of course, managed some success using Western systems but their strategy still seems lacking due to their different requirements.

"A feature common to viewpoints on dentistry and dental care in the Pacific region is the recognition that most dental services attempt to, or have succeeded in, mimicking Western style dental systems and technology. While this may be favourable in a few instances, generally the very nature of population distributions (rural rather than urban), socio-economic conditions (poor rather than affluent), and disease conditions (endemic and untreated) indicate a need for a different approach to community dental care."

(Cutress 1984)

A massive study, the 'International Collaborative Study of Dental Manpower Systems in Relation to Oral Health Status' was started in 1972 by WHO and the US Public Health Service. Its purpose was to study oral health delivery systems in a cross section of countries and compare system features to suggest ways in which the most beneficial features might be incorporated into complete systems. About twenty countries have participated in the system study.

The first group of five participants feature analysis produced the following indications by Barmes (1976):

- (i) The need for reinforcement of preventive behaviour and services.
- (ii) The effectiveness of regulated contact between consumer and provider in meeting treatment needs.
- (iii) The need to concentrate on quality as well as volume of care in providing adequately for the needs of child and adolescent populations.

Also, the treatment/need ratios and amounts of retreatment required show the benefit of the existence of the school dental service.

There were two further points regarding the findings.

"The fact that no clear picture has emerged for periodontal conditions is probably a finding in itself, related to the way systems of all types have failed to cope adequately with this problem." (Barnes 1976)

The other finding is that reported by Barnard and Clements (1976) in the individual study regarding the lowering of caries prevalence through personal and community preventive measures - fluoridated water and other forms of fluoride administration. This was significant for

"None of the other populations provided evidence of important preventive achievements." (Barnes 1976)

"I am convinced from our own International Collaborative study as well as from observations in many countries, that better systems must develop to extend the benefits of prevention and restoration to adult populations. Some features of those systems are surely an extension of school dental services throughout secondary and tertiary years, development of dental services in industry and establishment of wide-reaching third-party payment systems." (Barnes 1979b)

The final analysis of the International Collaborative Study (Arnlijot et al. 1985) produced the following main findings as reviewed by Sheiham (1986):

- Increasing oral health manpower did not improve oral health status and reduce treatment need.
- The method of payment for dental care could not be used to predict oral health status or the consumer perceptions of availability, accessibility or acceptability.
- The study focused attention on the importance of consumer acceptability of dental health services and showed consumer behaviour and beliefs to be important in determining oral health.
- The main hypothesis of the study, that the more available, accessible and acceptable the dental care provided to a population, the more positive is the effect on that population's oral health was not supported by the findings.
- Social, attitudinal and behavioural variables play a slight role in the overall DMF rates.
- There was no relationship between DMF and patterns of utilization and perceived need for more services in the study.

"The International Collaborative Study has answered many questions and posed many more. The findings suggest that different types of dental manpower working in close collaboration with other primary health workers and stressing prevention rather than repair are needed. More emphasis should be placed on the primary health care approach, which includes health promotion, utilization of low technology procedures, working with the agricultural, educational and economic sectors and involving the community." (Sheiham 1986)

In many industrialized societies, large credit can be attributed to dental education and research in the appreciable improvements in oral health status. The main features of the response have been community preventive programmes and measures mediated through a motivated profession, including public dental health and auxiliary members.

In many of the developed countries education programmes in public or community dentistry started in the early 1960s almost coinciding with similar programmes in medical personnel education and spreading to various degrees worldwide as a trend in health curricula.

1.6 THESIS OBJECTIVES

The previous background relating oral health to health and placing it in the wider context of wellbeing and socio-economic development of society pointed to the benefits of planning in integrating and coordinating all efforts in oral/health care services and acknowledged the effect of social and environmental factors and the role of the community in attaining health status compatible with its aspirations and constraints. The background also gave evidence of the role and effect of health manpower development, especially education and the responsibility of educational institutions in meeting the challenge of changes in society and its health status by equipping the oral health professionals with the requisite knowledge, skills, attitude and behaviour through appropriate and relevant curricula and programmes, stressing the need for promotion of health and prevention of disease as well as treatment efforts.

It is with this background and noting the worldwide commitment to oral/health for all that the author proposes to investigate the experiences in the field of dental education and what contributions can planning, strategy and programming produce for the local dental curriculum. It is envisaged that the effects of those contributions should go beyond the walls of the dental faculty to influence a young dental profession, not yet hard set in the cast of treatment philosophy and without the intransigent practices and attitudes that proved, obstacles unsurmounted, in some societies wherever there were efforts to provide better and relevant oral health systems to all.

There are great responsibilities on the dental profession and Faculty in responding to the legitimate needs and safeguarding the oral health of the community in the developing country of Libya.

The responsibilities on the dental Faculty are accentuated for the following reasons:

- (a) The number of nationals on the Faculty staff, although increasing, is still small.
- (b) Most of the specialities pursued by present and potential staff are treatment oriented undertaken in clinically sophisticated modes and settings.
- (c) The dental profession is still not well developed and organized to lead on common issues on oral health which are incompletely identified.
- (d) Most of the education and training undertaken by the present dental personnel, local and foreign, is treatment oriented and so is the present stress in the Faculty's curriculum.

The following are the main characteristics of the local situation:

- (a) Libya is a developing country of about 3.6 million people and with only one dental Faculty producing about 30 graduates a year. Population is young, the 0-14 years are about 46.5%.
- (b) The only other category of dental personnel which is being trained - mostly abroad - is dental technician.
- (c) Dental caries, although low, ~~might~~ have been increasing, and there are the associated factors, for a continued rise in its prevalence, that operate in developing countries in general.
- (d) Periodontal disease is thought to be high.
- (e) Fluoride is present in varying amounts in water but there are no fluoridation of water studies.

Although an oral health crisis of large magnitude might appear to some non-existent and unlikely, this should be the stage at which to make sure that no such crisis would arise. Planning, strategies and programmes should provide the right background for a preventive, promotive oral health approach.

The vital input of oral health personnel to the oral health system should be reassessed critically. Simple numerical increases in the hope of extending coverage and matching population growth, to improve oral health, could well prove illusory, without paying attention to the types needed and their appropriate education and training. In addition to the economic implications of the situation, there are increasing societal expectations and accountability in both the oral health and education sectors.

Related to the whole local situation is the problem of the present curriculum for the education and training of the dental professional. Stated simply, there is not enough stress on prevention of oral disease and a lack of community orientation including the concept of PHC.

Apart from the effects on society in general and their oral health in particular, there are the implications for the dental professional of job satisfaction or in more general terms, what has been well known in the medical profession and nursing as the "reality-shock syndrome" and "professional burnout".

Arising directly from the problem are questions of attitude towards issues and activities like the training and utilization of auxiliaries, regulation of fluoride levels in water supplies, community programmes, oral health surveys and participation in oral health plans.

The major goal of this thesis therefore is to look for answers to the stated problem by examining the undergraduate dental curriculum and suggesting ways of rectifying deficiencies and imbalance. The limitations, however, will direct the major effort to the area of community dentistry, although suggestions and recommendations for improving the curriculum in general may result.

For the purpose, the needs of the curriculum will be related to the requirements of the community and guided by the global trends in oral health, dental education and other issues presented in the introduction. This should lead to identifying the most suitable elements of community dentistry to be incorporated in the dental curriculum. Finally, the development of the community dentistry programme will make use of some of the tremendous advances in health sciences education relating to the planning, teaching and learning processes.

2. DENTAL EDUCATION

2.1 HISTORICAL DEVELOPMENT

Dental disease has afflicted mankind throughout history and treatment ranged from harmless incantations and potions to dangerous substances, like acids and arsenic. Later in history, resort to extractions and attempts at replacement of few teeth developed (Samson 1939).

The ancient Egyptians, Chinese, Greeks, Romans and Arabians, amongst others, practised medicinal, surgical and mechanical methods aimed at reducing dental pain, removing the cause or replacing a few teeth (Campbell 1981).

The Arabian civilization as found in its accounts in Southern Europe about the ninth century A.D. paid particular attention to mouth hygiene and dietary advice as public health measures in dental care. The removal of calcareous deposits to control periodontal disease is accredited to Abulcasis of Andalusian Spain in the late eleventh century (Dunning 1979).

Until about the 12th century, in Western Europe including Britain, the healing art was generally undertaken by the clergy. In 1163, the Pope prohibited priests from performing any operation which involved the shedding of blood. This resulted in a state of chaos with surgery, including tooth-drawing relegated to barbers. About two centuries later they formed themselves into guilds which eventually became the companies of barber-surgeons with the surgeons doing surgery proper and the barbers restricted to other tasks including tooth-drawing (Campbell 1981).



In the UK it was not until the early eighteenth century that the surgeons and barbers parted company emulating the split of the apothecaries - the future general medical practitioners - from the Company of Grocers in the early seventeenth century. Dentistry was to emerge later under the aegis of The Royal College of Surgeons - direct successor to the original company of barber-surgeons (Davis 1980).

Mention must be made of Pierre Fauchard (1678-1761), regarded by many as the father of scientific dentistry. His two-volumed classic on dentistry "Le Chirurgien Dentiste" was the first serious attempt to present a textbook on dental practice. Published in Paris in 1728, it created a profound impression on dental thought throughout the continent of Europe and the USA. Although a German translation was published in Berlin in 1733, it was not fully translated into English until 1946 (Campbell 1981).

Dentistry and medicine were part of the same art and lectures in dentistry, dental science and dental surgery were an integral part of medical education in England as early as 1781 (Vann 1978). Apart from physicians, dentistry was open to others who practised after an often lengthy and expensive apprenticeship. In the face of increasing demand, the practice of dentistry became lucrative and gave rise to increased numbers of charlatans. The situation was so bad that one writer in England around 1840 complained "the old adage that any fool will do for a parson may be applied with still greater force and truth to the profession of dentist" (Hall 1973). So open was dentistry that not only mountbanks but kings partook in its practice. "King James IV of Scotland (1472-1513) who was of an inquiring turn of mind experimented in the art of drawing teeth" (Samson 1939).

The history of the education of the dentist is intertwined with the development of the dental profession. Elements of professionalization like the formation of societies and associations and publication of periodicals prepared the way for registration, dental education, licensure and legislation to improve the image of and upgrade the profession and regulate the practice of dentistry to protect the public.

The issues of professional development continue today with various categories of dental personnel vying for autonomy and professional status like denturists, hygienists, therapists and others. The profession in general is also contributing and benefiting more in its relationship with dental education.

While the industrializing societies of Europe in the 19th century provided the essential technical and economic basis for occupational development and diversity in the health area, the all important social and political conditions for the emergence of an independent dental profession were not present (Davis 1980). All the favourable conditions were found, however, in the USA where the efforts of Horace Hayden and a few physician-dentist colleagues to include dentistry in the curriculum of the medical school of the University of Maryland at Baltimore were frustrated leading to the opening of the world's first dental school - the Baltimore College of Dental Surgery - in 1840. Dental education became a university discipline when Harvard University opened a dental department in close association with the medical department in 1867 (Zambito 1969).

In the years following 1890 about 80 proprietary dental schools were opened and 150 were operating prior to 1920. The majority of these schools were operated for profit and stimulated

by the advent of the dental engine in 1870 had curricula dominated by the mechanical phases of dentistry with little emphasis on the biological sciences (Zambito 1969).

Various organized agencies were formed by dental practitioners, educators and dental schools. The ethical members of those associations were aided by two influential Carnegie Foundation reports in reducing the number of proprietary schools. The first was Flexner's "Report on Medical Education in the United States and Canada" issued in 1910. Flexner called for the teaching of more scientific medicine and his suggestions gave organized dentistry support in taking note of the many increases in requirements established by medicine for equipment, supplies, teaching, research and curricular evaluation.

The second report "Dental Education in the United States and Canada" by William Gies, a distinguished biochemist with lifelong interest in dental education was published in 1926. The report set dental education on the road to complete incorporation as a university based discipline and spelled final doom for the dental school-for-profit (Vann 1978).

In 1859, dental practitioners organized the American Dental Association out of which arose the National Association of Dental Faculties in 1884. Another body, the National Association of Dental Examiners, made up of members from licensing boards of several states was formed in 1883. Dental schools operated for nearly 70 years without concerted efforts to standardize on issues like entrance requirements and duration of curriculum. By 1909, the three associations mentioned earlier formed the Dental Education Council of America as the first agency to evaluate and improve dental education, and to classify and accredit dental schools. Finally, in 1923, The

American Association of Dental Schools joined several American and Canadian associations of schools and dental teachers in the common goal of attending to problems of the dental curriculum (Zambito 1969).

The Dental Education Council of America first accepted the existing three-year curriculum until 1916 when it specified a four-year curriculum of 4400 hours and outlined subject matter and time allotments for each subject. Backed by the Flexner report, the Council decided not to give an "A" classification to any dental school run for profit to individuals or a corporation as not meeting the standard of fair educational ideals. The Council's classification included requirements concerning classrooms, laboratories, infirmaries, library, faculty and admission requirements in addition to curricular guidelines. The Council constantly shaped the curriculum during its 17 year existence and was succeeded in this task by the Council on Dental Education of The ADA in 1938 as a Standing Committee (Vann 1978).

The American Association of Dental Schools (AADS) through its Curriculum Survey Committee published a report in 1935 concerned with the substance of the dental curriculum with the added requirement of two years pre-dental college education. The committee prepared another report dealing with the process of teaching in 1945. In general, there were few changes in dental curricula between 1934 and 1959. In 1957 the ADA and the American Council on Education allowed the latter to form a "Commission on the Survey of Dentistry in the United States" signifying federal government concern over issues of professional dental education regarding manpower - including auxiliaries, requirements and health care delivery methods (Zambito 1969).

In England, 1856 saw the founding of two dental societies aimed at raising the standard and status of dentistry. One was the College of Dentists of England with about 200 members. The other was formed by a smaller but more influential group of members of the previously mentioned College and named the Odontological Society of London. Representations, mainly by the Odontological Society, led to an amendment by Parliament to the Medical Act 1858 in the same year, empowering the Royal College of Surgeons of England to institute examinations and grant diplomas. The first examination for the Licentiate (L.D.S.) was held in March 1860. The Odontological Society acquired the "British Journal of Dental Science" in 1856, started in July of the same year by John Churchill. The Society also opened the first dental hospital in London in 1858 with The London School of Dental Surgery attached to this hospital organized by 1859 to conform with the Charter of The Royal College of Surgeons of England and both later became the Royal Dental Hospital and School of Dental Surgery.

The College of Dentists launched its own publication, the "Quarterly Journal of Dental Science", in 1857 which changed its title in 1859 to "The Dental Review". The College instituted a comprehensive course of lectures on medicine, surgery and dentistry and granted its own diplomas. The College also opened The Metropolitan School of Dental Science (later to become the University College Hospital Dental School) almost at the same date as the opening of The London School of Dental Surgery in 1859. The rivalry between the two societies came to an end in 1863 with their amalgamation under the title of Odontological Society of Great Britain, the society from which nearly all progress stemmed (Campbell 1981).

The Dentists Act, 1878, in the UK established a register for the practice of dentistry under the control of the General Medical Council (GMC) and entrusted this body with supervising and improving dental education. It also protected the titles, 'dentist' and 'dental practitioner' and rendered it lawful for surgical colleges and academic bodies to examine candidates and grant the L.D.S. diploma. The University of Birmingham was the first to avail itself of this ruling, apart from the Royal Colleges and first granted dental degrees in 1900, with Liverpool second in 1902 (Campbell 1981).

The British Dental Association was formed in 1880 primarily to safeguard the ethics of the profession with John Tomes as its first president. The extent and gravity of unqualified dental practice finally led to the passing of The Dentists Act, 1921, which closed the profession and restricted the practice of dentistry to those formally qualified, but made provisions for those practising for five years or over to continue (Hall 1973).

The Dentists Act 1921 also established the Dental Board of the United Kingdom but the Dentists' Register still remained in the custody of the GMC. The Board offered grants to dental schools for full-time professors, research and equipment and bursaries. An Interdepartmental Committee on Dentistry reported in 1944 that dentistry should become autonomous with its own general council to supersede the Dental Board. The Dentists' Act 1956 effected this change and consolidated the unrepealed provisions of the previous Acts of 1878, 1921 and the amending Acts of 1923 and 1927 (Campbell 1981).

An important event in the UK is the National Health Act which became operative in July 2, 1948, when dental treatment became a statutory benefit. The Dentists' Act 1957 allowed for the first time,

since the closure of the profession in 1921, persons other than doctors and dentists to carry out in civilian premises operative procedures in patients' mouths, thereby introducing dental auxiliaries and teamwork in dentistry (Allred, Hobdell 1981).

Two private dental schools were opened in Tokyo, Japan in 1888 but were soon abolished. A third was named after its founder, the Takayama Dental College. Founded in 1890, it was accredited by the Ministry of Education in 1907 and became the present Tokyo Dental College. It was not until 1928 that the first government dental school was approved by the Diet in Tokyo and a second in Osaka in 1951. Japan had a system of licensure by examinations in 1883 which also required an apprenticeship of two years. In 1903 the National Dental Association was formed (Otani 1975).

Contact with the Americans influenced Japanese dentistry to a large degree. First American and Japanese dentists came to Japan from America in the second half of the 19th century. Later the occupation of Japan from 1945 to 1951 altered the whole system of education which resembled the European system. The effect on dental education was mixed. The reform allowed the six dental schools to improve their academic level and restore the curriculum to four years after operating on a $3\frac{1}{2}$ year period during the war. However, there were two women's dental Colleges which could not fulfill the new requirements and had to close. Overall, the number of students in all schools was reduced by about 50% (Otani 1975).

In Europe, after the number of master surgeons with experience in dentistry increased in the second half of the nineteenth century, courses were organized in many countries to prepare new dentists for examination by boards. Later, vocational schools for dentists were

set up, and out of these grew the modern university dental schools and faculties. However, the education of the dentist became separate in some countries while it remained part of medical education in others (Kostlan 1979).

In countries like Austria, Italy, Spain and Portugal, dentistry is practised by qualified physicians with training - usually about two years - in dentistry. Another system is operating in the USSR where dentistry is considered a speciality of medicine and dental subjects constitute about a third of the curriculum producing a stomatologist (Doinikov 1969, Pedersen 1969).

The system of dental education that is most prevalent nowadays, however, is independent of medical education and undertaken at a school or faculty part of a university, although it can be a separate department of a medical school.

It must be realized that the developing countries underwent none of the upheaval of the then newly industrializing countries associated with the industrial revolution, rapid urbanization and other socio-economic changes; these changes that initiated and moulded the dental profession and the education of the dentist. Instead, most of them were colonized and subjugated by the industrial nations who dictated and directed their educational policy among other things. To deal with the oral health problems of their peoples, these countries were directed or chose to copy the system of dental education in order to produce the equivalent of traditional professional dentists. In fact, by the time this copied system was grappling with difficulties of numbers of schools, candidates and years of dental education, changes were well under way in most developed countries to produce different categories of oral health personnel and with changes and innovations in dental education and curricula.

2.2 STAGES AND DETERMINANTS

The various changes in the forces acting on dental education, together with the natural desire to improve the education and dental profession have caused dental education to undergo an evolutionary maturation process. Chaves (1962) discerned three periods in the development of dental education:

1. The "artisan" or occupational period, characterized by empirical, pre-academic training when dentistry was considered as an art or occupation.
2. The "academic" period, characterized by university-level training in independent faculties, highly technical, introvert and self-sufficient.
3. The "humanistic" period, in which teaching will be related to the community, related to Man and laying emphasis on him at every point.

At the time, Chaves considered only some schools to be at the last period. Although Chaves was writing about WHO's Region of the Americas, his discern would have been more widely applicable.

Schour (1965) identified more stages:

1. Mechanical Stage: during the preceptor-apprentice period where the concern was the tooth rather than the patient with the focus on the technical and mechanical treatment.
2. The Biologic Stage: with advances in the basic sciences and the acceptance of dentistry as a university discipline. There was a beginning recognition of the intimate interdependence of the tooth with the rest of the body.

3. The Social Stage: with the growing concern of the public for the welfare and health of all members of society and the advent of preventive dentistry. Dentistry's concern expanded beyond the individual patient to include the community and society.
4. Pedagogic Stage: where dental education began to look at the educational process itself which was seriously neglected. Attention to the processes of teaching and learning can substantially improve the situation.
5. Humanistic Stage: with continuing maturity and widening horizon of dental education. The concept evolved that the main aim should be to produce both a competent dentist and an educated and cultured person. The dental graduate should be deeply concerned with human relations and as an integrated professional leader with a high sense of ethics and social responsibility in his local, national and world communities.

Schour seemed to think that although a number of educational programmes were at the "pedagogic stage", the "Humanistic Stage" was for most a future concept. However, Dworkin (1981) identified three eras in US dental education's evolvement, technical, biological and psychosocial, almost coinciding with Chaves' analysis. The "technical era" of Dworkin seems to overlap the "academic period" of Chaves and this technical era - pre the 1960's - for most developed countries, seems to have provided an impasse for many developing countries who modelled their curriculum on that era. Further, for many it seems the social and humanistic periods are the same. Whatever differences that result from drawing the line at the historical development, two points are worthy of mention. One in the 1920's, the start of the biologic period coinciding in the US with the Gies Report. The other in the 1960's coinciding in the US with the advent of departments of

social and community dentistry.

The development of dental education as shown by the previously mentioned stages is not formed in vacuo. It comes about as a result of many interacting forces on the dental education system. Forces within and outside the system result in the changes that mark the stage of development. These forces are continuously evolving and so is their net effect.

Briefly, a summary of the major forces acting on dental education can include:

- Society: demographic make-up; degree of social organization and awareness; economic development, income; cultural level, education, expectations; manpower availability for education; oral health status.
- Economic situation: the potentially available funds for dental education.
- Advances in science and technology: can be from almost all from architecture to medical engineering, but more specifically from: basic, clinical and behavioural sciences, materials and equipment.
- Educational advances: deserve a special mention and include teaching, learning, evaluation; curriculum research and development.
- The profession: a critical force in many countries, particularly in aiding or hindering changes and innovations not only in education but public oral health policy and programs.

- Legislation: by professional bodies but mainly government and specially through allocation of funds; also licensure requirements.
- Internal factors: apart from staff, facilities and funds; student participation is increasing and encouraged.

The forces mentioned are obviously not mutually exclusive; one can lead to other forces being invoked to act together with greater chances of success in shaping dental education, its objectives and future.

Eventually, many of these factors are inevitably reflected in dental education. The objective should be to identify and introduce the necessary changes to keep dental education ahead, or at least in step with changes in society and other areas, not to wait for pressure to mount and then have to make hasty changes and alterations. Mounting pressure from society, for example, can lead to legislation which can be misguided or not the best alternative.

2.3 INNOVATIONS AND OBJECTIVES

Innovations in dental education came and can come about through the concern of individual persons and groups. In the right environment such concern can be translated into action. An appropriate environmental condition can be the occasion of opening a new dental school; the result of a general or local curriculum review, this in addition to the previously mentioned determinants or forces acting on the curriculum stemming mainly from society, science and technology, the profession and legislation.

The principles of planning are so relevant to educating the professional dentist that before tackling curricular and other problems like what and how to teach and other qualifiers, the objectives of the educational process itself must be analysed and identified. There must be a clear concept of the nature and role of the end-product or output - the dentist. It is only then that choices can be made as to the inputs and the process of education selected and geared to achieving the desired output or goals in the oral health sector. Monitoring and evaluation of the whole system will indicate the changes required.

Dental education has been undergoing changes since the 1960's, particularly in developed countries. There are many factors that have influenced changes in its broad objectives leading to changes in the undergraduate dental curriculum. Many of the factors are related to changes in society. These include not only increased expectations and accountability, but also demographic changes and oral health status. Other changes are related to dentistry as a science, with the "scientific explosion" producing more and more material for inclusion in the curriculum. Together with this new material there

has been advances in the field of education which many dental curricula sought to utilize in making the educational process more effective. Modern technologies and government legislation in many countries also have their impact on the curriculum.

A WHO report by an Expert Committee on Dental Health (WHO 1962) proved remarkably progressive for its time in dealings with problems of dental education. It considered dental education should have objectives that identify the knowledge, skills and attitudes a dentist must have to practise effectively. These objectives should be realistic in terms of the needs of a country and the main objective is undoubtedly to educate personnel to a suitable level of competence to meet those needs. The formal education of the dentist, however, should include:

- (1) The attainment of a high level of general education.
- (2) A thorough understanding of the biological sciences.
- (3) The skill to perform well those restorative and other clinical treatment services required for general practice.
- (4) A proper sense of professional ethics and conduct.
- (5) The acceptance of the dentist's responsibility to the community in which he lives and for providing leadership within it.
- (6) The ability and desire to perform preventive dental services.
- (7) The competence to organize and administer a practice properly including the utilization of auxiliary personnel.
- (8) The dentist's desire to continue his professional education throughout his lifetime.
- (9) A knowledge which will allow the dentist to appraise research findings critically and apply them to his own practice.
- (10) The assumption of responsibility for the dental health of the community, particularly in developing countries. This should include the capacity to define dental health problems, to educate the public in dental health, and to advise upon and to evaluate dental health programmes.

(WHO 1962)

Schour (1965) stated that in setting up the ten specific objectives of dental education the WHO Expert Committee on Dental Health made it significant that 5 of these were directly related to attitudinal values and professional and social conduct.

Goldhaber (1973) reported on a questionnaire study of the objectives of the undergraduate dental curriculum in 94 dental schools worldwide. The study was undertaken by a Working Group for The Commission on Dental Education of the FDI and used a list of 31 curricular objectives (Figure 12a). The list appreciably expands the WHO list of objectives.

Innovations in undergraduate dental education are also a potential source of future objectives and the same FDI study listed 26 innovations (Figure 12b) that were at various stages of development and use in dental curricula.

Figure 12. Dental Education Objectives and Innovations

Figure 12a. Objectives

1. to produce competent practitioners
2. to develop awareness of community problems and needs, and sense of professional and social responsibilities
3. to develop a sound scientific basis for practice
4. to inculcate desire for continuing education
5. to be able to diagnose and treat diseases of oral cavity and related structures
6. to obtain experience in using all types of auxiliaries
7. to place emphasis on preventive dentistry
8. to provide the basic technical skills
9. to increase student awareness of and participation in research
10. to be able to provide comprehensive care
11. to develop necessary skills and understanding of dental bioengineering and technology
12. to foster attitude of critical inquiry
13. to point out career possibilities in dental research, dental education and dental public health
14. to develop a competent administrator able to manage an effective and efficient practice
15. to develop an effective teacher who educates and directs people towards excellent oral health
16. to develop leadership qualities in profession and community
17. to prepare students to be able to express themselves effectively orally and in writing on professional subjects, directed either to the public or profession
18. to teach student his limitation
19. to prepare students for specialty training or postdoctoral programs
20. to prepare each student for practice of the future
21. to transmit knowledge in the field of general medicine indispensable for successful prevention and treatment of disease
22. to provide for flexibility in curriculum to incorporate new approaches
23. to provide for elective opportunity
24. to provide flexibility in curriculum permitting acceleration
25. to prepare student to work with all members of the health professions
26. to be able to provide dental care within a hospital or other environment outside office
27. to place emphasis on periodontal care
28. to be able to analyze clinical performance of peers
29. to prepare students to be able to work effectively in committee, class or group organizations
30. to be able to utilize and assist his patients in employing the available systems for the delivery and financing of dental care
31. to provide unusual students the opportunity to pursue graduate programs concurrently

Figure 12b. Innovations

1. increased elective time to permit student to develop his area of interest
2. early introduction of students to clinical dentistry
3. expansion of student experience with auxiliaries
4. establishment of undergraduate hospital clerkships
5. each course must set specific, realistic goals without any specific time requirement
6. student training to take place in neighborhood health centers and in hospital and other community health service institutions and agencies as well as in the school or in private practice offices
7. greater use of audiovisual material and self-instructional media
8. programs to promote concept of comprehensive care
9. senior elective program with opportunities for delivering oral health care outside the dental school environment and in foreign countries
10. a community oriented course in Public Health Dentistry and Behavioral Science where students participate outside the school
11. emphasis on preventive dentistry
12. individualization of curriculum by pre-testing in first year to determine entering competencies in various disciplines
13. admit student to advanced standing if he already has specific courses or talents ordinarily required for the dental degree
14. opportunity for students to take the D.M.D. or Ph.D. program concurrently
15. teaching of student in simulated office environment
16. use of dental laboratory technician students to work along with undergraduate dental students
17. bring undergraduate students into frequent contact with graduate, postgraduate and continuing education students
18. involvement of students in dental research
19. participation of students in epidemiological surveys
20. develop an oro-facial rehabilitation center for the handicapped
21. establish bioclinical conferences similar to grand rounds
22. allocation of instructional time on basis of subject matter content instead of attempting to fit the conventional schedule
23. curriculum arranged in series of integrated instructional units, eliminating fragmented departmental courses
24. development of a completely interdisciplinary curriculum in Human Biology
25. development of 'Conjoint Sciences', bringing together basic science and clinical dentistry faculty in problem-oriented committee teaching
26. teaching of the basic sciences throughout the length of the curriculum

2.4 FUTURE OUTLOOK

The education of the dentist is concerned with the future and should anticipate what the dentist is likely to be doing in practice for many years ahead. In the absence of further opportunities to educate the dentist, the undergraduate experience will be the only basis for life-long practice.

Therefore, undergraduate dental education should provide an adaptable learning environment with a curriculum emphasizing principles not minutiae which will likely change even before the student obtains his degree (Durocher 1970).

That is also why the single most important objective of higher education generally and dentistry in particular should be to teach learning and prepare the student for life-long learning.

The future can take its cue from the development of the primary health care concept and dentistry's widening horizons in relation to medicine. The concept of PHC is already an officially accepted policy by almost all countries; the concept of widening "medical orientation" in the dental curriculum is envisaged and called for by a number of authoritative figures in dental education. Both are yet to be reflected in the dental curriculum to any appreciable extent.

The former concept can widen the scope of oral health care to provide essential and acceptable services to all the community and with its participation. The latter can make the higher education of the dentist more productive by adding to his skills and tasks beyond the oral cavity making the new-type dentist truly a functional member of a health team. Essential to the development of both concepts will be further development of the roles of old and new types of oral

health auxiliaries.

"The future relationship of medicine and dentistry is a factor that may become a curriculum determinant, since dental curriculum from its inception has mirrored medical curriculum, this trend can be expected to continue."

(Vann 1978)

"I do believe that the future role of the dentist will be modified and that he will spend less of his time doing routine technical procedures. The oral medicine component of his practice will be expanded and refined. His health screening and care-finding function will increase in importance in the entire health care scheme, and the dentist will be interacting with other health professions in coordinated patient care to a markedly greater degree."

(Morris 1976)

Allred, Duckworth, Johnson and Slack (1972) put forward a hypothesis that in future dental care will be the responsibility of specially designed teams where members will be trained together to combat dental disease on a community scale. The principal objective in the education of the dentist, as a team leader, should be the creation of a person able to integrate responsibility for total patient care with a particular responsibility for the management of oral diseases, that is, the creation of a specialist within medicine.

Rovin (1977) presented an overview of a primary care dental curriculum with recommendations and suggestions, many of which were operative in limited or experimental form except perhaps his last recommendation: "Ultimately, integrating dentistry into medicine so that the future primary care practitioner receives both medical and dental training."

Bohannon (1982) looking beyond the year 2000 foresees a variety of experiments in dental education which will have to include exploration of integration with medical education. He reminds us that it was only by a quirk of fate that dentistry evolved as

a separate profession and separation has been maintained primarily because of the universality of dental caries and the size of the manpower base required for its treatment. With the decline in dental caries prevalence he foresees the future training of stomatologists, products of a medical education with extended dental clerkships and dental residency programmes in the United States.

Barmes (1986), referring to the rapidly growing surplus of dentists and insufficient study of the primary health care strategy in industrialized countries, synthesizes the function of PHC, medicine and dentistry by suggesting: "....broadening the role of personnel involved in oral health and use of oral health network at all levels from primary health care to the ultimate referral level and in all systems and structures." He suggests the areas for which oral health could accept responsibility as for measurement in selected areas of care deficiency, health promotion and education and consistent with the oral physician concept, certain interventive tasks beyond surface measures. Further, Barmes sees the need for the oral physician rather than the present day dentist at dental high technology level, one that will be a full member of the team of physicians responsible for all health.

Schour (1965) as mentioned previously identified a "pedagogic stage" in which the dental education, taking a look at itself, paid attention to the processes of teaching and learning. For that stage to flourish, and the trend in educational advances to spread, there is need to educate the dental educator, something which cannot be said to be frequent for lack of availing or availability.

Saroff (1975) surveyed educational needs of dental faculty members and found that although less than 15% of 1030 US respondents

had a degree in education, more than 80% had no formal training in education at all. It was also significant that 95.7% of those surveyed expressed the need for some formal training in course and curriculum evaluation, instructional aids and their development, test evaluation and other skills.

It is interesting to note that most of the educational research has been directed at levels lower than higher education. The resultant findings and advances found less application at university level, although badly needed in the majority.

Of the health sciences categories, nursing education has perhaps been most receptive to applying and introducing the newer trends and innovations in education.

2.5 EDUCATING THE TEACHER

Boozer, Gaines, Copping and Rasmussen (1977) noted that for too many years dental education has operated under the assumption that good dentists automatically make good teachers of dentists, but the faculty members and administrators were becoming increasingly aware that effective dental education requires knowledge and skill in the teaching/learning processes, in addition to knowledge and skill in dentistry.

Reviewing his work with WHO in health sciences teacher training, Guilbert (1985) noted that a growing number of teachers have become increasingly aware of the potential usefulness of applying to their programmes the principles and methods elaborated by educational scientists. With this increasing awareness during the middle decades of this century many teachers, however, found it difficult to obtain a comprehensive understanding of the nature and scope of these developments as they might be applied to the teaching and learning of health sciences. Few found time for comprehensive training in education; some grasped at partial solutions such as audiovisual techniques or construction of multiple choice examinations and the interest was personal rather than institutional.

Guilbert in 1969 developed an educational handbook for health sciences personnel teacher training. Published by WHO, the handbook is extensively used in workshops conducted by WHO as a semi-programmed text. It has been available in 15 languages and has remained since 1977 "best seller" of all WHO publications in French and the second in English (Guilbert 1985).

WHO global teacher training programme started in 1969 with the purpose of making teachers of the various health professions familiar with how educational programmes should be planned, and how teachers could most effectively assist student learning; this implied training in planning, implementing and evaluating educational programmes. Such training, it was envisaged, would ultimately result in educational programmes that would be particularly responsive to the health needs and health-care issues of the populations to be served by their graduates (WHO, EMRO 1982).

Alert to the principle of the "multiplier effect" of teacher training, WHO's programme was designed in three phases:

- for the first phase the Centre for Educational development, University of Illinois College of Medicine, Chicago, was designated Interregional Teacher Training Centre where key personnel were to be trained from 1969. These key persons would contribute to the establishing of regional centres.
- The second phase began in 1972 and saw the establishment of eight regional centres for teacher training (RTCCs). Each centre would place special emphasis on teacher training in issues and problems pertinent to the WHO region it serves. Educational leaders trained at a RTTC would organize National Teacher Training Centres (NTTC) whose major task would be to increase the educational sophistication and competence of the classroom teachers who might later create institutional units of medical health personnel education, thereby realizing the multiplier effect.
- The third phase was designed to transfer the responsibility by 1980 from the regional centres to national institutions.

(WHO, EMRO 1982; Miller 1980)

It is worth mentioning that the Regional Teacher Training Centre for Health Personnel of WHO, Western Pacific Regional Office, Sydney, Australia, organized the first WHO workshop in Dental Education from 1-14 February, 1976, with 21 participants from various dental teaching institutions in the Region (WHO, WPRO 1976). The Regional Centre is one of the few that realized WHO's third phase by becoming a School of Medical Education within the Faculty of Medicine at the University of New South Wales in 1983.

3. COMMUNITY DENTISTRY: A TREND REVIEW

Community dentistry will be reviewed here as a trend.

Bandaranayake (1979) notes that "the student of curricular trends is able to extract, from the collective experiences of others, those aspects which are of particular relevance to a given situation. While direct transfer of a trend across socio-cultural barriers is not feasible, nor in fact desirable, adaptation of the trend to a given situation is a real possibility. The ability to synthesize and adapt from the experiences of others who have contributed to the trend, while avoiding pitfalls in implementation, is one of the values of studying curricular trends."

This review intends to clarify the concept of "community dentistry", trace its development in undergraduate dental curricula under the various influencing factors, and look at the contributions and difficulties associated with the trend implementation:

3.1 NATURE OF THE TREND

Community dentistry in undergraduate dental education has come to mean a large number of subjects and topics. Dummet (1974) gives a nearly exhaustive list in Figure 13.

The list gives an idea of the concept of community dentistry and Petterson and Littleton (1971) gave a useful grouping of such topics under the headings:

- public health;
- business aspects of dentistry;
- professional life;
- social science.

The stress on these groups and their component subjects or topics varies widely in undergraduate dental education today. Also, their introduction into the curriculum varies mainly with the country, although variations within the same country may be found.

An accommodating definition that embraces all the topics of community dentistry is provided by Gleeson, Graves and Soricelli (1964):

"The term "community dentistry" refers to the scientific diagnosis and treatment of community oral health problems, requiring, in most instances, multidisciplinary skills and knowledge."

The term "community" is roughly synonymous with mass, group and aggregate. It may refer to any aggregate of people which might be delineated usefully for the purpose of promoting oral health. Examples are towns, cities, neighbourhoods and institutions. Other aggregates share common characteristics or interests, like age or occupation (Gleeson, Graves, Soricelli 1964).

Figure 13. Topics representing the scope of community dentistry

(Source: Dummet 1974)

1. Ethics
2. Jurisprudence
3. Practice administration (office management)
4. Manpower
5. Biometry
6. Hospital organization
7. Hospital dental services
8. Systems for the delivery of health care
9. Systems for the delivery of dental care (private solo, private group, open-panel and closed panel clinics)
10. Methods of financing health care
11. Methods of financing dental care
12. History of dentistry
13. History of public health
14. Health legislation
15. Dental health legislation
16. Administration of dental public health programs
17. Community health facilities (health department, neighborhood health center, child and youth projects, Head Start)
18. Special patient—congenital defects
19. Special patient—chronically ill
20. Special patient—geriatric
21. Special patient—brain injured children and the mentally retarded.
22. Political action
23. Government organization
24. Methods of educating patients
25. Patient-oriented preventive care
26. Community preventive programs (screening, referral, fluoridation, diet control, accident prevention)
27. Professional organization in the dental field (dentists, hygienists, assistants, laboratories, laboratory assistants)
28. The dental service corporation
29. Public speaking
30. Professional writing
31. Storage and retrieval of professional and scientific information (libraries, reprint files, film libraries)
32. Dentist-patient communication (interviewing techniques, history taking, case presentation)
33. Interprofessional relationships
34. Dentist-patient relationships
35. Human relations in the dental office (dentist and co-workers)
36. Attitudes toward health and illness
37. Normal personality development
38. Recognizing and coping with personality deviations
39. Literature evaluation
40. Research methods
41. Human values and motivation
42. Economics of personal investment
43. American culture (ethnic groups, minority groups, socio-economic groups)
44. Dental aspects of vocational rehabilitation
45. Comprehensive care in dental school clinic
46. Epidemiology
47. Dental auxiliary utilization
48. Training of auxiliaries by dentists
49. Social welfare
50. Community voluntary organizations
51. Dental specialization

Dworkin (1981) states:

"For reasons difficult to discern, but easy to speculate about, during the 1960's a great impetus was given to the notion that dental education must concern itself with issues other than the basic biologic sciences and the teaching of technical or clinical skills....".

Waldman and Siegel (1980) discerned the reasons mentioned above as related to the many changes that have occurred in the social, economic, and government environment within which dental and general health services were provided since the early 1960's. A partial list included the civil rights movement, the War on Poverty, Medicare and Medicaid, oil economics and its consequences, the recognition of new categories of health professionals, increased third party payments in dentistry, denturism, advertising, peer review and Professional Standard Review Organizations.

Waldman (1970) states:

"The dental profession, specifically dental educators have recognized the marked differences between the profession's official pronouncements and aspirations and the character and motives of the dental applicant and later the student. In an attempt to overcome these marked differences, departments of social and community dentistry have been developed in most schools of dentistry in this country. The prime concern of these departments seems to be a desire to provide students with the insight needed for leadership in the humane aspects of practice....".

3.2 TREND DEVELOPMENT

A number of reports and surveys on dental education by various official bodies and interested persons in the USA has kept the dental schools informed of the prevailing situation and produced recommendations for the improvement of dental curricula. Conferences, workshops and similar gatherings are also another medium used to inform, discuss, evaluate and disseminate new ideas and approaches in dental education. The resulting literature was published in special or periodical publications.

All these activities have contributed to the inclusion of the various topics of and greater emphasis on community dentistry. Examples are given in the following pages.

The National Association of Dental Faculties' requirements for the three year course of not less than six months in each year had in its outlined schedule of studies in 1899 the subjects of ethics and history in the third year (Horner 1947).

In 1916 the Dental Education Council of America indicated that the minimum requirement for class "A" dental schools should include 32 hours devoted to jurisprudence, history, ethics and economics, out of a total 4400 hours - about 1.5 per cent in a four year curriculum of 32 weeks and six days in each week (Gurley 1960).

The 1934 Curriculum Survey Committee's report for the American Association of Dental Schools included the following recommendations for the teaching of community dentistry topics:

1st year: orientation in dentistry	10 hours
personal hygiene	16 hours

2nd year: mouth hygiene and oral prophylaxis	16 hours
3rd year: nutrition	16 hours
4th year: application of preventive principles in dentistry	32 hours
practice management	32 hours
history of dentistry	16 hours
social and economic relations of dentistry	32 hours.

In addition, there was a recommendation of 16 hours of technical composition in each of the last three years, making a total of 218 hours out of 4367 curricular hours or 4.99 per cent.

The recommendations were not always followed by all schools and Hollinshead (1961) showed the discrepancy between the 1934 recommendations and what was in operation in 1941-42 and 1958-59:

Average percentage distribution	Recommended	1941-42	1958-59
Public health and hygiene	1.83	1	0.54
History, ethics, jurisprudence, practice management and technical composition	3.16	2.87	1.32

The development of public health dentistry produced groups and persons interested in furthering the teaching of the subject in undergraduate dental education.

The American Association of Public Health Dentistry (AAPHD) was founded by a group of State dental directors in 1937 to provide leadership in improving the oral health of the public through the discipline of public health dentistry. In 1941, AAPHD initiated the Journal of Public Health Dentistry.

"Public Health Dentistry" was recognized formally as a dental speciality by the American Dental Association in October, 1950.

Subsequently, the American Board of Dental Public Health was officially recognized by the House of Delegates of the ADA in October, 1951 (Allukian 1986).

The inclusion of community dentistry topics came from various writers, too. Hine (1951) called for the teaching of developments in dental public health. Muhler, Day and Hine (1952) called attention to the importance of a course in preventive dentistry in the dental curriculum indicating that only two out of 41 dental schools listed course specially on "Preventive Dentistry"; thirty schools failed to list a course in preventive dentistry of any nature, while nine indicated a course in caries control as being taught.

A call for a balanced educational programme in dentistry came from Peterson (1953) to allow the professional to play a full role in the community and provide better service to his patients and the community by playing the role of a psychologist, a humanitarian, and a scientist and by integrating and correlating his knowledge and skills using understanding of psychology, sociology and economics.

Hadjimarkos (1954) suggested the establishment of departments of "Public Health and Preventive Dentistry" in dental schools, and citing that the term preventive medicine has a broad meaning, which includes public health, thought such departments could be designated simply as "Department of Preventive Dentistry".

The increasing number of subjects being advocated for inclusion in the dental curriculum and the calls for greater emphasis on preventive dentistry, public health, and dental public health led to suggestions to establish a department to organize and strengthen their teaching.

A Conference on Public Health Dentistry was held in Chicago in 1955 and a Symposium on Preventive Dentistry followed in 1956.

The Chicago conference was no longer occupied only with clock-hours of teaching public health dentistry but discussed course objectives and content and qualifications and training of teachers of the subject. At that conference, Galagan (1956) noted that the mission of the dental school is to produce a graduate who is not only technically competent, but conscious of his professional obligations, and able and willing to meet his broad social responsibilities. Also that the public health phases of the curriculum can and should make a very important contribution to these objectives by providing the future dentist with the opportunity to study and acquire an understanding of his relationship to his patient as an individual, to his community and to his fellow workers in the health field.

There is a growing recognition that the practice of dentistry is a social activity involving the interaction between the dentist and the community as well as between the dentist and an individual patient.

"This has been repeatedly demonstrated in the general political interest in dental health matters and the continuing plea by the spokesmen of organized dentistry for the development of a social consciousness within the profession." (Galagan 1956)

Blackerby (1956) summarizing the general discussion for the same conference noted:

"It was suggested that public health can contribute much to the broadening of dentistry as a profession, to balance the traditional over-emphasis on the technical and mechanical aspects of dentistry. It is very important to present public health in this light to the dental school administrators, if it is to develop fully and find its proper place in the dental curriculum."

The summary also revealed that the conference was divided on the issue of integrating the teaching of public health dentistry into existing

courses or teaching it as a separate subject and the quotation above points to where Blackerby's sympathies lay.

The idea of a department to encompass all topics related to community dentistry surfaced again in 1957. Blackerby (1958) mooted the idea of a department of "Social Dentistry" to a Conference Session on Public Health Dentistry of the A.A.D.S. in Atlantic City, New Jersey, referring to the difficulties facing the curriculum of public health in many dental schools as "improperly conceived, poorly organized and ineffectively taught." Among the difficulties Blackerby cited the small part of total curriculum time given and the unavailability of qualified teachers. The result, more often than not, was a hodge-podge of disorganized subject matter presented by a series of guest lecturers resulting in public health often being unpopular, lacking in prestige and respect with so few students seeking a career in public health dentistry after graduation. His long range solution suggested:

"...reorganization of the dental curriculum to provide for consolidation of teaching and research in public health and related subjects like preventive dentistry in its broadest sense, social and economic relations, dental economics, ethics and jurisprudence, gerodontology, chronic disease and rehabilitation and perhaps some pedodontics and practice administration and the utilization of auxiliary personnel. Furthermore, it is necessary to prepare personnel for teaching this logical combination of disconnected segments of the curriculum, perhaps as a department of "Social Dentistry". In addition, staff of other departments should be encouraged to recognize, interpret and teach the social, public health and preventive implications of their own subjects. In this way graduates of dental schools would be more broadly educated and better prepared to assume responsibility as professional men and community leaders and a greater number should be motivated toward careers in public health." (Blackerby 1958)

Blackerby (1958) suggested that public health and preventive dentistry might be expected to constitute the basic framework of the newly established departments. He also thought the change

suggested was idealistic and long range requiring the cooperation of schools of public health, dental schools and perhaps schools of education to provide the type of training needed for teachers of social dentistry.

Although many people have been responsible for effecting changes in the teaching of preventive and community dentistry, Blackerby is perhaps best known, not least for his famous and much quoted paper "Why Not a Department of Social Dentistry?" Blackerby (1960) presented his paper as one of four on the topic "Why Not a Department of Social Dentistry?" at the Conference Session on Public Health Dentistry of the A.A.D.S. held in Chicago, Illinois, in March, 1960. The paper's interrogative title with the evocative use of the word "Social" engendered much argument and discussion.

Later, Blackerby (1963a, 1965) admitted his term "social dentistry" was seemingly stigmatized through its semantic implications but insisted "I like 'social,' but I'll settle for either 'Preventive' or 'environmental.' What'll you have?" In effect, he steered the argument from an opposition, to a choice of name for the new department.

Blackerby's paper provided a culmination to much of the previous efforts in advocating the introduction and the giving of more emphasis to a number of subjects and topics of social or community import. A departmental status seemed attractive, uniting previously competing claims to curricular time and emphasis and staffed and run by interested and committed members.

A seminar on "social dentistry" soon followed in 1963 in Alabama and a workshop on the teaching of dental public health in New Brunswick, New Jersey, later the same year.

Blackerby's suggestion for a department of social dentistry was motivated by a strong conviction that the social aspects of dentistry were then seriously neglected in the typical dental student's education and by a sincere desire to find ways of correcting this basic deficiency in the methods of preparing dentists for their role in society. Blackerby (1960) proposed a Department of Social Dentistry to be established by dental schools for two purposes:

1. To assume primary responsibility for curriculum development, teaching and research in those areas of dental education which contribute most directly to the social maturation and evolving professional philosophy of the student.
2. To coordinate these areas throughout the total programme of dental education in order that the efforts of all departments may be joined effectively for the basic and common objective of producing graduates who are well rounded, socially motivated, and professionally competent citizens.

A department of social dentistry according to Blackerby would, in addition to teaching public health and dental public health, profitably group and integrate for greater emphasis and better coverage a host of other subjects of social import that hitherto were considered "curricular orphans" - belonging to no faculty member in particular and being taught as a chore rather than a challenge. These subjects include: ethics, jurisprudence, history, social and economic relations, dental economics, epidemiology, psychology and behavioural science, gerontology, civil defence, radiological health, hospital relations, chronic disease and rehabilitation, family dentistry and the social aspects of practice administration. Logical additions would be preventive dentistry (in its broadest sense), the effective utilization of auxiliary

personnel, biostatistics and the social significance of dentistry and the fostering of the concept of "comprehensive dentistry". He also thought the Department would be responsible for the planning and supervision of essential field experience for the students in such areas as public health, epidemiology, chronic disease and rehabilitative hospital relations and community organization. Further, the department could introduce research in social and behavioural sciences through its psychologist or behavioural scientist members and contribute to the teaching and investigative activities of other departments. Also, deal with dental faculty problems of recruitment, admissions, counselling, evaluation, administration and public relations.

Finally, he suggested the department would be chaired by a competent dentist with education and experience in public health administration, together with other essential qualifications.

Apart from the teaching and coordination of the subjects of social import, Blackerby (1963b) cited as a rationale for departments of social dentistry the conspicuous inactivity of dental schools in social science and public health research; the dental profession's relative ineffectiveness in its efforts to secure wide public acceptance of fluoridation; the reluctance of many dental practitioners to lend their active support to state and local dental public health programmes; and the slow development of prepayment and insurance programmes for dental services.

The designation of departments under which the community dentistry programmes were offered varied. Only three departments carried the title "Social Dentistry". Harvard settled for "Ecological Dentistry" as a term to include dental public health, practice

management and social sciences (Giddon, Dunning 1963). Tufts University, School of Dental Medicine, was the first to organize its community dentistry subjects under the name "Social Dentistry" in 1961 (Calisti, Kramer 1965). The University of Kentucky, School of Dentistry, established a first department of "Community Dentistry", a term also sponsored by the University of Michigan (Dworkin 1981).

Petterson and Littleton (1971) reviewed the development in the teaching of preventive and community dentistry and concluded that data showed a trend since the fifties of increased emphasis on the teaching of the subjects, especially on social sciences, public health and preventive dentistry. Their own survey showed dental curricular time devoted to preventive and community dentistry averaged 201 hours or 4.5 per cent of total curricular hours. Also, the number of dental schools with programmes in the subject had risen from two in 1960 to 38 in 1969 with the programme in a department in 30 schools. Five of the programmes were in divisions, two in sections and one in an institute.

The previously mentioned "Survey of Dentistry" conducted for The American Council on Education by a Commission appointed in 1957 reflected in its final report (Hollinshead 1961) the political concern on social and community issues in dental education:

"The teaching of practice administration and several other courses, such as ethics and the history of dentistry, is often less effective than it might be because these courses are not integrated with one another and are often assigned to teachers who have no real interest in them. There is a growing belief among dental educators that such courses should be grouped together into an area of instruction that might be called "social dentistry," "community dentistry," "dental sociology," or something similar. Some schools might wish to make this area of instruction a department; others might wish only to place it under a coordinator. Under the department or coordinator there could be courses in ethics, jurisprudence, public health dentistry, history of dentistry, dental practice administration, psychology, and perhaps the sociology of dental care plans. Since these individual

courses are often additional assignments to already busy teachers, such organization would improve the teaching of these subjects in most schools. Undoubtedly, such courses running vertically through the curriculum would offer a stimulating challenge to the faculty members responsible for them. Perhaps the creation of a department or section of this type might help to imbue dental students with a sense of social responsibility that not all of to-day's graduates seem to possess."

The Kentucky Conference on Dental Curriculum was held at the College of Dentistry at the University of Kentucky Medical Centre in December, 1961. The newly formed dental school's proposed curriculum constructed by five experienced dental educators presented many new concepts and innovations. The Conference subjected it to intensive study and open criticism (Durocher 1962).

At the dedication ceremony of the Kentucky College a year later Hein (1963) stated:

"The dedication of this new school to a philosophy encompassing social sensitivity marks the onset of a significant new dimension in dental education.....It is significant that this new dental institution has a stated philosophy that places development of social sensitivity on a par with the objectives of technical capability and scientific knowledge."

A greater impetus to the initiation and increase in the number of community dentistry programmes and departments was given by financial support from federal government agencies during the 1960's and 1970's. The initial funding under the 1964 amendments to the Public Health Service Act for general department development was followed by special service delivery project grants which enabled departments of community dentistry to support new schemes like Dental Auxiliary Utilization (DAU) and Training in Expanded Auxiliary Management (TEAM). The Public Health Service as an agent outside the dental schools, was rated as the foremost positive influence in establishing programmes in community dentistry (Petterson, Littleton 1969; Waldman, Siegel 1980).

The ADA launched a two year study of all dental schools in the US and published its report in 1976. According to Waldman and Siegel (1980), the study was called for due to the growing concern regarding the many forces affecting the curriculums of dental schools - especially the increased emphasis on social dentistry - which prompted some ADA members to call for a thorough evaluation of dental school curriculums throughout the country to ensure adequate attention to "total patient care" in the clinical areas.

The ADA report on dental education in the USA (ADA 1977) showed the following features regarding the community dentistry programmes:

- All the subjects and topics pertaining to community dentistry were reported under behavioural science.
- "Behavioural sciences" faculty members accounted for 10% of all faculty members of the 59 dental schools with about 33 per cent part-time members.
- Broadly speaking, the behavioural science clock hours comprise from 4 to 6 per cent of total curriculum hours.
- Every school has at least one or two faculty members who is a psychologist or dentist with a Ph.D. in behavioural/social science. About 6-8 schools have 8-12 behavioural/social scientists.
- The study defined the areas of behavioural and social sciences instruction as comprising six areas with subareas:

I. Behavioural Principles of Dental Practice

- a. Understanding human behaviour
- b. Management of human behaviour
- c. Pain and anxiety control
- d. Prevention

II. Application of Behavioural Principles to the Care of Non-Institutional Patients

- a. Routine patient
- b. Handicapped
- c. Chronically-ill
- d. Culturally variant
- e. Homebound
- f. Pediatrics and adolescents
- g. Geriatrics

III. Application of Behavioural Principles to the Care of Institutionalized Patients

IV. Community Dentistry (Dental Public Health)

- a. Principles of biostatistics and research design
- b. Epidemiology of disease
- c. Professional ethics
- d. Jurisprudence
- e. History of dentistry
- f. Prevention
- g. Extramural/externship experiences
- h. Preceptorships
- i. Health care economics
- j. Social issues
- k. Quality assurance and peer review

V. Forensic Dentistry/Medicine

VI. Practice Administration

- a. Personnel management
- b. Patient management
- c. Business management
- d. Professional practice development

- 12 dental schools reported requiring 70 or fewer hours. One school reported 1165 hours of instruction. Of all the schools, 46 reported total clock hours ranging from 50 to 349.
- Available curriculum time ranged from 20 to 400 hours for about 80 per cent of the schools.
- Elective/selective courses in the behavioural and social sciences were possibly used by few students according to the report.

In the summary of recommendations, some of the relevant points from the report are:

- The behavioural and social sciences should be integrated more effectively into the clinical setting and existing clinical faculty should serve as transmitters and evaluators of behavioural and social sciences curriculum content.
- The dental schools should evaluate the adequacy of their current programme offerings in the areas of practice management skills and effective communication with patients and, where warranted, increase their allocation of time and resources devoted to the training of students in these skills.
- The primary focus in dental education should be to prepare students to provide comprehensive patient care to all population age groups including the handicapped and medically compromised patient.
- All predoctoral students should be provided with learning experiences in the various health care delivery systems so that the graduate can make sound judgements on selecting a type of practice setting.
- Professionalism entails values and ethical behaviour and, therefore, the dental schools should carefully select students and faculty members with high ethical values and maintain an educational environment which reinforces ethical behaviour among its graduates.
- The Guidelines for Teaching the Comprehensive Control of Pain and Anxiety in Dentistry should be implemented by each school.

- Each school should develop a coordinated programme with a clinical component in nutrition.
- DAU programmes should be expanded and greater emphasis placed on instruction in the clinical setting.

In 1973 the American Dental Association's Council on Dental Education indicated it would consider approving curricular guidelines developed by the American Association of Dental Schools Sections. Various curricular guidelines were developed since then and they are intended for use by individual educational institutions as curriculum development aids without being official policy statements of the AADS or constructed as recommendations for restrictive requirements - as in accreditation (AADS 1975). Although this is the official policy of AADS, it is noted that the ADA's 1976 Report on dental education recommended schools should implement the Guidelines for Teaching the Comprehensive Control of Pain and Anxiety in Dentistry; the Guidelines for Teaching Orthodontics in Dental Education and the Guidelines for Teaching Physical Evaluation in Dental Education (ADA 1977).

Some of the curriculum guidelines developed by the AADS of relevance to community dentistry in order of publication in the Journal of Dental Education are:

1. Preventive dentistry curriculum: Minimal preventive action guidelines for dental practice (1975).
2. Practice administration (1980)
3. Preventive dentistry (1980)
4. Predoctoral extramural programme guidelines (1980)
5. Behavioural sciences in dentistry (1984)
6. Practice administration (1986).

Perhaps it is noteworthy that the first curriculum guidelines to be developed were those for preventive dentistry curriculum, which were developed by the AADS Section on Community and Preventive Dentistry in 1975.

Between 1980 and 1985 the AADS Sections developed curriculum guidelines for 25 disciplines related to the undergraduate dental curriculum which were published in the Journal of Dental Education. Susi (1986) surveyed the use of curriculum guidelines by educators in US dental schools and found among the respondents:

64% of basic science course directors familiar with the guidelines in their disciplines.

70% of clinical course directors similarly familiar.

Less than 50% in two basic science disciplines and one clinical area were familiar with the guidelines concerned.

The respondents also indicated the use of guidelines in:

Course development	47%
Course review and evaluation	67%
Course revision	50%.

The findings of the survey prompted the AADS to collect all the guidelines in a single source published as "Compendium of Curriculum Guidelines".

The WHO report on Dental Education (WHO 1962) suggested a properly planned curriculum should include among six groups of subjects a group on "humanities and social sciences", which should include sociology, psychology, and social dentistry, including dental public health. The report also suggested teaching this group of subjects throughout the four year curriculum and commended the

the creation of departments of preventive and social dentistry in some schools at that time.

Another WHO report on the organization of dental public health services (WHO 1965) considered the undergraduate dental curriculum as comprising two major phases - social dentistry and technical dentistry - which overlap. The report pointed to the responsibility of dental health administrators in promoting the expansion of society-oriented courses in their respective countries. The courses may include public health, ethics, jurisprudence, history, social and economic relations, psychology and human behaviour, biometrics and epidemiology. In addition, they may also include the social aspects of preventive dentistry, dental economics, practice administration, gerontology, radiology, hospital relations, chronic disease and rehabilitation and health insurance. The report also noted the trend toward grouping these courses in departments of "social" or "environmental" or "community" dentistry.

Dental schools in the Nordic countries recognized the need to include Blackerby's "Subjects of social import" in their undergraduate curricula when teachers from their schools met at Aarhus in 1972 to lay the first plans for the teaching of community dentistry. Their meeting agreed on an undergraduate curriculum for community dentistry and sought coordination and cooperation in teaching and research for the subject. Riordan and Windstrom (1984) surveyed the development of community dentistry in the four Nordic countries as outlined here.

The four countries have 12 dental schools between them, seven of which have a department of community dentistry divided as follows:

Denmark	2 dental schools	2 departments at Aarhus and Copenhagen
Norway	2 dental schools	2 departments at Bergen and Oslo
Finland	4 dental schools	2 departments at Kupio and Turku
Sweden	4 dental schools	1 department at Malmo.

- At least two other schools had plans to start a department.
- About 100 hours of teaching were given on community dentistry subjects during the five year course of study with an average 69 lectures and 45 seminars and no field work.
- The teaching was spread over at least three academic years starting in first or second year.

Although unemployment among dentists exists already in the Nordic countries (Moore 1985a) and student intake reduced with the possibility of closure of some schools, none of the schools expected reduction in their community dentistry departments and several expected expansion in curriculum time and staff in keeping with trends in other countries. A possible explanation is the recognition that it is the disciplines of community dentistry which may be applied to plan dental manpower requirements and the dental public health specialists are those required to advise health and education authorities on policy (Riordan, Widstrom 1984).

The Nordic countries with their cultural traditions and social policy providing some unique oral health services (Helm 1982) might have seen less urgency in introducing community dentistry in their dental curricula. Still, it is rather perplexing that some of these countries like Denmark with the teachings of N.F.S. Grundtvig, C. Kold and S. Kierkegaard, 19th Century Danish philosophers, educational innovators and humanists had to follow the US lead and to await Blackerby's "Why Not a Department of Social

Dentistry?" to introduce "subjects of social import" into their dental education.

Grundtvig, Kold and Kierkegaard helped shape the Danish cultural traditions of individual independence and integrity combined with social cooperation that are reflected in modern Danish health, education and social policy. The Child Dental Health Service in Danish schools is a result of the "child care first" values of the Grundtvigian humanist tradition (Moore 1985b).

The tardiness shown by dental education in relation to social developments seems to be widespread and may indicate its relative isolation in many countries, including the highly developed Nordic countries. Their tardiness in introducing community dentistry might have also reduced the effectiveness of dental personnel in influencing public health policy; an example of which is the profession's failure to gain public acceptance of water fluoridation (Riordan, Windstrom 1984).

The dental programmes developed for the Institute of Dentistry and Stomatology, Dakar in Senegal with the support of WHO, trains dentists and operating dental auxiliaries. The objectives of the programmes enable the two categories to work together in a public health team trained in accordance with the general principles of a common education in preventive and social dentistry. The greater part of the dentist programme's objectives are related to preventive and social dentistry, in particular, integration in general health services and the role of the dentist as head of a dental team. The student dentist starts preventive and social dentistry in the third year with 60 hours, and takes 90 hours in the fourth and fifth years. The fourth year started in 1971-72 prior

to which students used to complete their studies in France. The dentist training programme was so successful, it received students from 13 countries in 1975-76 (Grappin 1977).

The 28 Latin American countries have 106 dental schools, half of them located in Brazil. The estimated 74000 dentists (1977) are mainly concentrated in capital cities and urban areas, while the majority of the populations are rural. Rapidly increasing population has not improved dentist-population ratios in spite of large increases in student intake. Dentistry is still largely understood, directed and performed by a rigid-minded, culturally dependent and self-centred dental profession and is built on industrialized countries' dentistry (Beltran, Gillespie 1977).

Increased consciousness of the social nature of dental care among dentists and communities is helping to remedy the situation. The response shows increasing auxiliary training and a strong community orientation in dental education. Some of the concepts of the response pattern shown by dental education in Latin America include:

- Education of dentists and auxiliaries tailored to population needs as in "community laboratories" in Venezuela and the "rural brigades" in Ecuador.
- Educating auxiliaries with later opportunities to become dentists allowed Cuba an estimated 80 per cent coverage of its population by 1977 in a short period of time.
- Learning experiences in a community setting was developed by the Department of Social Dentistry of the dental school in Guatemala.

- The dental school of the University of Antioquia in Columbia developed a department of preventive and social dentistry in collaboration with WHO and the WK Kellogg Foundation in November 1961. The school also initiated the first dental nurse-type auxiliaries formal training programme in Latin America and built the educational process of the dentist on a revised professional profile (Beltran, Gillespie 1977).
- The first university to start a department of community and preventive dentistry in Latin America was that at Concepcion, Chile, in May 1960 (Chaves 1963).

To meet accreditation requirements, a dental school in Japan must have 18 departments, one of which is preventive dentistry. As an example, the curriculum adopted by the Gifu College of Dentistry has under "preventive and social dentistry" 135 hours of preventive dentistry and 60 hours dental jurisprudence making a subtotal of 4.2 per cent of total curriculum hours - 4635 hours. "Dental Administration" is shown under the title "Clinical Dentistry and Related Medicine" and is given 60 course hours (Otani, Mori 1975).

"As might be noted, social dentistry has so far not been emphasized in Japan, but it will surely bring a new phase in Japanese dentistry in the next decade."
(Otani, Mori 1975)

In the UK, James (1966) noted that undergraduate curricula placed almost all their emphasis on diagnosis and treatment of individual patients with little attention paid to public health aspects of dentistry, although some Scottish universities increased their public health teaching and some English universities established chairs and readerships in dental health, child dental health and preventive dentistry. He advocated a shift of emphasis to inculcate a sense of responsibility to the community during undergraduate

training through instruction in public health, social and preventive dentistry, dental health education, epidemiology and statistics for the benefit of the public, the health services and the dental profession. He appeared not to favour the setting up of a new department for the purpose, instead, thought the overall concept should permeate all instruction.

Allred and Slack (1968) noted it was not sufficient to teach the techniques of dentistry alone for it is necessary to prepare the students to be responsible members of the community and respect each other. However, their revised curriculum for the London Hospital Medical College Dental School presented no obvious mention of community dentistry topics for that purpose.

Slack (1969) thought dental public health should be taught by all departments throughout the undergraduate course and noted the creation of a social dentistry department may produce more problems than it solved but conceded such a department had a coordinating role and should be staffed by a small core of skilled personnel with participation staff in rotation from other departments.

It seems just as the stranglehold of the medieval guilds on early dentistry in Britain proved difficult to break off, in the late 1960's the shackles of the departmental structure made innovators rather wary. Typically,

"The answer in British schools may be the compromise, at least to begin with, of having a small department with responsibility for developing a continuous course of instruction throughout the undergraduate course. This department should have power to coordinate with other departments and it should have some teaching time of its own. To begin with it may consist of only one suitable person who is already a staff member. In time, the teaching staff could grow, and full departmental status may be achieved."
(Burt 1970)

In 1977 the Nuffield Foundation saw a need for a comprehensive review of dental education in the United Kingdom. A Committee was appointed in March 1978 to review education and training for the practice of dentistry in the light of community needs taking into account advances in dental science and technology, changes in concepts of dental care provision and possibilities of dental disease prevention; to advise on what principles future developments should be based; and to make recommendations. The Committee included medical, dental, legal and administrative members with some educators and general dental practitioners.

The Committee's report did not deal in great detail with the undergraduate curriculum, a matter more for the General Dental Council. However, the Report's review included some observations relating to community dentistry:

- Early exposure of students to different community groups in a community dental health department or unit in close collaboration with other clinical departments and liaison with Area Dental Officers in Health Authorities.
- Practical aspects of prevention to be taught at an early stage with prevention as part of the theme of all teaching during the course.
- Training in applied psychology with particular attention to the skills of communication and interpersonal relationships. The teaching may recur in different parts of the course and requires the understanding of clinical teachers to achieve its objectives.
- Teaching fundamentals of forensic odontology, ethics, jurisprudence and a good grounding in research methods, including statistics.

(Nuffield Foundation 1980)

The General Dental Council in the UK has the responsibility for promoting high standards of professional education. In the GDC recommendations concerning the dental curriculum (GDC 1980), it has the following relevant to community dentistry:

- Students should receive instruction in dental jurisprudence and the legal and ethical obligations of registered dental practitioners should be made aware of the problems of running a general dental practice.
- It is desirable that students should be trained to work with ancillary staff.

A report on the conference on undergraduate dental education in Europe (WHO, EUROPE 1968) noted that teaching of dental public health was neglected or absent in several dental schools and recommended teaching epidemiology and biostatistics, behavioural sciences and the organization of public health services, including principles of operational research throughout the undergraduate course, coordinated by a specific department if no separate department is created.

In New Zealand, Sir John Walsh who was Dean of the dental school and a member of the Expert Committee that produced the WHO Report on Dental Education in 1962, indicated dentistry lagged behind many other professions in the development of the psychosocial, humanistic and social dimension in its students' education. The teaching of community dentistry subjects he indicated would give dentistry its third dimension providing depth and full meaning creating a profession that will provide leadership in planning, developing and participating in programmes for the prevention, control and treatment of dental diseases and shape public and State

attitudes to dental health (Walsh 1966).

The curriculum of the New Zealand dental school at Dunedin had many innovative features when introduced in 1945, including a Department of Preventive and Children's Dentistry. A revision started in 1972 when a new dean took over and allowed for the introduction of elements of sociology to be built into the course at all levels (Warren 1973).

A seminar on the Education of the Dentist held at Sydney, Australia (Aust Dent Assoc 1974) stressed the development of responsible attitudes in relation to social, economic and political factors and the role in total health care of the community by providing the student with training in the behavioural and social sciences, auxiliary utilization, management and other community dentistry topics.

The Report of the seminar, remarkably, suggested also the topics: bioengineering, electronics and the basic technology of equipment and instrumentation involved in dental treatment. A suggestion appropriate today with increasing cost and complexity of dental equipment and which may lead to better appreciation of primary health care's "appropriate technology" as stipulated in the "Declaration" of Alma-Ata.

3.3 DIFFICULTIES IN IMPLEMENTATION

The introduction and development of community dentistry's various components into undergraduate dental education was not without difficulties or problems. The acceptance of social dentistry departments to complement the biological and technical phases alarmed many. Some faculty members would have been concerned about giving up time to accommodate the new programme, or worse still, having to teach part of it. Others inside and outside the schools could have been genuinely worried about the de-emphasis on the rest of the curriculum, especially the mechanical portion. The editorial in the Journal of the American Dent Assoc, May 1975, by HC Butts, was critical of the "creeping liberalism" in dental education over the previous 15 years, resulting in de-emphasis on clinical training which became the sacrificial offering to the "new curriculum".

Another dentist, upon assuming the presidency of the New York Academy of Dentistry, objected to this change in emphasis and asked, "Do we feel that clinical exposure should be sacrificed for didactic courses such as community dentistry and nutrition?" (Waldman, Siegel 1980).

Although none of the advocates of community dentistry suggested any lowering of clinical standards, the resistance to change in curriculum matters - and any change for that matter - is well known and stems from various reasons as will be seen later.

Other difficulties include crowding of the curriculum and the short time the student has to digest an increasing body of knowledge. The lack of suitably qualified and interested teachers was constantly referred to in the earlier years of the development.

There is also a difference between teachers and students on the relative importance of the various topics of community dentistry. In a survey of second and third year students' selection of topics, from a list similar to Figure 13, to be included in community dentistry, Dworkin, Picozzi and Simon (1972) found the students selections agreed quite well among themselves for the two groups but there was virtually no agreement between the students' topic rankings and those of teaching staff attending a conference on teaching of preventive dentistry. Extracts from the rankings illustrate the differences more vividly:

Topic:	Rankings by:		
	Teachers	2nd years	3rd years
Practice administration	23	1	1
Jurisprudence	34-35	2	3
Ethics	31	3	7
Community preventive programmes	1	19	16
Epidemiology	2	24	21-22
Biometry-Biostatistics	3-4	40	45
Methods of financing dental care	3-4	25	24
Manpower	7-8	28-29	36
Interprofessional relations	38	12	14
Special patient-Congenital defects	46	8	9-12

Dworkin et al. (1972) conclude that it is obvious unless such contradictory judgements are recognized and considered as a first step in curriculum planning, there can be little hope for effective teaching and communication in this important aspect of dental education.

Waldman (1970) reports that his review of trends in the pertinent literature would seem to discount a high potential for competence in social sensitivity on the part of the graduating student

and reasons that the rigid criteria for admission, the hostile atmosphere in the student-faculty training situation, the limited time made available to the department of social dentistry, and the constraints of the number system of clinical grading, as all discouraging potential competency in social sensitivity. He also believes that social sensitivity will result from optionally accomplished innovations in the curriculum of dental schools to remove the discouraging factors.

These discouraging factors cited by Waldman earlier in turn may be important in influencing the dental student's view of dental public health, community dentistry.

O'shea and Cohen (1968) found that dental public health was the least preferred specialty. Petterson (1975) found that dental students from 19 USA dental schools rated a career in dental public health compared to that in private practice or dental education as the least successful, exciting, rewarding, valuable, reputable or meaningful! Less than five per cent only rated a career in dental public health more favourably than the other two careers.

However, that the dental school and its environment are not fully to blame for such attitude on the part of dental students was indicated by Smith (1968) who identified the motives which the dental student lists as the influences deciding his or her choice of dentistry were the same motives that would cause that student to dislike the practice of dental public health.

3.4 CONCLUSION

The teaching and scope of community dentistry is still expanding worldwide with a number of countries reporting an increase in instruction or expressing a need for greater emphasis on topics like practice management, behavioural sciences and auxiliary utilization. In some countries an increase in dental public health, preventive dentistry and geriatric institution was specifically related to decreased prevalence of dental caries (Allen 1985).

The importance of increasing community dentistry topics in situations of increasing dental caries prevalence should be more obvious and the need more urgent. The concepts of PHC should feature more prominently among these topics, especially in developing countries.

Of all the changes that have affected the undergraduate dental curriculum, perhaps none has been more debated and far reaching as that of community dentistry. Its wide acceptance and spread has signified a new stage in dental education with continuing effects and contributions to the undergraduate dental education. The increasing emphasis on community dentistry has heralded the advent of the humanistic, social and psychosocial eras and stages of the previous writers. Its various elements are heavily represented in the objectives and innovations of the curriculum as outlined and suggested by the FDI and WHO.

The role of community dentistry in dental education is still evolving and its effects are continuing. As a subject or department it is best suited to further the cause of the new concepts in PHC as applies to oral health.

The teaching of community dentistry subjects and topics can be seen as a natural development in the evolution of a higher and professional education. The inclusion can be justified on academic, professional and moral grounds. The development has largely followed similar changes in medical education and was spurred on by changes in society and political assistance. Balancing, liberalising and humanizing the dental curriculum might have largely been achieved and so has the attempt at imparting the knowledge and skills to the dental student in social dentistry. However, the socialization of the dental student in the affective domain is less certain.

In 1980 the ADA and AADS set up a Special Committee on the Future of Dentistry in the USA. The Committee's three year study covered five topics: dental research, dental manpower, public and professional concerns, dental education and dental practice. The report presented a strategic plan with five principal recommendations - "priority guidelines" to be considered as a blueprint for the future of dentistry. In 1983 the ADA adopted the five principal recommendations and added the sixth:

1. convert public unmet need into demand for dental services;
2. prepare practitioners (existing and future) to be more patient and market oriented;
3. broaden practitioners' clinical skills and mix of services offered to the public;
4. influence the quality and quantity of the manpower supply;
5. stimulate research and development;
6. improve the profession's ability to favourably influence public policy.

(ADA 1984; Ginley 1985)

It can be clearly seen that most of the six principal recommendations are directly related to community dentistry activities implying that the future of dentistry is dependent on the future of community dentistry in dental schools and the profession at large.

The following points sum-up the trend review:

- Recommendations are almost always implemented slowly and rarely fully.
- The trend of teaching community dentistry is world-wide and increasing its share of the curriculum, and although the scope is generally similar, emphasis and curricular hours vary widely.
- Special departments were created to develop and strengthen the teaching of community dentistry.
- Many dental educators advocate the teaching of community dentistry throughout the dental curriculum and without a separate department for greater integration.
- The social and behavioural sciences components are gaining wider recognition and emphasis.
- Difficulties in introducing the trend include resistance from faculty members, lack of qualified and interested teachers, crowding of curricula and their treatment orientation.
- The trend spread due to changes in society, government inducements and the interest of individuals and groups.
- Benefits from the trend include humanizing the curriculum, acceptance of water fluoridation on wider scales, training of various types of dental auxiliaries, oral health care for

special groups and improved professional image.

- The trend has made good efforts towards achieving equitable distribution of oral health care by promoting prevention, oral health education and community involvement.

- In developing countries especially, the trend can benefit the community more by emphasizing the principles of PHC concept in its education and training.

- The future of dentistry in some developed countries requires the strengthening of community dentistry in dental education and dental profession.

- The future of oral health in developing communities faced with economic stringency and deteriorating oral health may rest largely on community dentistry teaching and application.

4. LIBYA - ORAL HEALTH SITUATIONAL ANALYSIS

The following is a situation analysis of features of the national profile relating to the country and its people. Available and relevant development indicators including economic, education and oral/health data are presented.

The information presented is built on most of those required for planning oral health services (WHO 1980) and without being too detailed present data and information on the country, the community, the environment, the social and policy issues of relevance to health and oral health.

The framework for the information presented is also similar to that provided by Sheiham (1981) for estimating manpower requirements in dental public health.

Data were assembled from the following sources:

- . Demographic yearbook 1982
United Nations, New York (1984).
- . Demographic yearbook 1984
United Nations, New York (1986).
- . Statistical yearbooks 1984 and 1985
UNESCO.
- . World Health Statistics Annual 1984 and 1985
Geneva: World Health Organization (1984, 1985).
- . FAO Statistics Series No. 61
FAO Production Yearbook vol. 38
Rome: Food and Agriculture Organization of
the United Nations (1985).
- . World Development Report 1985
International Capital and Economic Development
World Development Indicators
Published for the World Bank by Oxford University Press.
- . WHO Assignment Report, Oral Health Situation
SPLAJ (1983).

4.1 THE COUNTRY

4.1.1 Background

To gain a better perspective, Libya should be seen as a part of and in the context of the Arab world (Figures 14 and 15). This group of 21 independent countries and the people of Palestine form the remnants of the last great civilization the world has seen. The Arab world today extends from the Arabian Gulf in Asia to the Atlantic coast in Africa, covering an area half as large as the USA. The Arab populations (including Palestinians) numbered 185 million in mid-1983 and are expected to reach almost 300 million in the year 2000. Currently, the Arab people constitute 4 per cent of the world population and taken as a group rank as the fifth largest population in the world. Libya is part of the North Africa region of the Arab world and with Tunisia, Algeria, Morocco and Mauritania contains almost 30 per cent of the Arab population as estimated in 1983. The Arab countries are socially and demographically similar. They share a common history, heritage and culture with Arabic as their language and Islam the predominant religion. The Arabs - wealthy and poor, educated and illiterate - are exquisitely conscious of their past and all this permeates their individual and collective behaviour, as well as their view of the future and belief in a common destiny. The Arab region and people have undergone fundamental social, political, demographic, economic and health changes in recent years (Omran 1984).

Libya with a vast desert in the interior and a thin, fertile coastal belt in the north inhabited by a small population in centres separated by vast distances has proved historically a vulnerable, yet vital link to the continuity of the whole Arab region. Official borders were drawn administratively by foreign occupying powers,

THE ARAB WORLD

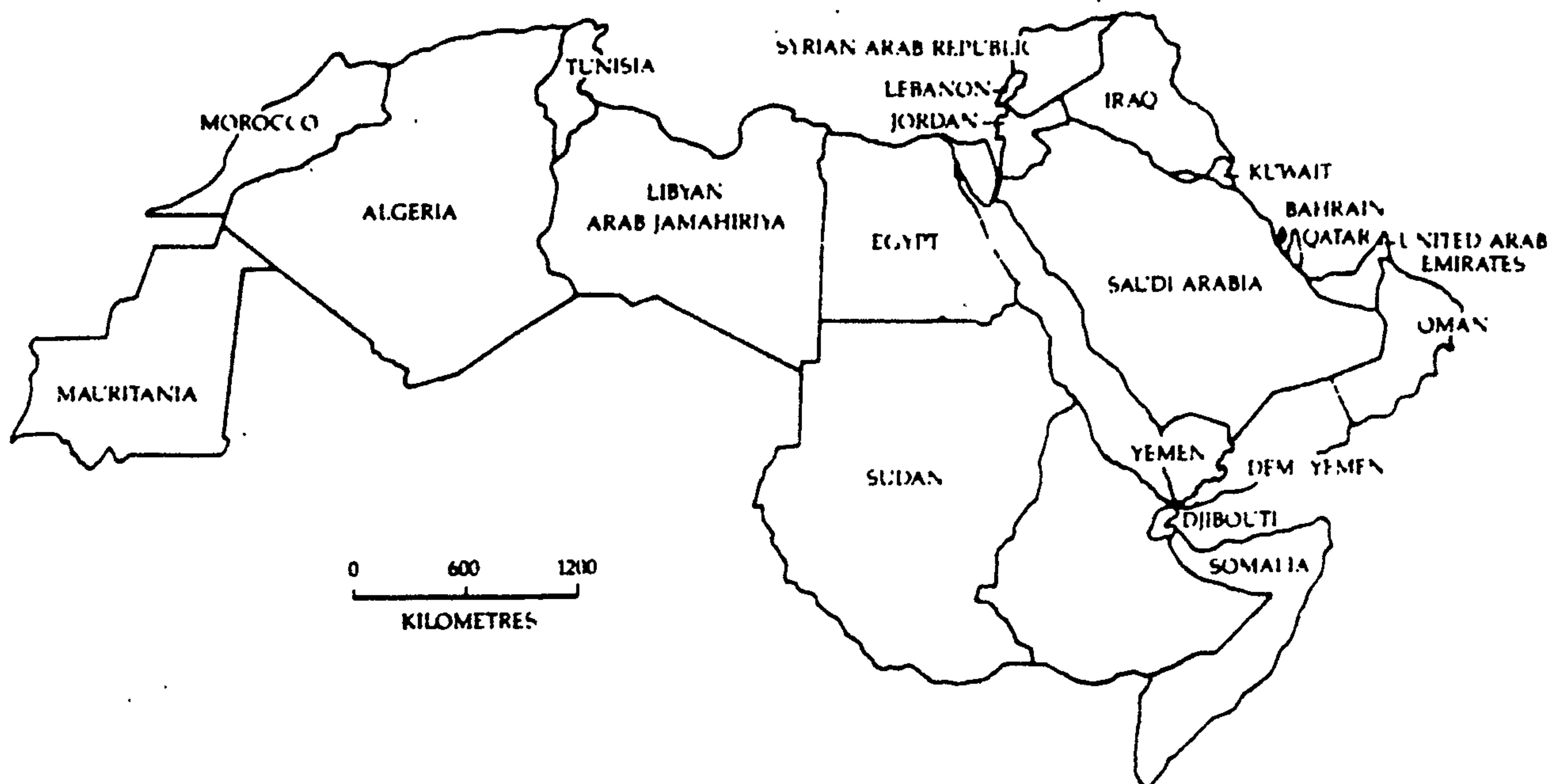


Figure 14.

(Source: Omran 1984)

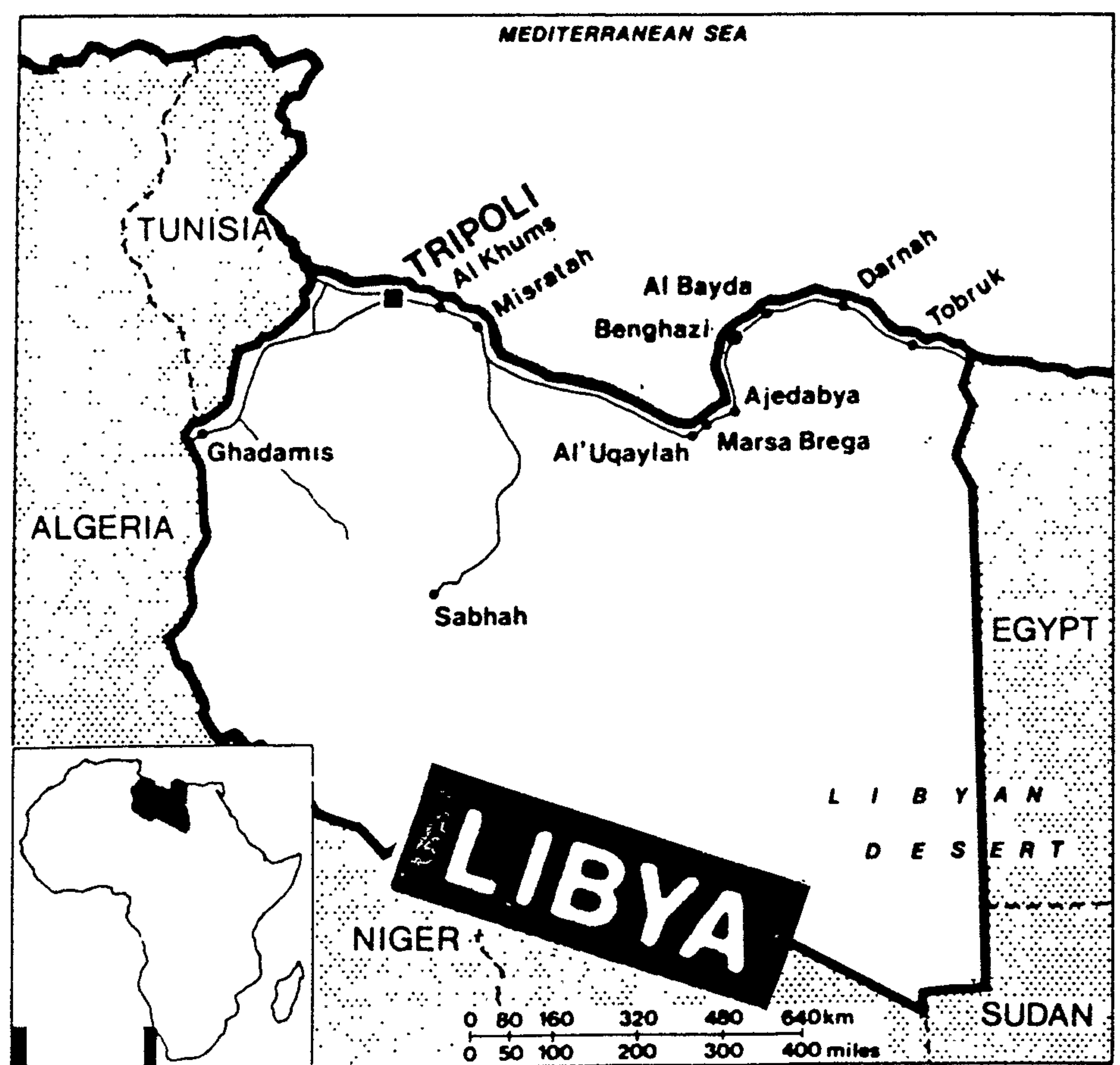


Figure 15. Map of Libya

(Source: Ritchie 1985)

often without much regard to the populations on the land. However, for many nomadic and settled tribes on Libyan borders, life is carried on regardless of what is commonly seen as an artificial line. With its newly found wealth from oil explorations starting in 1956, not only those who had to migrate to neighbouring and other areas of the Arab world during foreign occupations, but also many people from the Arab region came to settle and work in many of the ambitious development projects undertaken in the last fifteen years or so. Manpower came, particularly from heavily populated Egypt (nearly 50 million in 1983) and included not only manual workers in industry, agriculture and building, but also professionals, such as teachers at all levels, doctors and dentists. This trend has slowed down in recent years, not only due to the worldwide general recession but also due to policies of self-sufficiency and the results of planning.

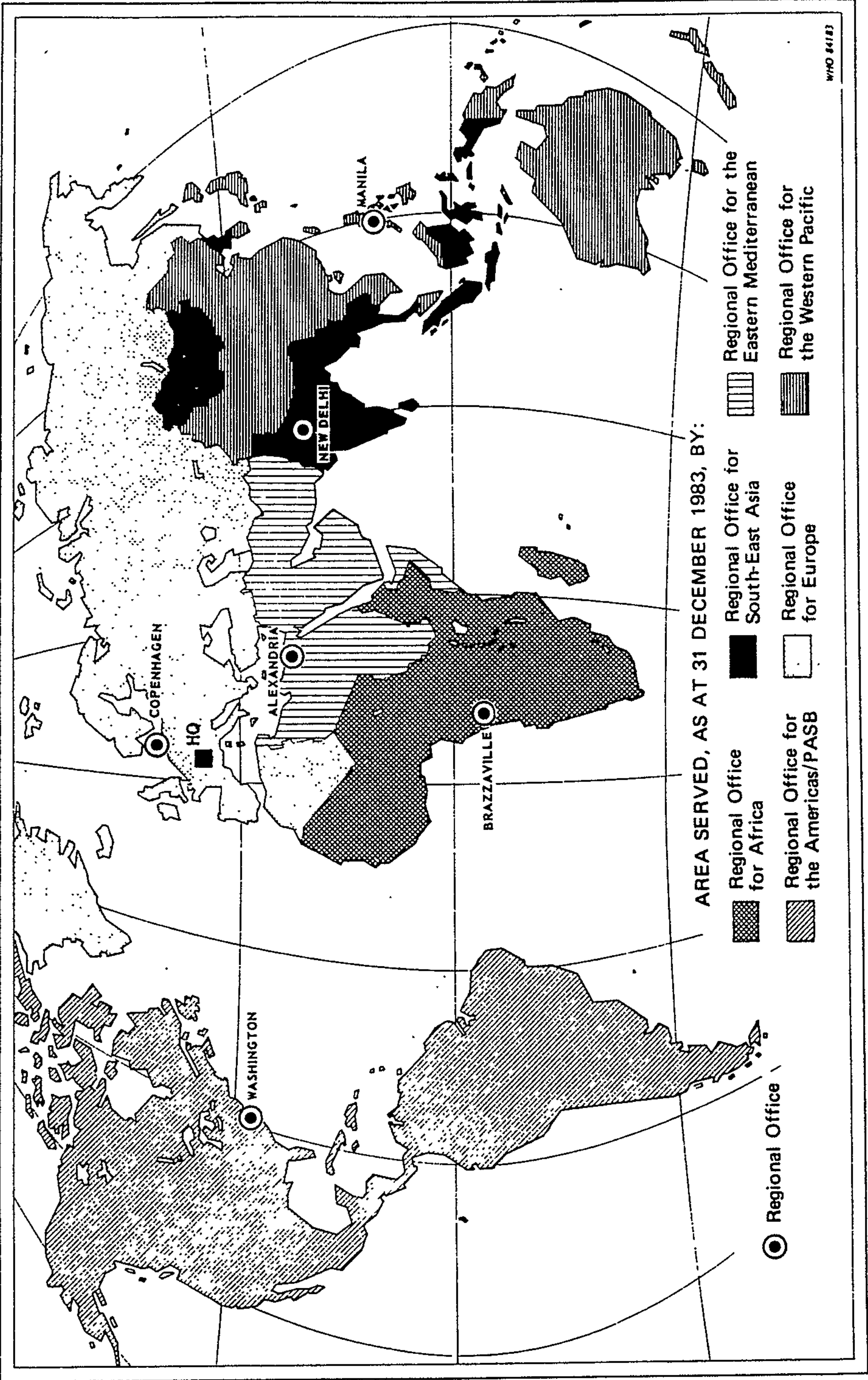
Libya has also an African dimension being strategically placed for a gateway to continental Europe. As a member of WHO, Libya is a part of its Eastern Mediterranean Regional Office (EMRO), which has 22 member states (Figure 16).

4.1.2 Geography

The map inset in Figure 15 shows the location of Libya, the fourth largest country in Africa. It has an area of about 1.8 million sq kilometres or 680 000 sq miles, roughly seven times the size of Britain or the size of Germany, France and Holland, together. It has about 1900 kms of Mediterranean Sea coastline. The whole of the country forms part of the vast plateau of North Africa which extends from the Atlantic Ocean to the Red Sea. There are mountainous areas in the east rising to 600 metres; in the west and in the

Figure 16. WHO Regional Offices and the areas they serve

Regional offices and the areas they serve



(Source: WHO 1982)

central Sahara some peaks reach 3500 metres in height. The Tibesti Ranges are continuous with those in the central Sahara. Low lying coastal plains in the east and west corners of the country are the most fertile with a number of oases dotting the south. The great Sahara with its vast sand seas covers the rest of the land.

Climatic conditions are influenced by the sea in the north and the desert in the south. The climate is temperate in the coastal plains, warm in winter and tending to be humid and hot in the summer. Inland it is continental, cold in winter and hot and dry in the summer. A special feature is the "ghibli", a hot, dry, dusty wind from the south, commoner in the spring and end of summer that raises the temperature in the north sharply in a few hours. The highest temperature ever recorded in the world 136°F (57.8°C) is claimed by a small town south of Tripoli, Azizyah, on September 13, 1922.

The average annual rainfall is 400-600 mm in the east and west hills of the coastal areas but in the remainder of the country the amount is 200 mm, or less. Most of the rain falls between November and March.

4.2 SOCIAL PROFILE

4.2.1 Population Profiles

Total population:

A census is carried out usually every ten years. Total population census results are:

31st July 1954	1,088,873
31st July 1964	1,564,369
31st July 1973	2,249,237
31st July 1984	3,637,488

Percentage distribution by age groups in years:

	0-14	15-64	65+
1973	51.4	44.4	4.2
1980	46.7	51.1	2.2

Figure 17 shows the male and female age-groups distribution for 1973. The population pyramid is typical of a developing country.

Average rate of total population growth (per cent):

1965-73	1973-83	1980-2000
4.1	4.3	4.1

The rate of population growth for nationals only is less, or 3.5, but is still one of the highest in the world. The population will double in 20 years (from 1983), reaching 4 million in 1990 and 7 million by the year 2000. Assumed year of reaching net reproduction rate of 1 is the year 2025.

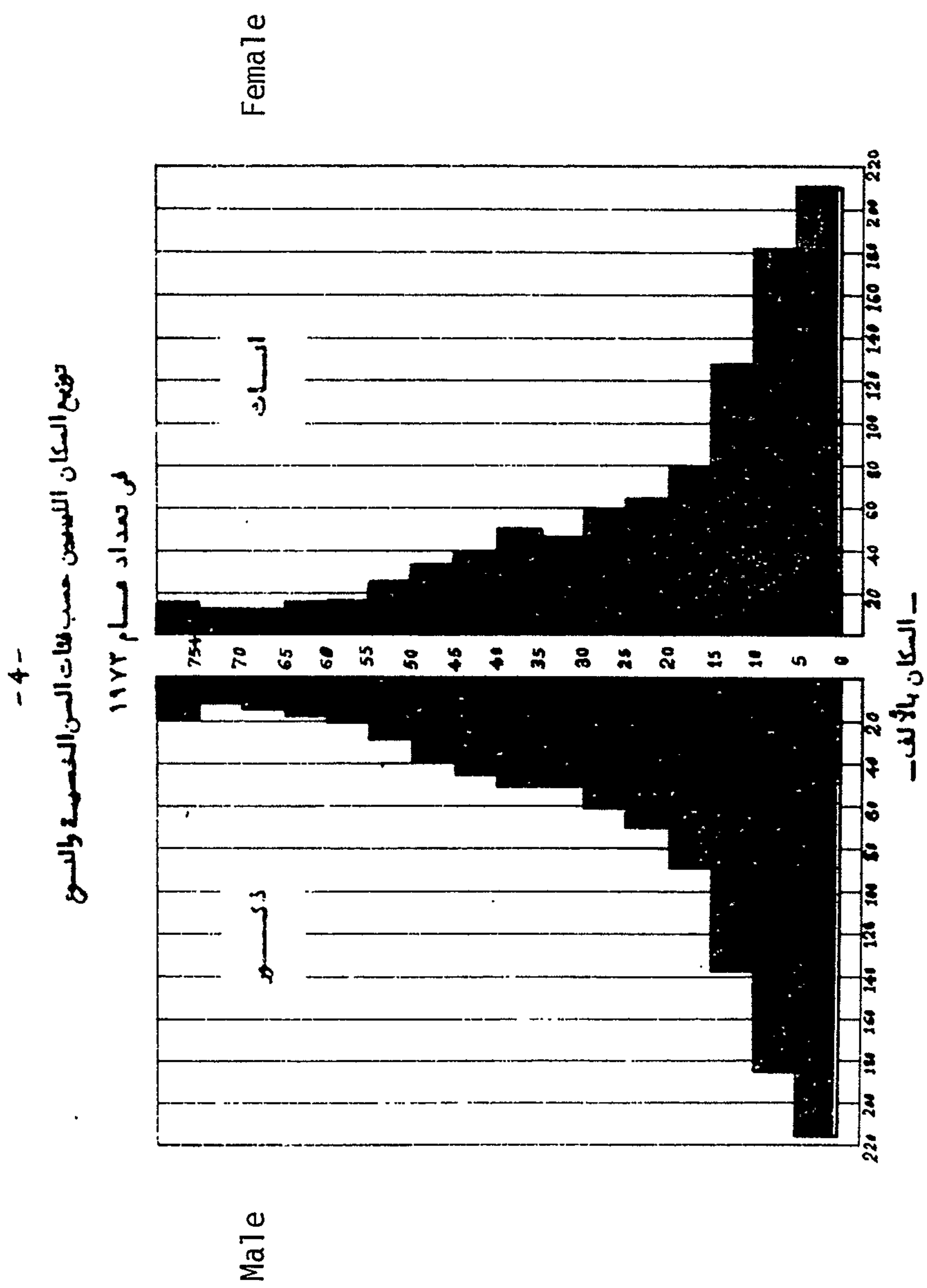


Figure 17. Libyan population pyramid 1973 census

(Source: Statistical handbook 1982)

Population distribution:

Urban population as percentage of total population:

1965	1983	1984
29	61	75.9

Average annual growth rate of urban population per cent:

1965-1973	1973-1983	1980-1985	1985-2000
8.9	8.1	6.4	3.9

Figure 18 shows the urban concentrations and their distribution in the country in 1980. Libya is one of the most urbanized in developing countries (Kezeiri 1983). Urbanization occurred in Libya in the 1960's when many left their farms and rural areas in search of a better standard of living and employment in the oil industry. Since then, however, urbanization has itself been achieved by previously rural areas. By this it is meant that jobs, services, roads, hospitals, schools, etc., and even cash grants and loans to farmers were provided to people in rural areas.

The large increase in the previous figures for urbanization - 29% in 1965 to nearly 76% in 1984 - is explained by abandoning the previous definition of urban which included only four localities in the country.

4.2.2 Education

. Percentage of illiterate population 15 years of age and over:

1973	61.0	38.7 male	85.2 female
1985	33.1	18.6 male	50.2 female

S. K. KEZEIRI

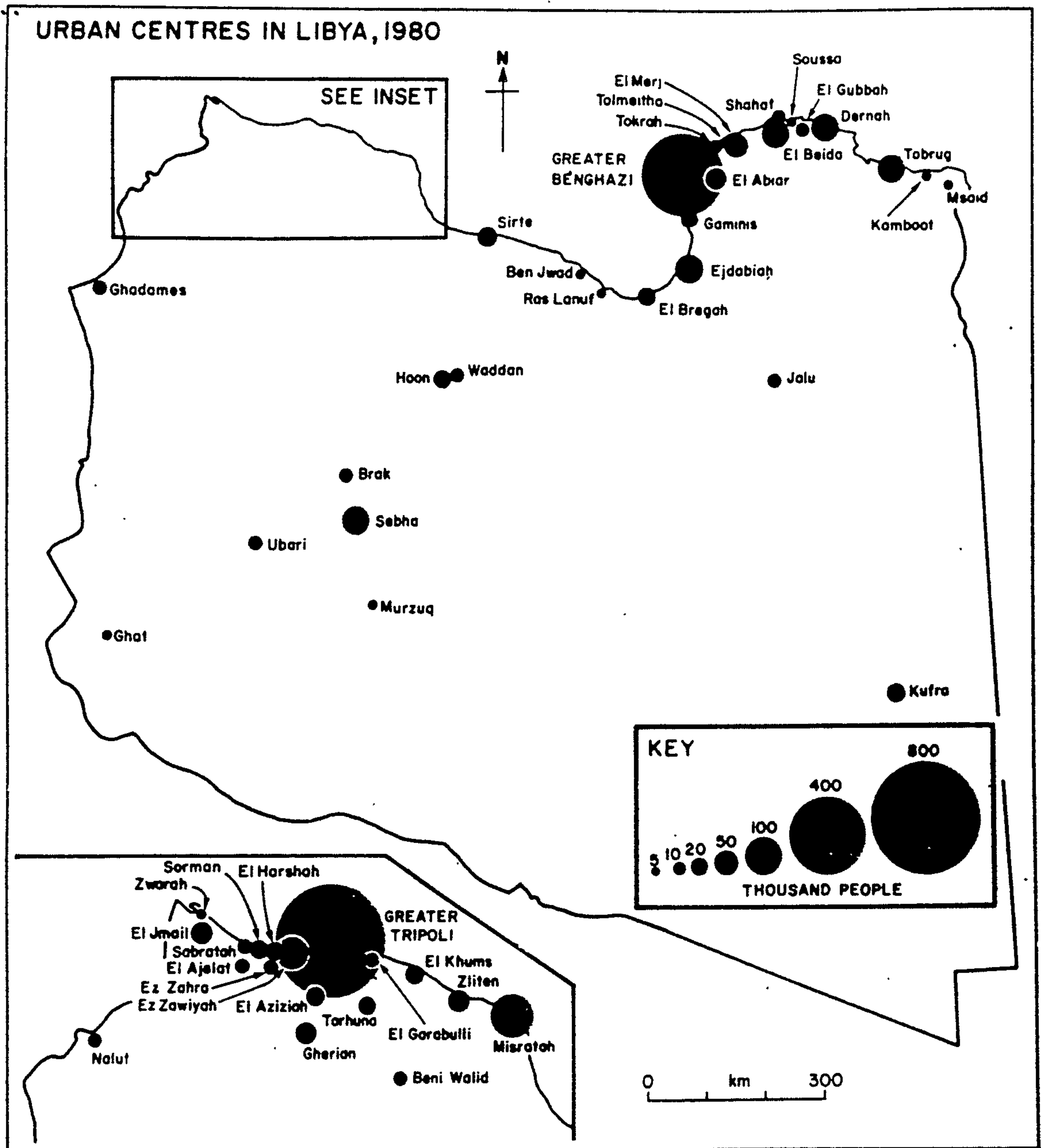


Figure 18. Urban centres in Libya, 1980

(Source: Kezeiri 1983)

. National education system:

Education is compulsory for 6-15 age limits and an entrance age of 3 years to kindergarten.

Primary schooling is 6 years for ages 6-11

Preparatory schooling is 3 years for ages 12-14

Secondary schooling is 3 years for ages 15-17.

. School population:

First level (primary) education enrolments:

1970	350,225	37% female	pupil/teacher	28
1982	721,710	47% female	pupil/teacher	17

Second level (preparatory and secondary) enrolments:

1970	53,953	18% female
1982	340,703	41% female.

Third level education (university and equivalent):

1970	5,222	11% female
1982	27,532	26% female.

4.2.3 Economic Profile

. Socio-economic status:

Inflation	(1984)	8%
GNP per capita in US dollars	(1983):	8480
GDP per capita in US dollars	(1983):	10386
GDP real growth	(1983):	3%

. . Source of funds for health:

Almost all health resources are government funded and almost all oral/health personnel are government employed.

. Total government expenditure on health:

4.1 per cent of total government budget (1979).

. Expenditure on health per head of population:

US\$82.2 - (1979)

about US\$25 - (1969)

4.3 HEALTH

4.3.1 Health Indicators

Indicators related to life expectancy:

Life expectancy at birth in years:

	Male	Female
1965	48	51
1983	56	59

Infant mortality rate (aged under 1):

1965	143
1983	91
1985	79

Child death rate (aged 1-4):

1965	29
1983	10

Per thousand population:

	1965	1983	% Change
Crude birth rate	49	45	- 8.5
Crude death rate	18	11	-39.8

The crude birth and death rates indicate the number of live births and deaths per thousand population in a year.

The infant mortality rate is the number of infants who die before reaching one year of age, per thousand live births in a given year.

The child death rate is the number of deaths of children aged 1-4 per thousand children in the same age group in a given year.

Life expectancy at birth indicates the number of years a new-born infant would live if patterns of mortality prevailing for all people at the time of its birth were to stay the same throughout its life.

4.3.2 Manpower

Health manpower planning uses the health personnel/population ratio method. The 1980-85 plan aimed at achieving:

1 doctor for every	750 people
1 dentist for every	7500 people
1 pharmacist for every	5000 people
1 nurse or assistant for every	250 people

In hospitals the aim was:

1 doctor for every	10 beds
1 nurse or assistant for every	2 beds
7 hospital beds for every	1000 people

Present oral health manpower:

Dentists	57	(1970)
	277	(1978)
	540	(1986 estimate)
Dental Technicians	250	(1982)

Training:

Dentists annual output	30
(from one dental school)	

Dental facilities:

Dental polyclinics	2
Dental clinics	127
(Red Crescent)	
dental clinics	10

Present Health Manpower:

Doctors	731	(1970)
	3350	(1978)
Physicians	4050	(1982)
Specialists	1500	(1982)
Nurses	7500	(1982)
Assistant nurses	6500	(1982)

Training:

Doctors annual output	167
Nurses and assistant nurses	84
Other, health inspectors, technicians, etc.	152

There are two medical schools; one in Tripoli, the other in Benghazi.

Dental technicians are trained abroad, mainly in Greece.

Health and oral health manpower indicators:

	(1960)	(1965)	(1980)
Population per physician	6580	3970	730
Population per nurse	1320	850	400
	(1969)	(1978)	(1982)
Population per dentist	30600	9790	8800

There is still a large disparity in the distribution of dentists, for example, in the largest city, Tripoli, dentist population ratio is 1:2000, whereas it reaches 1:10,000 in semi-rural areas.

In 1982 there were about 300 non-national dentists working in the country.

Almost all dentists are employed in the public health service with provisions for part-time private practice recently formulated. A large percentage of the nationals who graduated from abroad and some from the local faculty have undertaken graduate studies abroad.

4.3.3 Oral Health Indicators and Information

In 1982-1983 WHO undertook an assignment to perform an oral health situation analysis for use in coordinated long term oral health planning. Highlights of the oral health situation analysis were:

- The prevalence of dental caries in 6 year olds - 50% (primary dentition).
- The average DMFT for 12 year olds - 1.5, with the M component less than 5% and the F component 6%.
- Although the prevalence of dental caries rises with age, the differences between 12 and 15 year olds was very small and even reversed in some areas.
- The average number of missing teeth per person at age 35-44 was 3.3 and 1% of the same age group were edentulous.
- The 55-64 age group had 13% edentulous cases.
- Early symptoms of periodontal disease appeared in 100% of rural and 95% of urban 15 year olds. Average number of segments with bleeding, 4.7 per child and for calculus, 3.8.

Generally, there was a high prevalence of periodontal disease as assessed by the CPITN index. Table 7 (Barmes and Leous 1986) shows the results of the CPITN survey for the country (SPLAJ).

- The average annual incidence in the D component is about 0.2 to 0.3 per child from 6 to 18 years of age.
- There is preference for surgical intervention before treatment in services on demand.
- 25% of the population were receiving dental services.
- Productivity is about 1200 clinical working hours annually, with dentists operating without chairside assistants.

Other factors mitigating against productivity include lack of materials, lack of spare parts and adequate maintenance for dental equipment.

There is also little use of the appointment system and lack of adequate public transport and telephone systems use.

An orthodontic survey of Libyan schoolchildren done in Benghazi in 1980 by Gardiner (1982) found in a sample of about 500 children between the ages of 10 and 12 years a large proportion, 63 per cent, not to require any orthodontic treatment; 14 per cent could benefit by extractions only; 21 per cent were considered to require removable orthodontic appliances with or without extractions and 2 per cent were considered to have complex malocclusions requiring fixed orthodontic appliances treatment.

The following is a commentary on the local oral health data and the oral health "Global Goals".

Goal 1: 50% of 5-6 year olds will be caries free.

This indicator is present - just.

Table 7. CPITN for Libya (SPLAJ) and other countries

International Dental Journal (1986) Vol. 36/No. 3

Community Periodontal Index of Treatment Needs survey data 1982-1985																
Locality	Age	No.	Sex	% affected	Percentage of persons with:				Number of Sextants with:					Treatment Needs: Percentage of persons and average No. of sextants per person		
					Period. pockets				Period. pockets					OHI	Scaling	Special periodontal care
					Bleeding	Calculus	4-5 mm	6+ mm	Healthy	Bleeding	Calculus	4-5 mm	6+ mm			
Kabul	12	20	M/F	93	7	86	—	—	1.5	4.5	2.4	—	—	93%	86%(2.4)	—
Afghanistan (A)	15	50	M/F	100	12	65	23	—	1.4	4.6	3.7	0.3	—	100%	88%(3.7)	—
	35-44	43	M/F	100	—	12	50	38	0.1	5.9	5.7	2.7	0.6	100%	62%(5.7)	38% (0.6)
Dhaka Bangladesh (B)	12	40	M/F	100	5	90	5	—	1.2	4.8	3.2	0.15	—	100%	95%(3.2)	—
	15	20	M/F	100	5	70	25	—	0.9	5.1	3.7	0.4	—	100%	95%(3.7)	—
Havana	12	40	M/F	98	10	88	—	—	2.8	3.2	2.6	—	—	98%	88%(2.6)	—
Cuba (C)	15	20	M/F	95	5	65	25	—	1.5	4.5	4.2	0.3	—	95%	90%(4.2)	—
	35-44	20	M/F	100	—	55	40	5	0.2	5.8	4.6	0.8	<0.1	100%	95%(4.6)	5%(<0.1)
Bratislava CSSR (D)	12	20	M/F	95	10	85	—	—	3.5	2.5	2.0	—	—	95%	85%(2.0)	—
Kuopio Finland (E)	13*	20	M/F	75	15	60	—	—	4.1	1.9	1.2	—	—	75%	60%(1.2)	—
Erfurt GDR (F)	13*	25	M/F	92	16	76	—	—	3.1	2.9	1.7	—	—	92%	76%(1.7)	—
Yamanashi Kofu Japan (G)	12	20	M/F	65	5	60	—	—	3.9	2.1	1.5	—	—	65%	60%(1.5)	—
	15	20	M/F	95	5	90	—	—	3.1	2.9	2.5	—	—	95%	90%(2.5)	—
Amman Jordan (H)	12	20	M/F	100	5	95	—	—	1.9	4.1	3.4	—	—	100%	95%(3.4)	—
	15	70	M/F	99	3	85	11	—	1.3	4.7	4.0	0.16	—	99%	96%(4.0)	—
Kaishadoris Lith. SSR (I)	12	40	M/F	92	45	47	—	—	2.2	3.8	2.1	—	—	92%	47%(2.1)	—
	15	40	M/F	95	35	60	—	—	2.1	3.9	2.3	—	—	95%	60%(2.3)	—
Drammen Norway (J)	12	20	M/F	85	55	30	—	—	4.3	1.7	0.6	—	—	85%	30%(0.6)	—
	15	20	M/F	80	35	45	—	—	4.0	2.0	0.8	—	—	80%	45%(0.8)	—
Aden PDRY (K)	12	40	M/F	78	7	69	2	—	3.2	2.8	2.2	0.02	—	78%	71%(2.2)	—
	15	40	M/F	100	5	83	12	—	1.8	4.2	3.8	0.15	—	100%	95%(3.8)	—
14 Localities SPLAJ (L)	35-44	30	M/F	100	—	36	47	17	0	6.0	6.0	1.6	0.2	100%	83%(6.0)	17%(0.2)
	12	280	M/F	98	8	87	3	—	1.9	4.1	3.1	0.1	—	98%	90%(3.1)	—
	15	269	M/F	100	5	80	15	—	1.3	4.7	3.8	0.2	—	100%	95%(3.8)	—
	35-44	80	M/F	100	—	13	53	34	0.3	5.7	5.6	2.5	0.6	100%	66%(5.6)	34%(0.6)
Tyresö Sweden (M)	12	20	M/F	100	35	65	—	—	3.5	2.5	1.5	—	—	100%	65%(1.5)	—
	15	20	M/F	100	15	85	—	—	2.9	3.1	1.7	—	—	100%	85%(1.7)	—
Sweida Syria (N)	12	20	M/F	100	—	100	—	—	1.1	4.9	3.9	—	—	100%	100%(3.9)	—
	15	20	M/F	100	—	85	15	—	0.5	5.5	5.0	0.15	—	100%	100%(5.0)	—
Ban Pong Yaeng-Nok Thailand (O)	12	48	M/F	92	6	82	4	—	0.9	5.1	3.8	0.1	—	92%	86%(3.8)	—
Novi Sad Yugoslavia (P)	12	20	M/F	100	—	100	—	—	2.1	3.9	2.8	—	—	100%	100%(2.8)	—
	15	20	M/F	100	5	95	—	—	1.7	4.3	3.5	—	—	100%	95%(3.5)	—

* Summarized in presentation as 12 years

(Source: Barmes, Leous 1986)

Goal 2: 3 DMFT at 12 years.

The average for the whole country (1.5) compares favourably but:

- . the range for the country is 0.7-2.6
- . 12 year olds in some areas have higher DMFT index than 15 year olds of the same area
- . comparison can be made with some comparable Arab countries

from Table 5:

	DMFT at 12 yrs	Year	DMFT at 12 yrs	Year
Jordan	0.2	(1962)	2.7	(1981)
Lebanon	1.2	(1961)	3.6	(1974)
Morocco	2.6	(1970)	4.5	(1980)

- . Urbanization is recent and almost 76%
- . Fluoride in tap water may be decreasing
- . School dental services are inadequate with no preventive programmes.

Goal 3: 85% of the population should retain all their teeth at age 18.

The missing teeth for this group average 0.5 with teeth indicated for extraction 0.2 per person. Therefore, it may be considered that 70% have lost one tooth each.

Goal 4: A 50% reduction in present levels of edentulousness at age 35-44.

The present index is 1%.

Goal 5: A 25% reduction in present levels of edentulousness at age 65 and over.

The index for this age group is 13%, but with life expectancy at birth (1983) of 59 years, this index is of less urgency than the others, at least for now and by the year 2000 it should improve following the realization of other goals.

Goal 6: A data based system for monitoring changes in oral health will be established. (Started in 1983.)

The level of oral hygiene practice may be low if judged by the use of toothbrush and toothpaste. However, the social practice of mouthrinsing several times a day is required before prayers by the Islamic religion and cleansing the hands and mouth with soap and water is widely practised before and after meals. The use of the siwak used to be prevalent but has almost disappeared.

Wheat products form the main constituents of the typical diet and a highly sweetened, strongly brewed tea is widely consumed several times a day by most people.

It is worth noting that all dental treatment, including prosthodontic and orthodontic appliances are provided free of charge. Nominal charges for pharmaceutical prescriptions have been introduced recently to discourage the misuse of pharmaceutical drugs in medicine.

Sugar consumption:

The annual consumption of sugar including honey was 41.21 kg per capita in 1978. Consumption seems to be stabilizing or even decreasing rather than increasing. In an effort to limit the excessive use of sugar, mainly in tea and sweets, price subsidies have been gradually reduced.

Daily calorie supply per capita:

Total for 1982

3581

As percentage of requirement

152

Service coverage of water supply and sanitation:

		Water supply	Sanitation
1970	Rural	42%	54%
	Urban	100%	100%
1980	Rural	90%	72%
	Urban	100%	100%

Fluoride in reticulated water is quite variable in different areas - the range is 0.2 to 1.88 ppm - with no artificial fluoridation undertaken. The two largest cities have 0.58 parts per million in tap water. The heavy demand on natural water resources has led to increased use of desalinated sea water in the reticulated water systems which could have lowered the fluoride concentration in parts of the country's water supplies.

The fluorosis index for 12 year olds averages 1 with a range of 0.3 to 2.2 for various parts of the country.

4.4 POLICY

4.4.1 Health Legislation

The Health Law No. 106 dated 13 December 1973 (Al-Jaridah Al-Rasmiyah Vol. 12, No. 6, 18 February 1974, pp 188-240) has the following provisions under health and medical care in Part I:

1. Health and medical care shall be an established right guaranteed to all citizens by the state. The Ministry of Health shall develop the health and medical services, raise their standard, and increase their efficiency, in such a way as to satisfy the needs of citizens and conform to advances in science in these areas and the overall national development plan. The Ministry of Health shall also take steps to ensure the availability of the technical personnel required to staff the health services.
2. The Ministry of Health shall exercise surveillance over public health, preventive and curative medicine, curative institutions, and pharmaceutical establishments; it shall likewise control transactions in drugs and the practice of the medical and allied health professions.
3. The Ministry of Health shall provide school health services, both preventive and curative, to all children in such a way as to ensure the physical and mental health of the new generation.

Part V of the Health Law 1973 specifies the requirements for the practice of the health professions - medicine, dentistry, pharmacy and clinical pathology and bacteriology and limits the practice to registered holders of an academic degree or an equivalent qualification awarded by a recognized university or institution of

higher learning.

4.4.2 Development Planning

The country uses five year development plans and in 1979 embarked on regional planning for the economic and social deveopment of the country to the year 2000 with short-term five-year and long-term 20-year plans.

Earlier short-term development plans with emphasis on agriculture, industry and the infrastructure of the country also devoted larger shares to education and health. The latter sector was allocated over 10 per cent of the development budget of 1972.

The 1976-80 development plan, known as the Economic and Social Transformation Plan had the overall aim of diversifying production to achieve lessening dependence on oil income, to develop the economic and social infrastructure and to achieve a more equitable distribution of income and wealth.

The 1981-85 five-year plan as part of the major 20-year development programme continued the aim of structural change in the economy to reduce its dependence on petroleum and planned that by 1985 the non-oil sector would contribute 53% of national income, compared with 35% in 1980 (Fisher 1985).

Health - including oral health - is included in development plans by allocation of resources to achieve services and manpower targets.

Oral health is represented at the Secretariat of Health by "Dental Medicine Services Section" headed by a dentist and health services in general are regionalized under local health secretariats.

"Since 1969 Libya has become a challenge to its own people in attempting to modernize itself and to create a viable nation with its own values and traditions independent of alien influences and pressures. It is providing its people with the benefits of their own natural resources, transforming the raw wealth of the country into services in agriculture, education, housing, health and welfare. Rarely has a nation done so much for itself in such a short time." (Habib 1979)

5. DENTAL FACULTY

This Section presents information and discussion of the undergraduate dental education in Libya. It presents issues related to the local dental faculty (Faculty) with its regulations, staff and curriculum.

5.1 FOUNDATION

The Faculty is the only one in the country and was officially established by the Government on June, 19th, 1974, as one of the faculties of Garyounis University at Benghazi, in accordance with health manpower development policy following the establishment of the two medical and one pharmacy faculties. Like all health education institutions the Faculty is completely dependent upon financial support from the national budget.

The Faculty's first intake of forty male and female students was for the 1974-75 academic year. The bachelor of dental surgery (BDS) degree requires a course of six years which include one pre-dental and one internship year with two each for the preclinical and clinical periods.

The Faculty is accommodated in a modified residential building centrally located in the city, but should be moving to a new specially designed dental school as part of a new health sciences complex. The dental, medical and science faculties joined together in 1984 to form the Arab Medical University. There are possibilities of establishing other faculties and educational facilities for auxiliary personnel within the scope of the centre activities.

The conception of the Faculty was not under easy conditions. With few national dentists in the country, the immense task of starting it fell to a national dentist with graduate qualifications in dental public health. As its first Head he shouldered the task extremely well under difficult circumstances. Initially, the Faculty was located in an old public building serving as a dental clinic run by the Ministry of Health. In 1977 the Faculty was relocated in the present modified building which was bought and equipped by the University.

5.2 CURRICULUM ISSUES

5.2.1 Regulations

The only available document published by the Faculty concerning the curriculum "Dental Faculty Regulations Handbook, 1977-1978" contains general information, University and Faculty regulations. The regulations concerning the curriculum include conditions of acceptance, subjects taught and their clock hours, examination arrangements and conditions for promotion and graduation of students.

Over the years a number of changes have been introduced but all are minor modifications and no updated version of the handbook has been published.

The Faculty regulations handbook contains a statement of purpose for the Faculty depicting its aims as provision of dentists and various dental specialists for the country, undertaking research and studies in dentistry, raising the oral health status of the community, contributing towards dental education in the country and maintaining relations in its field with similar institutions in the world.

For the requirements of establishing the Faculty, including drawing up the curriculum, consultations were sought from WHO and dental educators in Egypt, Syria and the UK.

The undergraduate curriculum is of the traditional type, subject centred with a lock-step arrangement. The six years are divided into four stages: predental, preclinical, clinical and internship.

The academic year is from early September to the end of May. There are two terms per year with a mid-year break of two weeks. Activities are scheduled for six days a week with Fridays off. The total clock hours for the preclinical and clinical stages only slightly exceeds 4000 hours.

All instruction is in the English language.

5.2.2 Subjects

The four stages of the course and the subjects taught are listed as follows:

A. Predental Stage

One academic year spent at the science faculty and under its control. The dental Faculty specifies the subjects taught but has little input as to other arrangements - scope of contents, teaching/learning methods and resources, evaluation, etc. The arrangement is the same as for medical students.

The subjects for this year:

- Physics
- Chemistry
- Zoology
- Botany
- Statistics
- English language
- Islamic civilization and social culture.

B. Pre-clinical Stage

Composed of two academic years with all non-dental subjects given at the medical faculty under its direction.

Subjects for the first year:

- Gross anatomy
- Histology
- Physiology

Biochemistry
Dental anatomy
English language.

Subjects for the second year:

General Pathology
Bacteriology and Parasitology
Pharmacology
Oral histology and oral physiology
Conservative dentistry
Crown and bridge
Prosthetics and dental materials.

C. Clinical Stage

This stage also has two academic years.

Subjects for the first year:

General medicine - including skin and
venereal diseases
General surgery - including ENT and ophthalmology
Oral pathology
Conservative dentistry - including endodontics
Crown and bridge
Prosthetics and dental materials
Oral surgery - including local and general
anaesthesia
Oral medicine and periodontology.

Subjects for the second year of this clinical stage include all dental subjects except oral pathology from the previous year with the additions of:

Children's dentistry - including preventive
dentistry
Diagnosis and radiology
Orthodontics.

There has been a number of changes to the listed arrangements of subjects. Major changes in the clinical stage include:

Subjects taught over two years, instead of the previously listed one year:

Diagnosis and radiology
Preventive dentistry
Orthodontics.

The subject of oral medicine is taught over the first clinical year only and is separated from periodontology.

D. Internship Year Stage

The internship year was primarily envisaged as a period in which the undergraduate dentist can complement the somewhat short clinical exposure of two years by rotating students on various clinical departments of the Faculty for a fixed number of weeks and completing a required number of cases. Part of the internship year is also spent in one of the clinical departments as a Selective assignment to complete the required Calendar year.

No educational activity is undertaken by the Faculty after the undergraduate level but there is pressure from the University authorities to start graduate education. The medical faculty has instituted an MD programme and prepares candidates for a number of fellowship examinations including the recently instituted Arab Fellowships.

During the internship period the Ministry of Health provides a grant for each participant. After graduation the Ministry appoints each dentist in the country's health service usually at place of residence. The majority are employed in dental clinics, the school health service and in polyclinic dental surgeries.

5.2.3 Teaching Staff

A number of the graduates remain in the Faculty as demonstrators with a view to graduate training abroad to become teaching staff members. About ten have embarked on such training and a few are already back supplementing the small number of local staff.

The most pressing problem facing the Faculty is perhaps the development of a cadre of permanent teaching staff. Most of the Faculty staff are still contracted from abroad and the majority have been able to remain for only two to three years in service. There is also an increasing difficulty in their replacement. Nationalities of staff have included a number from Egypt, India, the UK and the USA.

An appreciable input into the educational process has been through the use of visiting staff who usually manage to spend only a few weeks, but their contributions have helped appreciably with various courses, including preventive and community dentistry topics.

Lack of stable faculty members is problematical, not only in contributing to the teaching/learning situation but also in undertaking local research activities, providing role models for students and in starting graduate education.

5.2.4 Examination System

Examination of students is made during the year usually at mid-year and at the end of the year. Written, laboratory, clinical and oral forms of testing are used as applicable. Examinations for subjects taught over two years are assessed at the end of each year with the assessment contributing 30 and 70 per cent of the total marks. For the final examinations of all subjects external examiners are usually invited to participate in the evaluation. The B.D.S. final examinations are at the end of the Clinical period with no further examinations in the internship year. Written examinations are of the objective - mainly MCQ and essay types, with the MCQ tests gaining popularity among students and staff.

5.2.5 Teaching Methods and Language of Instruction

The lecture method predominates for all subjects with clinical and laboratory instruction given as applicable. There are three lecture rooms provided with slide and overhead projectors and video recording and playing equipment. There is a limited projection slides collection for a number of topics, including some in the form of self-learning packages which are under-used by students and staff alike.

The clinics have a limited number of dental surgery assistants and students get no training in their use and usually work with little help.

The language of instruction as may be gathered from the multinational character of teaching staff is English as are all the textbooks and library collection. The issue of the language of instruction is a vexed one and it can be appreciated that the exclusive use of English has benefits as well as limitations and drawbacks. Most of the easily available instruction material is in the English language, whereas the national language of the students and all their previous education is Arabic, which is also what almost all the patients solely understand and use.

The only Arab country that teaches dentistry - and medicine - in Arabic is Syria. The issue is of practical, as well as emotive, considerations.

In the sixth Saudi Annual Medical Conference held in Jeddah in March 1981, attended by 1200 doctors from all over the world, there was a strong inclination towards Arabization of medical instruction, not only at Saudi Faculties but also at medical faculties throughout the Arab-world. The issue was re-examined in

the seventh conference but apparently without resolution (Kassimi 1983).

There are strong arguments for either view, practicality on one side and national pride on the other may appear to spearhead the arguments, but the long term effects and even cost can only be guessed at. A sensible approach would be to develop the use of Arabic alongside that of English as an undertaking on a pan-Arab scale. The Arabic language is certainly capable of accommodating the medical sciences as it has done in the past and as shown in some places and with other science subjects at present. Such development will be limited only by the scale of effort directed towards this issue. What may be needed urgently perhaps is an upgrading of teaching the English language itself so that it can be mastered and used better by the students allowing time and effort to develop the use of Arabic as well.

A concerned WHO Regional Office has instituted a programme on the promotion and use of national languages in health personnel education in the Eastern Mediterranean Region (WHO 1986).

Surely, the national language must have a place in teaching some community dentistry topics, for example: ethics, jurisprudence, history, and the behavioural sciences.

5.2.6 Changes in Curriculum

The desire to improve the curriculum in general gave rise to many attempts in the form of committees and many sessions almost from the beginning of the clinical training at the Faculty. Lack of coherence of the objectives for change and vague notions of the causes of dissatisfaction resulted in the usual cosmetic changes as

in the shifting of a few subjects from one year to another and the preoccupation with clock hours. As Miller et al. (1961) said,

"The meetings of a curriculum committee some times seems like a battleground where the prize goes to the most persuasive, the most irascible, the most glib, or the most noisy of the protagonists. And the prize is a large bundle of curricular hours. The selection of a tool before a clear decision about what must be done is surely indefensible."

There were, however, some good suggestions and foresight to introduce preventive dentistry as part of paedodontics. The issue of departments has also been a bone of contention with their number expanding as a territorial imperative and there were also individual efforts at formulating objectives for the subjects of paedodontics and conservative dentistry.

The lack of a curriculum directive, departmental or subject objectives places the onus on the teacher, allowing inclusion of what is judged suitable according to initiative, ability and interest with little accountability or communication with other faculty members.

Preventive dentistry is part of the paedodontics department and topics include epidemiology, prevention of oral diseases, nutrition, plaque control and fluorides. Psychology in children's dentistry is included in the paedodontics programme. Forensic dentistry has been neglected since the departure of an excellent educator - the late Dennis Coleman Hall from the Dundee dental school. Professor Hall was head of the department of oral anatomy and pathology at the Faculty and one of the most popular staff members.

Other issues related to the dental Faculty are as follows:

The medical school has a well established department of community medicine and some of its members have given courses in ethics and jurisprudence to dental students.

A periodical publication is also issued by the medical school and articles are accepted from the dental Faculty. Although research is encouraged in the Faculty and is even a requirement for promotion of staff members, not enough facilities are provided or even pursued so far. The situation should improve with the increasing number of local staff.

The country has a health professions association that includes all categories of health personnel. Registration with the association is required by law in separate registers. Its activities include organization and participation in conferences, some publications and community health programmes in urban and rural areas which take the form of case finding and health education.

6. ADVANCES IN EDUCATION

The need for applying the principles of planning to health manpower education and the need to educate the teacher were discussed in Sections 1.4 and 2.5.

The dental educator must gain a working knowledge of the advances in educational theory and technology to enable a systematic approach to the development and use of the instructional process.

In this section some facets of these advances are introduced dealing mainly with the development, levels, use and classification of objectives in education. A number of other educational advances in teaching, learning and evaluation are included in the following Section 7.

In order to relate all the elements of the instructional process in building a successful programme a method involving the development of an overall plan incorporating the interrelated parts of the instructional process in a sequential pattern is receiving increased attention. The method is called the systems approach to problem solving and is based on the method of scientific inquiry. The application of this process to instructional design is called instructional technology. For many people the term instructional technology means the resources of instruction machines and materials - projectors, computers, recorders and films, slides, etc. Another more important meaning is the process of systematic planning that establishes a way to examine instructional problems and needs, sets a procedure for solving them, and then evaluates the results (Kemp 1977).

"Educational technology, in the widest sense, can be described as a systematic approach aimed at effecting improvements in teaching and learning. In this sense it is as broad as education itself. However, particular but interrelated aspects of educational technology can be identified and can predominate in certain teaching-learning situations. These aspects relate to curriculum, teaching-learning methods and evaluation and predominate according to the particular situation."
(Stevens 1977)

6.1 ORIGIN AND USE OF OBJECTIVES

One of the major features of educational technology has been the increasing use of educational objectives formulated to guide curriculum and course planners to improve learning, teaching and evaluation.

The term objectives has come to convey a more technical meaning than the previous goals, aims or intentions assumed to exist for all educational endeavours whether explicitly or implicitly.

Any dental school is created to meet certain expectations implying a number of aims or purposes which identify its mission or reason for being. "Consequently, every school should define for itself the entire scope of its hoped-for activities." (Durocher 1970). Foremost among the activities and purposes will be the education of its students. Other purposes may include: dental research, service to patients and the community, provision of graduate and continuing education, training of auxiliary personnel, acting as a resource centre for advice and consultation on oral health issues and policies and training of dental teachers. "There is a rational place for a broad statement of purpose alongside the more specific statements of educational (or learning) objectives, which are the ones deserving greatest emphasis." (WHO, TRS608 1977).

Most writers agree on three levels of educational objectives (Taba 1962; WHO 1977 TRS608; Eraut 1985), but the levels are not necessarily comparable.

"To avoid perpetuating ambiguities caused by using ill-defined descriptive words something must be said to clarify the meaning they are intended to have. Examples of objectives at various levels are probably the best means of defining these levels."
(Harlen 1971)

The three platforms of educational objectives are general, intermediate and specific objectives. The more general objectives providing guidance for the less general level objectives.

"One can define an objective with sufficient clarity if he can describe or illustrate the kind of behaviour the student is expected to acquire so that one could recognize such behaviour if he saw it."
(Tyler 1949)

The use of objectives in education, however, is not new. Davies (1976) cites Herbert Spencer (1860) as the origin of the movement for explicit objectives in education and credits Franklin Bobbitt and Werrett Charters with a behavioural description of curriculum construction built on formulation of objectives.

Bobbitt and Charters took Johann Herbart's (1924) thoughts on the importance of stating the aims and added Spencer's method of analysis to distinguish "ideals" and "activities" in the manner of Frederick Taylor's job analysis to produce their works on the construction of the curriculum. Bobbitt's (1918) "The Curriculum" which was probably the earliest systematic treatise on curriculum theory was followed by Charter's text "Curriculum Construction" in 1925. Both works reflected the ideals of their times which pressed education to prepare the learners for a life of work (Davies 1976).

Frederick Taylor published his influential book "Theory of Scientific Management" in 1912. The importance of Taylor's work in education is that his job and task analysis and even time-and-motion studies of steel company workers became a source of educational objectives.

In the USA, many of the educationalists in 1920's grew up in the age of "scientific management" and developed the notion that the school curriculum could be compared to a production line for socially useful finished products of adults from the raw materials

of infancy (Hamilton 1976).

The interest in detailed analysis and specific educational objectives collapsed in the 1930's and 1940's giving way to the child-centred approaches and freedom movement in education.

Ralph Tyler, a former student of Charter's saw objectives as offering the basis for a useful methodology in diagnostic testing and evaluation for a philosophy of individual development rather than utilitarian efficiency. Tyler carried further the idea of objectives as a cornerstone of curriculum development and teaching in his book "Basic Principles of Curriculum and Instruction" published in 1949. In it he saw a need for formulating objectives with sufficient specificity to guide evaluation and later course improvements in which the objectives themselves might be altered according to new possibilities, feasibility and priority (Eraut 1985).

In his classic book on the curriculum, Tyler (1949) based his curriculum model on four fundamental questions:

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained?

This basic four-stage model is cyclic in that evaluation feeds back to objectives is often termed "the rational planning" model on the account of the rationality of specifying the ends of an activity before engaging in it. Since the formulation of the Tyler rationale as it has become known, educationists such as Popham, Gronlund and Mager have concentrated on clarifying the first stage of objectives

in order to provide clear goals towards which student and teacher can direct their work and by which measurement is facilitated (Taylor, Richards 1979).

The Tyler model of curriculum development is commonly known as the objectives model. Other names are the 'sequential', 'rational', 'logical', 'classical', 'scientific' or 'means-ends' model. The model is fixed in that objectives must be specified first and the other elements of contents, methods and evaluation follow in sequence. Other models developed since the Tyler model are more flexible in that the beginning can be from any element and there is no fixed sequence (Brady 1983).

The use of objectives was given a further impetus when Benjamin Bloom, a former student of Tyler, published with his co-workers two taxonomies of educational objectives. Part I, The Cognitive Domain, Bloom (1956) and Part II, The Affective Domain by Krathwohl, Bloom, Masia (1964) (q.v. Tables 9 & 10). There was also an intention for a third part in the psycho-motor domain by the group but Anita Harrow (1972) published such a scheme heavily influenced by the previous authors. Her taxonomy seems of direct relevance to physical education but also offers a framework in vocational education and industrial training (Davies 1976).

Although there have been a number of other taxonomies (Landsheere 1985), the two associated with Bloom and Harrow's are the best known with Bloom's cognitive domain taxonomy the most developed and widely used. The use of these taxonomies is in guiding curriculum and course planning, instruction and evaluation by making the user aware of the different domains as well as the levels to be set for the educational objectives in each domain and encouraging the use of higher level categories to stimulate the learners sufficiently and help them develop.

TABLE 8. Major Categories in the Cognitive Domain of the Taxonomy of Educational Objectives (Bloom, 1956)

<i>Descriptions of the Major Categories in the Cognitive Domain</i>	
1. Knowledge.	Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain.
2. Comprehension.	Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding.
3. Application.	Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. Learning outcomes in this area require a higher level of understanding than those under comprehension.
4. Analysis.	Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.
5. Synthesis.	Synthesis refers to the ability to put parts together to form a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of <i>new</i> patterns or structures.
6. Evaluation.	Evaluation is concerned with the ability to judge the value of material (statement, novel, poem, research report) for a given purpose. The judgments are to be based on definite criteria. These may be internal criteria (organization) or external criteria (relevance to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all of the other categories, plus conscious value judgments based on clearly defined criteria.

(Source: Gronlund 1970)

TABLE 9. Major Categories in the Affective Domain of the Taxonomy of Educational Objectives (Krathwohl, 1964)

<i>Descriptions of the Major Categories in the Affective Domain</i>	
1.	Receiving. Receiving refers to the student's willingness to attend to particular phenomena or stimuli (classroom activities, textbook, music, etc.). From a teaching standpoint, it is concerned with getting, holding, and directing the student's attention. Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain.
2.	Responding. Responding refers to active participation on the part of the student. At this level he not only attends to a particular phenomenon but also reacts to it in some way. Learning outcomes in this area may emphasize acquiescence in responding (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). The higher levels of this category include those instructional objectives that are commonly classified under "interests"; that is, those that stress the seeking out and enjoyment of particular activities.
3.	Valuing. Valuing is concerned with the worth or value a student attaches to a particular object, phenomenon, or behavior. This ranges in degree from the more simple acceptance of a value (desires to improve group skills) to the more complex level of commitment (assumes responsibility for the effective functioning of the group). Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behavior. Learning outcomes in this area are concerned with behavior that is consistent and stable enough to make the value clearly identifiable. Instructional objectives that are commonly classified under "attitudes" and "appreciation" would fall into this category.
4.	Organization. Organization is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. Thus the emphasis is on comparing, relating, and synthesizing values. Learning outcomes may be concerned with the conceptualization of a value (recognizes the responsibility of each individual for improving human relations) or with the organization of a value system (develops a vocational plan that satisfies his need for both economic security and social service). Instructional objectives relating to the development of a philosophy of life would fall into this category.
5.	Characterization by a Value or Value Complex. At this level of the affective domain, the individual has a value system that has controlled his behavior for a sufficiently long time for him to have developed a characteristic "life style." Thus the behavior is pervasive, consistent, and predictable. Learning outcomes at this level cover a broad range of activities, but the major emphasis is on the fact that the behavior is typical or characteristic of the student. Instructional objectives that are concerned with the student's general patterns of adjustment (personal, social, emotional) would be appropriate here.

(Source: Gronlund 1970)

Such idealistic use seems, however, to be easier said than done. A disturbing conclusion was reached by Rinchuse and Zullo (1986) who sampled test items from the undergraduate dental curriculum administered by the University of Pittsburgh School of Dental Medicine during the 1983-1984 academic year for classification according to Bloom's six cognitive domain levels. The conclusion reached by the investigators and which could probably be found in the majority of the world's dental schools was as follows:

1. Written examination test items for which final cognitive level ratings were attainable, 83.9 per cent were classified at Bloom's taxonomy level one (knowledge) and 16.1 per cent at level two (comprehension).
2. The written examinations require students predominantly to recall factual information and, to a very limited extent, to "understand" the examinations' content materials.
3. The examinations do not require the students to use higher level cognitive skills such as application of knowledge, analyses, synthesis, and evaluation.

The implications of these findings can not be limited to dental education, for educators in general may have found the cognitive domain, specially at the lower levels, easier to pursue and test by depositing information with the learner and asking for its recall, a method labelled "the banking concept of education" by Friere (1972).

The affective domain is perhaps more neglected due to its relative underdevelopment by educators and the difficulties involved in its measurement, although affectivity has sometimes been intensively cultivated, but nearly always in terms of indoctrination processes. At present, the taxonomy movement in education is of great value,

though not perfect. Learner behaviour does not fall neatly into one or another domain only and there may be room for more domains (Landsheere 1985; Davies 1976).

The concern with specific objectives was given a boost by the Sputnik success and in the US greater emphasis was placed on science and mathematics in its wake (Oliver 1977).

Robert Mager developed his interest in programmed learning while working at the Army Human Research Unit in Texas and later working for an electronics company produced a programmed course for a behavioural sciences research project to train university graduates joining the company. His first book "Preparing objectives for programmed instruction" published in 1962 although specific, soon became popular among teachers at large, many of whom believed "objectives" started with Mager. The second edition of 1975 appeared under the title: "Preparing instructional objectives" designed for more general use (Davies 1976). Like Bobbitt before him, Mager derived his position from the behavioural technology approaches of trainers in military and industrial settings (Eraut 1985).

Mager's format for a useful, clear and specific objective includes three requirements to be stated in the objective necessary to communicate its intent to anyone who reads it:

1. Performance. An objective always says what a learner is expected to be able to do.
2. Conditions. An objective always describes the important conditions (if any) under which the performance is to occur.
3. Criterion. Wherever possible, an objective describes the criterion of acceptable performance by describing how well the learner must perform in order to be considered acceptable.

Though it is not always necessary to include the second criterion and not always possible to include the third, the more included the better (Mager 1975).

Many users and several authors pursued the Mager-type objectives with vigour, however, not all in education, including some of the staunchest supporters of the use of objectives were in favour of the method. Popham (1968), whilst defending the use of objectives against eleven criticisms raised by his colleagues in opposition to objectives states:

"In spite of its overall beneficial influence, the programmed booklet by Robert Mager (1962) dealing with the preparation of instructional objectives has probably suggested to many that precise objectives are usually trivial. Almost all of Mager's examples deal with cognitive behaviors which, according to Bloom's taxonomy, would be identified at the very lowest level."

Gronlund (1970), dissociating himself from Mager, wrote:

"This one-to-one relationship between the behavior taught and the behavior tested is characteristic of the training level and is widely used in programmed instruction (see Mager 1962). For regular classroom instruction, however, this procedure is useful only for teaching the simplest skills and the lowest level of knowledge."

Of course, the higher levels of the taxonomies are there for inclusion in balanced objectives and Mager might have given simple examples in his programmed text. However, Davies (1976) reviewed empirical findings and found no support to the contention that learning is increased when using specific behavioural rather than more general objectives. He also added

"This should be a matter of great relief, since the effort involved in writing Mager-type objectives is considerably greater than the effort needed for general statements of intent."

Miller who co-authored "Teaching and Learning in Medical School" in 1961, and helped modify teaching attitudes and techniques in US medical schools by emphasizing the use of objectives later warned of fanaticism in the use of objectives displacing reason, causing means to become the ends and losing both meaning and value (Miller 1978).

The review of empirical findings relating to the usefulness of objectives however, supports the following contentions:

1. they serve as guides to teaching and curriculum planning;
2. they serve as guides to learning in some situations and for some learners;
3. they serve as guides to teacher and learner evaluation.

(Davies 1976)

Although the movement for educational objectives in the health sciences education has been a growing trend mainly in North America since the early 1960's, its wider acceptance and use as suggested by Bennett (1982) may not be justified. Data collected by WHO in collaboration with the International Council of Nurses and the World Federation of Medical Education indicate that only about 10 per cent of medical schools worldwide have made the effort to define general learning objectives and only about 3 per cent are using the approach coherently (Guilbert 1984).

WHO had earlier in 1977 produced a report on the use of objectives in the education of health personnel. That report noted three levels of objectives: general - institutional; departmental - intermediate and specific instructional objectives for topics and units.

The report also noted:

"The failure of many educational planning efforts can be traced to the absence of intermediate level objectives, which are often the "missing link". A school will sometimes manage to produce a statement of institutional objectives, and many individual teachers, profiting from the work of Mager, Kemp and others, will produce their own well stated specific instructional objectives; but departments remain semi-isolated little units of teaching or, as some have referred to them "almost autonomous fiefdoms with fierce territorial prerogatives"."

(WHO TRS608 1977)

It can be concluded therefore that there are benefits to be gained from the proper formulation and use of educational objectives according to the requirements of the institution, departments, subjects and even topics in suitable cases in dental education.

7. DEVELOPMENT PLAN FOR A COMMUNITY DENTISTRY PROGRAMME

7.1 INTRODUCTION

This section contains a process for the instructional design of the proposed community dentistry programme. The process is systematic built on the work of Kemp (1977) and on course material undertaken by the author at the School of Medical Education, New South Wales University, Sydney, Australia. Two major bibliographies consulted and used as guidelines in the development of the programme are a teaching skills development manual (Ewan 1982) and an educational handbook for health personnel (Guilbert 1981). Guidelines for managing the teaching/learning process in general from "The Medical Teacher" (Cox, Ewan 1982) were also found valuable.

The instructional design plan by Kemp (1977) as shown in Figure 19 is a flexible process suitable for application to individual topics, units and courses. It is not fixed as its user can start with whichever element and move back and forth to the other steps, eventually treating most of the eight steps which may be reordered and adapted to the user's needs and situations (Kemp 1977).

The author has adapted the plan by Kemp to the needs of the community dentistry programme and the results of the local situation analysis. It was found that although the objectives were treated first, their section (and other sections) needed revision as treatment of the other steps were undertaken. The author also added and modified some steps of the plan as the section headings will show. Further, interspersed with the programme elements, the author has provided enough information from the field of education and its advances to explain how the programme was developed and possibly how it can be improved as well as to benefit other programme, subject or topic developers.

Instructional Design Plan

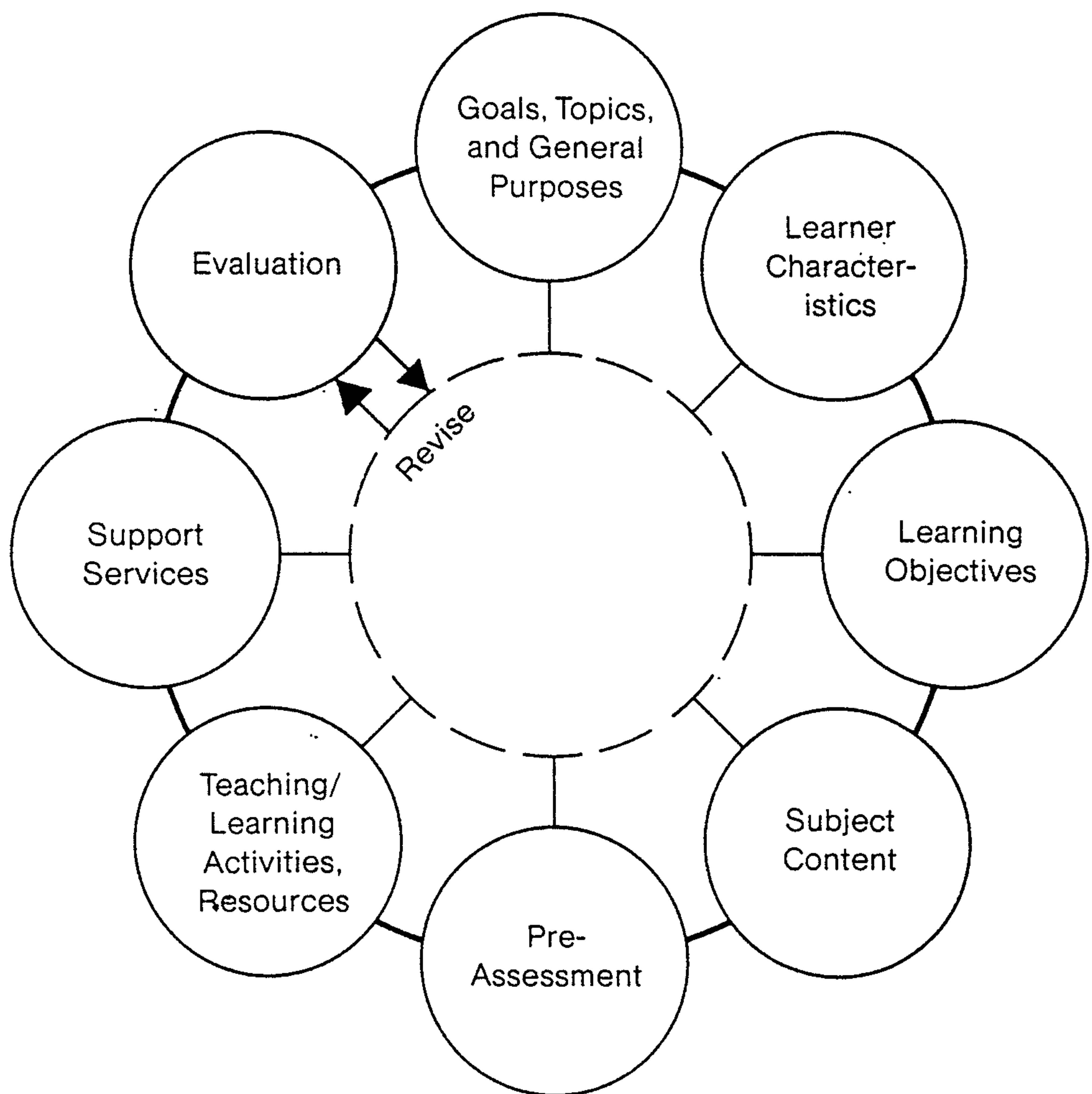


Figure 19.

(Source: Kemp 1977)

The contents of the plan for the community dentistry programme contained in this section is intended to be suggestive not prescriptive, capable of further amplification and refinement.

7.2 PROGRAMME RATIONALE

For a developing country with a fledgeling dental profession, the only dental school's curriculum is of critical importance in influencing the future of dentistry. At stake is also the direction of public dental health services for a population with high levels of periodontal disease, indications of increasing levels of dental caries and improving social and health indicators (Section 4.3). It will be very easy and it could be the easy way out to slip into the restorative-rehabilitative philosophy possibly left to the fee for service regimen. Then the efforts to stem the tide of the new requirements, let alone deal with the backlog of oral disease, will be in vain. Simple numerical increase of dentists in the hope of improving the oral health of the community constrained by resources will also be doomed to failure. The victim in such situations will be the oral health of the community and the sufferers those in greatest need.

The present dental curriculum of the Faculty is fairly adequate in preparing the learner biologically and technically, although one hastens to add there are lots of possibilities for improvement. However, the greatest contribution of the curriculum could only come from a firm commitment to the oral health of the community by helping its learners to gain the necessary social sensitivity and community orientation in addition to the required level of clinical proficiency. In effect, presently graduates are overqualified for what they are doing and ill-suited for what they ought to be doing.

The learners should be provided with a truly professional education as a function of a higher institution, not only a vocational training which may be undertaken by other oral health categories using much less resources.

By the introduction of the community dentistry programme, as proposed by the author in the following pages, other changes should ensure to benefit the community, the learners and the undergraduate curriculum.

Such changes and associated benefits include:

- Induce response to changes in society in general.
- Promote relevance to the oral health needs and problems.
- Encourage community involvement in its oral health problems and strategies to meet them.
- Initiate updating of curriculum content.
- Improve the teaching-learning process and evaluation.
- Facilitate cooperation and lowering of interdepartmental barriers in the dental Faculty.
- Redefine and generate educational objectives at all levels.
- Humanize and liberalize the undergraduate education.
- Encourage dental research, especially in oral health promotion, oral diseases prevention and associated social issues.
- Improve professional identity, satisfaction and self-esteem.
- Encourage self-learning throughout career.
- Promote intra- and interprofessional team-work and cooperation.

These improvements can ensue, not only because of the plethora of topics community dentistry encompasses, but also because of its central theme of preoccupation - the community - and its addressing the central issue in all health sciences education, that of relevance. Relevance to the teacher, learner and the community in their needs,

demands, resources, aspirations, and environment, forever evolving in quest of oral health, part of total health, part of the general well-being sought by all.

Further, the programme in its choice of teaching methods, resources, assessment and evaluation has as its main focus the promotion of learning.

7.3 PROGRAMME GOALS AND AIMS

Community dentistry should provide the learner with an overall view and understanding of the community profile with its demographic structure, major health and specific oral health problems, its priorities, values and attitudes towards these problems. Also the methods available to deal with these and other associated social and economic problems with the available resources; the role of dentistry in the community and the part the professional dentist can play in contributing to its oral health situation and overall well-being.

The ultimate goal of introducing community dentistry is to produce a dental professional better able to contribute fully towards the health of the community and especially its oral health.

The programme should prepare the learner to acquire an understanding of and apply the general knowledge, skills and attitudes involved in the social issues of dentistry as distinct from the biological and technical parts of the curriculum.

The learner should become socially sensitive and competent and community oriented following a philosophy of promotion of oral health and prevention of oral disease in the service of the community as a professional engaged in constant learning and personal growth.

To achieve the goals and aims, community dentistry topics are presented in a coherent programme built on suitable objectives. The programme's learning objectives have been derived from the following sources:

- The goals and aims of the programme.
- The analysis of the trend of community dentistry as experienced by dental education in developed and developing societies.

- The recommendations and guidelines of international bodies and experts as those of WHO, including the primary health care concept; the AADS; and FDI.
- Analysis of the local situation of the community in its development, health status, resources and needs - present and future, especially in oral health.
- The expected role and tasks of the undergraduate and graduate dentist.
- The analysis covered in the introduction to this thesis of development, health, oral health and the global situation, planning, manpower and epidemiology.
- Analysis of the dental Faculty.
- Analysis of the present dental curriculum.
- The learners, what they already know, their level of development and capabilities, their needs for self-fulfilment and self-advancement.
- Political attitudes, legislations and health goals.
- The personal abilities, preferences and value judgements of the author with a view to implementing, evaluating and continually reviewing these objectives.

It is also planned that the learners can contribute directly to the learning objectives by the use of a "questioning" strategy to be explained later. Also it is hoped the community can be involved without resort to proxy measures. This may result from the use of resource persons from outside the Faculty in the teaching/learning situations as planned.

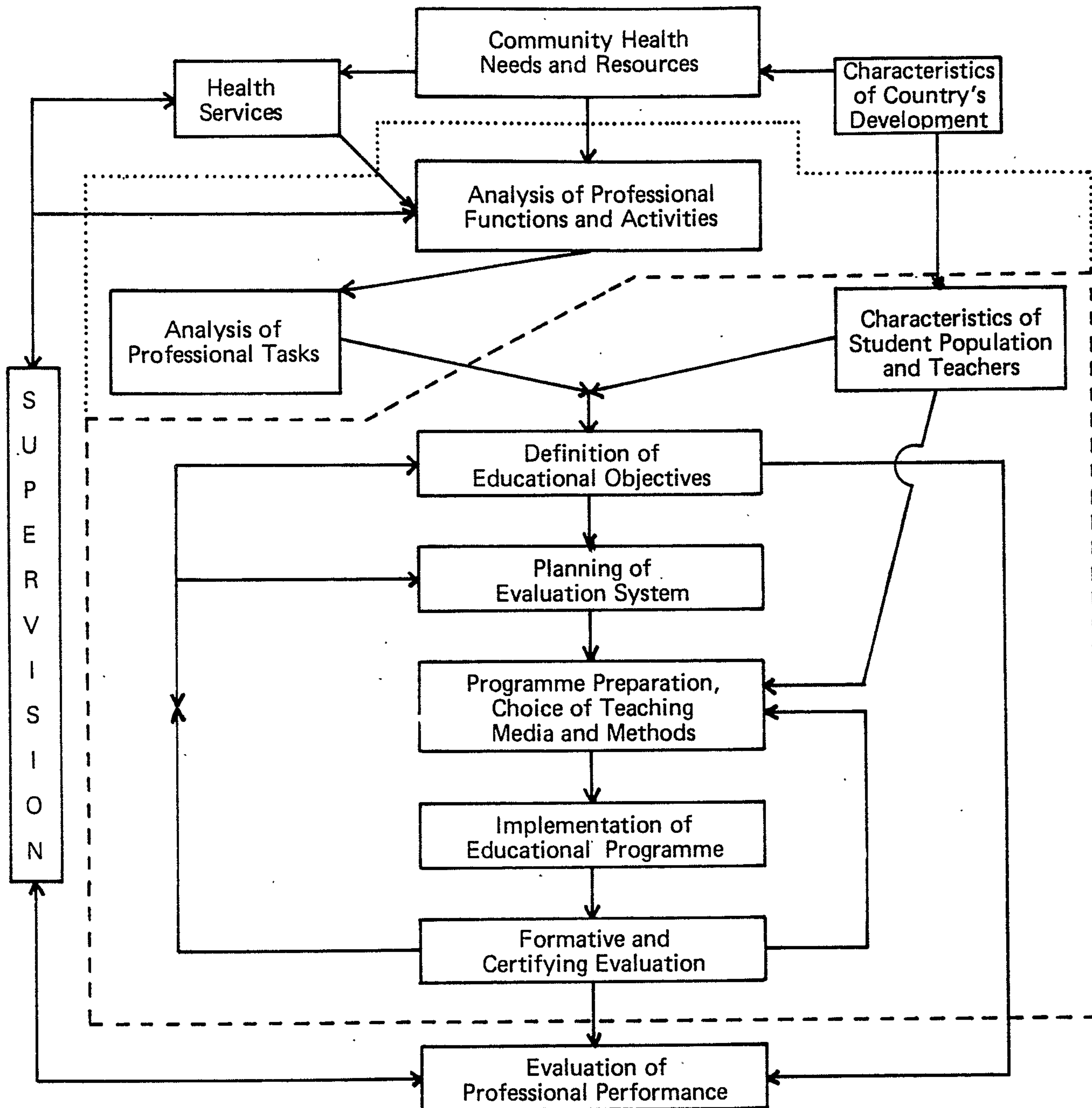
In general, the development of the programme's learning objectives has largely followed the scheme by Guilbert (1981) as appears in Figure 20, in which many factors are considered in defining the educational objectives. However, the author has additional sources including those from the nature of the subject of community dentistry as a trend in dental education with its role in dentistry and development guidelines. Also the topics covered in the introduction and the full analysis of the Faculty situation.

Figure 20 stresses the analysis of professional functions, activities and tasks as a source of defining educational objectives.

Figure 20.

Organizational diagram showing the relationship between the subsystem "Education" (inside the dotted line) and the subsystem "Health Service".

Some sources of educational Objectives



(Source: Guilbert 1981)

7.4 PROGRAMME OBJECTIVES

To make the learning objectives implied by the ramifications of the programme aims and goals manageable, three main groupings are proposed. These serve to categorize the objectives broadly into: A- social; B - public dental health, and; C - professional competencies and responsibilities.

The grouping of objectives is not intended to be all inclusive or mutually exclusive, but identifies the main thrust of the objective and indicates the relevant learning experiences.

The order of presentation of the learning objectives within each group is tentative only. This flexible arrangement allows for the interest of learners and the practical consideration of resources' availability in the order of presentation and use of the objectives.

In reaction to the learning situation, a certain objective may be followed by one objective one time and by different objectives on other occasions.

The first group of objectives are mainly involved with the community's social issues and include elements of the social and behavioural sciences - sociology and psychology. The second group of objectives relates to tasks and activities in public dental health. The third group relate to intra- and interprofessional issues and also concern the learner personally as a future professional. The issues include ethics, jurisprudence, development of the dental profession and personal growth and satisfaction.

After formulating the learning objectives each one is analysed to identify the educational activities most suited for its fulfilment. Instead of identifying the topic and subject content only and thereby reverting to the traditional method in which the learners are

presented with "this is what you need to know to pass your exams", a number of questions are formulated with the learners themselves contributing. These questions relate to the objective and also to local real-life situations and problems. For answers to the questions and solutions to the problems, knowledge, skills and attitudes will be acquired by the learners and therefore achieving the learning objective.

The use of "questioning" in the teaching/learning situation is not new but the author is using a method whereby the "questioning" break down and analyse the learning objective whenever possible. The use of this method, together with learner participation in the questioning process means the analysis of the programme learning objectives is not the final outcome for each objective and indeed the analysis of some contains sub-objectives or the topic concerned.

An example of the possible final analysis of objectives is given at the end of the programme learning objectives and is followed by discussion on the use of questioning - Sections 7.5 and 7.6.

To avoid applying instruction, learning and evaluation almost totally to the lower levels of the cognitive and affective domains and practical skills and to reduce the large number of levels (categories) as suggested in Bloom and co-workers' taxonomies, plus those for example of Harrow, a condensed version is supplied by Guilbert (1980):

1. Cognitive domain (intellectual ability):

- the ability to solve a problem;
- the ability to interpret data;
- the ability to recall facts.

2. Affective domain (attitudes):

- the ability to respond to the needs of another person;
- the ability to be receptive to the ideas of another person.

3. Practical skills (psychomotor):

- the ability to perform certain acts automatically and accurately;
- the ability to exercise control over a practical skill;
- the ability to know when and how to apply a practical skill appropriately in a given situation.

The use of this "taxonomy" is sufficient for the programme's objectives.

7.4.1 Learning Objectives for the Community Dentistry Programme

7.4.1.1 Group A Objectives

At the end of the programme the learner should be able to demonstrate social competence and responsibility as indicated by the following objectives and their analysis.

Objective: Define the concepts involved in community dentistry.

Analysis:

- What is health?
- What is oral health?
- What is a community?
- What is social?
- What is culture?
- What are attitudes?
- What is community dentistry?

Objective: Identify community attitudes, beliefs and value systems towards oral/health.

Analysis:

- What are the attitudes of community groups towards health and illness?
- What are the attitudes towards oral health?
- How are such attitudes developed and shaped?
- What practices such attitudes produce?
- How can unsuitable attitudes be modified?

Objective:

Explaining the psychological basis for specific dental concerns.

Analysis:

- What is the psychological significance of the face, the mouth, and teeth?
- Dental concerns:
 - Phobias
 - Anxiety
 - Fear
 - Pain
 - Gagging
 - Bruxism
 - Aesthetics
 - Acceptance of extraction and prosthesis, etc.

Objective:

Recognize the relationships and influences of social, cultural, environmental and economic factors on health and oral health.

Analysis:

- What are the socio-economic indicators of the country?
- What are the pertinent environmental features?
- What are their influences and effects on oral health?
- What is the relationship of oral health to general health?

- What are the major demographic features of the population?
- What are the resources of the country?
- What is the relative priority of dentistry in drawing on these resources - human, material or financial?
- What are the basic health status indicators?
- What are the indicators of the provision of health care?
- How do they compare with "HFA2000"?

Objective: Identify impediments to oral health and how to overcome them.

- Analysis:
- What are the sources of the impediments to the attainment of oral health by the community?
 - Which impediments can the dentist overcome or contribute towards overcoming?
 - Who else can contribute?
 - What are the strategies which can be used?

Objective: Discuss the role of dentistry in the community and the expectations from it.

- Analysis:
- What is the present role of dentistry in the country regarding:
 - promotion of oral health;
 - prevention of oral diseases;
 - research into relevant matters;

training of primary oral health care personnel.

- What does the community expect from dentistry in general and the dentist in particular?
- What are the discrepancies between community expectations and dentistry's present role?
- What are the policy makers' expectations?
- How can the discrepancies be dealt with?

Objective:

Identify the contribution of dentistry to the oral health of the population and the role of the dentist.

Analysis:

What are the contributions of dentistry in the country to oral health?

- How could these contributions be expanded and increased?
- What tasks should the dentist have?
- How much does the present training and education equip the graduate dentist and relate to the required tasks?
- What changes can prepare the graduate to take a more active and full role in contributing to the oral/health?
- Are there any differences in the roles of male and female dentists?

Objective: Accept responsibility for the oral health of the community and encourage community group participation in their oral health issues.

- Analysis:
- Show concern for the oral health of all community groups including the disadvantaged by identifying and responding to their requirements and special needs.
 - Organize all activities for maximum contribution to community oral health.
 - Identify methods of encouraging community groups, participation in oral health programmes formulation and implementation.
 - What contributions can the community provide towards its oral health and how can that be encouraged?
 - What is the role of community voluntary organizations, e.g. the "Red Crescent" in oral health?

Objective: Communicate effectively with community groups and persons.

- Analysis:
- What are the principles of communication?
 - What communication methods and media are most effective for which groups?
 - Interviewing, listening, questioning, responding.
 - Eliciting information on attitudes and expectations.
 - Public speaking.

- Writing for publications.
- Mass communication - TV and radio.

7.4.1.2 Group B Objectives

The undergraduate dentist should demonstrate public dental health competencies and responsibilities as in the following objectives:

Objective: Participating in and supporting oral health plans and programmes of the country.

Analysis:

- What is planning? Why plan?
- What are the principles of planning and programming?
- What are the oral/health plans in the country?
- What are the goals and objectives?
- What oral health programmes are there? How adequate are they?
- How to devise an oral health programme for a defined community group.
- What priority groups are there?
- What target groups?
- What level of service?

Objective: Discuss the proposition that community dentistry is important in oral health care and its delivery systems.

Objectives: Understand productivity and the role of manpower development in oral health.

Analysis:

- What is the productivity of the dentist in the country?
- What factors affect it?
- How can it be improved?
- What roles can dental auxiliaries play?
- How many specialities are appropriate for the community?
- What percentages are needed?
- How does the present situation measure up?

Objective: Apply principles of oral health education to the community stressing prevention.

Analysis:

- What is oral health education - principles, methods and evaluation?

NB: For further analysis of this objective, see example at end of objectives.

Objective: Apply preventive approach and measures and especially promote the application and use of various forms of fluoride in dental practice.

Analysis:

- What are the benefits of the preventive philosophy and approach to oral health?
- What preventive programmes can be applied to the community generally and the special groups?

- What specific changes occurred in the prevalence of dental caries and periodontal disease?
- What factors are thought to have contributed to the changes?
- What are the problems associated with these changes?
- What lessons can be concluded for the country?
- What are the "global goals" for oral health in "HFA2000"?
- What are the local oral health goals?
- What local goals can be achieved?

Objective:

Identifying the oral health requirements of the community.

Analysis:

- Epidemiology of oral diseases and survey methods.
- What are the demands of various community groups?
- What is the prevalence and incidence of dental and oral conditions in the country?
- What are the oral health needs of the community?
- What is the pattern of utilization of dental services in the country?
- What are the oral health needs of special groups?
e.g. school-children, hospital patients,
disadvantaged groups, the less accessible.

- What are the likely changes in the community's oral health requirements?
- How does the community's oral health status compare with the oral health global indicators?

Objective:

Identify the changes in the understandings of oral disease concepts.

Analysis:

- What are the recent changes in the concepts of etiology, prevention and treatment of dental caries?
- What is the current understanding regarding the dogmas; prophylactic odontotomy; extension for prevention; a clean tooth never decays, etc.
- What is the importance of at-risk groups or patients? - for both periodontal disease and dental caries.
- What are the recent changes in the concepts of etiology, prevention and treatment of periodontal diseases?
- What is the current position regarding:
 - Untreated gingivitis always leads to periodontitis and eventually tooth loss.
 - Periodontal pockets must be surgically eliminated.
 - "Do you want your teeth longer or no longer?" - said by some periodontists in praise of the virtues of gingivectomies.

- The values of flossing, professional prophylaxis, six-monthly check-ups, etc.

Objective: Evaluating the contributions of various oral health delivery systems to community oral health.

- Analysis:
- What are the types of oral health delivery systems used internationally?
 - How adequate is the oral health delivery system used in the country?
 - How is the system coping, e.g. with school children's requirements in oral health?
 - How can the effectiveness and efficiency of the system be improved?

Objective: Evaluate the availability of essential oral health care in the country.

- Analysis:
- How equitable are oral health services?
 - What percentage of population receive dental treatment?
 - What community groups are represented in that percentage?
 - What is the distribution of dental clinics and units in the country?
 - How do urban and rural communities compare?
 - How can primary oral health care improve the availability of essential care and contribute to improving oral health?

Analysis:

- What is the role of community dentistry in dentistry and the community?
- What is the need for graduate training in community dentistry?
- What areas in dental research can community dentistry contribute.

Objective:

Solving problem situations in community dental health.

Analysis:

1. Definition: What is the problem? How is it defined? What are the characteristics of the problem? What are the terms and processes used to describe the problem? Why is it a problem?
2. Distribution: What is the distribution of the problem in the specified population? How frequently is it observed?
3. Causality: What factors were responsible for the problem beginning and what factors are responsible for the continuation of the problem? What are the causal models that may explain the onset or continued existence of the problem? Which variables are involved and how do they inter-relate?
4. Resolution: What methods or techniques have been or could be used to resolve the problem.
5. Outcome: What were the outcomes of the various methods used and what are the potential outcomes of proposed methods to solve the problem? What has been or may be the outcome of failure to intervene?

(Silberman, Tryon 1980)

Objective:

Recognize the global changes in the oral health situation.

Analysis:

- What are the main features of the changes in developed and developing countries?

- What are the benefits and methods for the use of various forms of fluoride?
- What are the oral health problems associated with excess natural fluorides in drinking water supplies and how can they be reduced?

Objective:

Recognizing responsibility for containing costs and the economic implications of decisions.

Analysis:

- What are the economics of oral health care and services?
- What is the oral health services budget in the country?
- What percentage of the health budget?
- How can financing of oral health care be improved?
- How can costs be contained?
- What other types - non-monetary or indirect - of cost involved by suffering oral diseases?
- How is cost related to clinical and dental practice decisions by the dentist?

Objective:

Understanding the need to plan the use of dental technology wisely.

Analysis:

- What is the appropriate level of technology for the country in the oral health services?
- How can equipment and materials be chosen, used and maintained?

7.4.1.3 Group C Objectives

The undergraduate dentist should demonstrate professional competence and responsibility by the following:

Objective: Identifying the characteristics of the dental profession and its development.

Analysis:

- What are the characteristics of a profession?
- How does dentistry as practised now in the country conform to these characteristics?
- How did professionalism develop in world dentistry?
- How is the profession likely to develop in future in the country?

Objective: Using ethical standards in all duties and activities.

Analysis:

- Recognizing ethical standards involved in dealings with patients, community groups, colleagues and in other activities as in research.
- Is there a code of ethics for the health professionals in the country? If not, should it be developed? By whom and along what guidelines?
- What title should a dental practitioner be given?
 - dentist, doctor?
- What is the ethical and legal position?
- How can the quality of dental work be assured?
- Who should be responsible for it?

Objective: Relating to other health professionals, dental and medical as a team member.

Analysis:

- Appreciate the value of team work.
- Communicate effectively with colleagues, other health professionals and supplement own judgement with theirs.
- What other oral health personnel categories should be developed in the country?
- What types of dental auxiliaries have been developed in other countries and why?
- What benefits can result from utilizing auxiliaries?

Objective: Identify the structure and function of the health and oral health administration of the country.

Analysis:

- How are the oral/health systems administered?
- What is the general health policy?
How are decisions made?
- How efficient and effective is the system used?
- What improvements can be suggested and how can they be initiated?

Objective: Recognizing the effects of legislations on oral health and influences their formulation favourably.

Analysis:

- What are the present oral/health legislations in the country?

- How do they relate to the needs? What effects have they produced?
- How can future legislations be influenced and for what purposes?
- What are the effects of general health legislations on oral health?
- What are the effects of other legislations on oral/health?
- What environmental protection legislations are there?

Objective:

Understand the legal requirements and responsibilities for dental practice.

Analysis:

- Entering name in dental register.
- Limitations of practice.
- Limitations of drugs prescriptions.
- Laws of dental practice in the country.
- Rights and obligations of patients and practitioners.

Objective:

Understand principles of forensic dentistry and their application to legal problems.

Analysis:

- Tooth numbering systems.
- Need for accurate charting and other record systems.
- Writing of police report forms.

- Identification of victims.
- Bite marks.
- Identification methods for dentures.
- Identification of child abuse.

Objective: Applies learning skills effectively and efficiently.

- Analysis:
- How to improve class-room note-taking.
 - How to use text-books effectively.
 - How to study.
 - How to take examinations.
 - How to use the library.
 - How to write clearly and concisely.
 - Learn how to type.
 - Self-assessment.
 - Peer assessment.
 - Learning to observe and reflect on the results of clinical decisions and treatment interventions to draw valid conclusions.

Objective: Accept responsibility for continuing education and evaluation of own skills.

- Analysis:
- Evaluation of literature.
 - Subscription to periodicals on dentistry.

- Lecture programmes and discussions organized in local association.
- Attending of national and international dental conferences.
- What problems hinder the above activities and how can they be overcome?

Objective:

Appraising innovations critically and flexibly in oral health care methods and materials.

Analysis:

- Research methods and principles.
- Awareness of some problems in oral health that need investigating.
- Appreciating that even small scale research studies can be worthwhile.
- Accepting and proposing helpful changes in oral health care methods and materials.

Objectives:

Joining membership of professional associations as an active member.

Analysis:

- What associations are there internationally and nationally?
- How active is the local health professions association? What is its role and activities? How can the member contribute?
- What benefits are there to the member?

Objective: Practices measures conducive to safeguarding own oral/health.

Analysis:

- Recognizing principles of health safety and ergonomics in dental practice.
- Displaying oral/health practices necessary for well-being.
- Recognizing unhealthy lifestyle and practices.
- Reducing stress.
- Increasing job satisfaction.
- Identifying correct procedures to reduce infections in the dental operator and:
 - How to minimize health risks to oneself and patients in dental practice.
 - Precautions in dealing with hepatitis B and AIDS patients.
- Recognition and coping strategies for reality-shock syndrome and professional burnout.

Objective: Identifying the role of international agencies as the FDI and WHO in promoting oral/health.

Analysis:

- Activities and publications of WHO and FDI.
- What activities does WHO have in the country?
- 'Health 2000', Health and Oral Health Global Indicators.
- What health and oral health indicators are there for the country?

- What is PHC and how can it be applied to oral health in the country?

7.5 EXAMPLE ANALYSIS OF OBJECTIVE

For the learning objective: "apply principles of oral health education to the community stressing prevention," for example, instead of starting with the instructor giving the whole topic to passive learners, the learners themselves are guided to ascertain the situation of various community groups, e.g. school children, expectant and nursing mothers, university students, pensioners and even the learners themselves to establish what is already known about preventive oral health practice, what is the attitude towards it and what is actually practised. It is then that any topics on oral health education will be relevant and gain active learning.

Questions arising will include analysis of the present situation as applies to a particular community group or groups, the problem arising from that situation, how can oral health education contribute to its solution and the learner's role in its implementation:

- What is the knowledge, attitude and practice of the community group regarding their oral health?
- How did they get the knowledge, acquire the attitude and develop the practice?
- How do they perceive their oral health?
- What is the result in their oral health status and oral hygiene?
- What is their level of nutrition and dietary habits?
- What is the level of fluoride in their drinking water?
- How available are oral hygiene aids to them?
- What is oral health education, principles and methods?
- What special strategies to use for illiterates?

- How is it related to health education?
- What are the likely benefits to the community?
- What is the experience of other countries?
- What are the WHO and FDI recommendations and guidelines on oral health education of the public?
- What oral health diseases and conditions can it reduce and to what extent?
- What oral health education programmes can be used for the community?
- What objectives should be set and how are they likely achieved?
- How can the outcome be evaluated?
- What is the role of the dentist in oral health education?
- How comfortable is such a role for you?
- Who else could have a beneficial role?
- Should oral health educators be trained as a special auxiliary group for the country?
- What is the research situation on oral health education internationally and nationally?

The posing of such questions and identifying existing problems contribute to better learning by providing relevance, gaining attention and providing application of knowledge and skills. It also provides for critical learning where learners participate through their questions in providing specific learning areas by voicing what

concerns them and matches their interest leading to knowledge, skills and attitudes necessary for solving community problems.

Not all questions raised will have ready answers, some will require activities such as surveys, questionnaires, literature review, even anecdotal evidence from patients' contact. Some questions may even have no one or clear cut answers so challenging the learners and improving their powers of observation, also impressing on them the need for continuous learning.

Together with the educational objectives communicated orally or in a written form to the learners, the questions and problems posed serve to focus the issues concerned, prepare the learners for what is to come, indicate what is important and relevant and provide a framework for the topic's learning experiences and activities, including topic content and evaluation.

The role of the instructor will be a manager of the learning situation and a participator in it, rather than a dispenser of facts and information only. The instructor becomes a guide to and one of the several resources available.

It can also be appreciated that many of the questions are readily convertible to sub-objectives by substituting the whys and whats by behavioural terms like define, describe, identify, discuss, etc., and serve as basis for the formulation of tests for assessment.

The questioning and problem format adopted for the programme should also contribute to a better learning environment, being less authoritarian than specific objectives and lessening the predominantly oppressive nature of instruction.

7.6 USE OF "QUESTIONING"

In spite of the large number of questions usually fielded by most teachers, there is little prominence given to their application to the teaching/learning situation. The enthusiasm on the subject, especially during the sixties and seventies, seems to have waned, due probably, to the wider development of specific educational objectives which may appear as more impressive and acceptable when communicated to the school and other authorities.

Sanders (1966) in one of the few books on the subject, in an effort to upgrade the quality and use of questions in teaching/learning, produced a taxonomy of questions based on Bloom's taxonomy of the cognitive domains to enable the teacher to offer a greater variety of intellectual skills and allow their development by the learner to a greater degree, beyond the most often memory-only level.

Most of the question-classification systems are based on the cognitive process with scant attention given to questions which guide learning of a problem-solving, behavioural or affective skills (Gall 1970).

Tinsley (1973) indicated that key questions should be central to the lesson plan and sequenced toward a specific objective, will enable the learners to organize learning purposefully and encourage their participation in posing questions thereby increasing learning.

Rogers (1972) affirmed that in all research concerning classroom questions there was no evidence to suggest clear strategies for training teachers and that research was almost non-existent on how teachers can be helped to vary the level of questions to influence achievement.

In selecting priority teaching skills in course development for Australian teacher education programmes "Questioning" topped a list of nine priority skill areas and was included in the "Teaching Skills Development Project" of the University of Sydney in 1972. The resulting series publications contained the skills of basic and advanced questioning published in 1973 and 1975, respectively (Turney, Cairns, Williams, Hatton, Owens 1973).

The objectives of basic questioning may include:

- Arousing interest and curiosity in a topic.
- Focusing attention on a particular issue or concept.
- Developing an active approach to learning.
- Stimulating learners to ask questions of themselves and others.
- Structuring a task to maximize learning.
- Diagnosing specific difficulties inhibiting learning.
- Communicating that involvement in the lesson is expected and that covert participation by all group members is valued.
- Providing learners with an opportunity to assimilate and reflect on information.
- Assist in developing thinking skills.
- Developing reflection and comment by learners on the responses of others.
- Providing for learning through discussion.
- Expressing genuine interest in learners' ideas and feelings.

(Turney et al. 1973)

These objectives are complemented by the objectives of advanced questioning:

- Assisting learners to develop abilities in acquiring, organizing, using and evaluating information.
- Increasing learners abilities in forming and articulating reasoned statements which take account of the available information.
- Encouraging learners to effectively develop ideas and statements of these ideas in a reciprocal relationship with other members of the group.
- Providing opportunities for all members of the group to experience success in going beyond the immediately obvious to implicit or new ideas.

(Turney et al. 1975)

Health personnel education in general and dental education in particular seem to have benefited little of skill development in the use of questioning in teaching and learning. Hatton (1982) assumed that what is known about teaching skills in general is applicable to medical education and outlined skills in questioning and the types of questions. He also considered evaluation questions extremely difficult to frame and questions about feelings even more problematic because students are invited to verbalize publicly their own values, connections and prejudices. Such demanding types of questions are too difficult to frame, too threatening to consider and too uncomfortable to cope with, hence their avoidance by teachers. The rewards, however, for those who risk them are great for teacher and learner.

The importance of learner contribution to question and problem formulation is augmented by the inclusion of the individual learner's contribution in the continuous assessment. Knowing this, the learner will think about the topic and make an effort to contact and ask questions of practising dentists about the conditions and problems they face. As such opportunity may not be equally available to all, practising dentists and other resource persons can be invited to attend class discussions to give the learners the opportunity to ask questions about the problems of dental practice and the community's oral health.

7.7 PROGRAMME CONTENT TOPICS AND SEQUENCE

These are implicated by the learning objectives and directly related to the further analysis by the questions and problems posed indicating the scope of the programme. The whole of the previous analysis undertaken by the author in this thesis, including development, health, planning, manpower, the global oral health situation, WHO and FDI work forms an extensive basis for the scope and content material of the programme. The analysis of the local situation provides the problem situations that the programme draws upon. Further sources of content material on specific topics are textbooks on community dentistry, relevant periodicals and reports documents.

The following are topics and concepts indicated by the programme learning objectives and their analysis:

Group A

- Definition of concepts involved in community dentistry, e.g. community, social, culture, attitudes, etc.
- Attitudes towards health and illness, development, influences and modification.
- Psychological basis for oral/dental concerns.
- The relationships and influences between the socio-cultural, environmental and economic systems on health and oral health.
- Impediments to oral health.
- Role of dentistry and the dentist in society.
- Contributions of dentistry and dentists to oral health.
- Responsibility of dentist to community oral health and role of community.

- Communication - principles, methods and media.

Group B

- Planning for oral health - programmes, goals, objectives.
- Role of community dentistry.
- Problem solving.
- Global oral health status - changes in developing and developed countries; oral health "Global goals 2000".
- Epidemiology of oral diseases - need, demand and utilization.
- Changes in concepts of oral diseases.
- Oral health delivery systems - international, national.
- Essential oral health care - in the country - primary health care.
- Productivity - manpower development - auxiliaries.
- Oral health education of the community - principles, methods and evaluation.
- Preventive measures on a community basis.
- Economics of oral health care.
- Appropriate technology.

Group C

- Dental profession - history, changes, future.
- Professional ethics in dentistry.
- Team-work.
- Public health and oral health administration - system, functions, decisions, policies.
- Legislation - general health and oral health.

- Legal responsibilities of dentists.
- Forensic dentistry.
- Learning skills.
- Continuing education and self-evaluation.
- Innovations in dentistry - critical flexibility in attitude.
- Professional associations.
- Personal health and oral health - infection control.
- The work of WHO-FDI in oral/health.

The issue of sequencing has been partly anticipated by the grouping of the objectives into social, scientific and professional categories to be broadly introduced in that order. The knowledge of the community's general attitudes resources and problems preceding the identification of the oral health requirements of the community and the methods available for their provision with the professional development of the learners complementing the programme.

Organization of content within a topic depends on the topic, some possibilities suggested by Kemp (1977) are:

- From known facts to new facts.
- From the beginning of a process to its conclusion.
- From a chronological point to a later point.
- From a level of simple role-learning or an easy procedure to complex understandings and procedures.
- From concrete, specific units of content to abstract levels of understandings, problem solving and reasoning.
- From specific, separate facts, details or observations to concepts, principles and rules.

- Conversely from stated principles and generalizations to facts, observations and applications.

For arranging the contents of a single class Cox, Ewan (1982) suggests an alternative as:

- From questions to answers.
- From problems to solutions.

For the community dentistry programme the proposed sequencing relies more on the arrangement suggested by Ewan, but other arrangements are more applicable for some topics, e.g. the chronological for tracing the development of the dental profession; process beginning to conclusion for the topics of planning and programming; specific facts, details and observations to concepts, principles and rules. Further, the questioning and problem posing format adopted for the programme is structured along the main possibilities - known to unknown; simple to complex; basic to advanced. One arrangement does not necessarily exclude others and a combination of arrangements can enhance the sequencing of a topic and thereby learning.

7.8 LEARNER CHARACTERISTICS

In Libya, the students entering the dental undergraduate course usually have received twelve years of schooling with the last two years done exclusively in science subjects. The average age is eighteen years and they would be in the top third of the secondary school certificate pass list. A good percentage would have applied to university with medicine as their first choice. Allocation is done on a national basis by computer according to the total marks attained at secondary school certificate examinations and a list of preferences filled in by the student.

There is little variation in the social characteristics and the admitted students come from all parts of the country. Allocation of places to geographically remote or small towns has been attempted. Male and female candidates have equal chances of admittance.

Candidates are selected in a formal interview by a special committee. No written or practical aptitudes are tested by the committee. The criteria used are the secondary school certificate marks and the student's ranking of dentistry on his preference list. A health certificate is also required.

The annual intake has settled on about thirty students with about half of them females. There has been pressure to raise the number without realistic considerations for the teaching and clinical training capacity of the dental Faculty in its present location.

Tuition is free and all students receive a monthly allowance. Students from outside the city are provided with housing and other services free at the university hostels. All dental instruments are provided by the Faculty. Textbooks are subsidised by 50% of the cost.

7.9 PRE-ASSESSMENT OF LEARNERS

A pre-test can be used to measure any pre-requisites for a course. It can also ascertain what the learners already know about a topic from independent, unplanned learning experiences and this can be done in the form of pre-topic questionnaire of class, an informal oral questioning or even a show of hands.

For the community dentistry programme, however, a legitimate and more relevant use of pre-assessment is that a pre-test arouses interest and the learners must be told of the reason for the testing as tests are traumatic for some learners.

As a result of the pre-testing, objectives and sub-topics can be eliminated, modified or added. Modifications to earlier elements of the dental curriculum will also be considered.

7.10 TEACHING/LEARNING ACTIVITIES

Many of the numerous teaching/learning activities have varying degrees of impact on the results of learning. No one method has maximum effect on the achievement of learning in the areas of knowledge, skills and attitudes put together (Cordera, Bobenreith 1981).

The principles of learning should direct the choice of methods and techniques allowing selection and use of the most appropriate, effective and possibly efficient activities and resources.

The use of the lecture-only, for example, in the community dentistry programme may be suitable in increasing knowledge but will be deficient in providing skills and changing attitudes (Cordera, Bobenreith 1981; Ewan 1982).

Essentially there are three patterns of teaching and learning. Presentation to a group, individualized learning and teacher learner interaction. The first two are usually impersonal in that the teacher or a learner provides a one way presentation in person or even recorded. Although they may contribute towards attitudinal objectives their use is more suited for achieving cognitive and psychomotor skills (Kemp 1977).

The interaction pattern involves the instructor and learners or the learners among themselves, usually in small groups working to discuss, question, pursue problems and report. Interaction groups allow discussion that review, clarify, correct, reinforce and apply the learning that results from individualized and group presentations (Kemp 1977).

This pattern is also the best way to deal with affective objectives - attitudinal formation, development of appreciation,

cooperation and interpersonal relations. The learners can learn from the instructor as a role model as well as from each other. The pattern is also suited to develop problem solving skills and decision making and can use role play, simulations and case studies (Kemp 1977; Ewan 1982; Cordera, Bobenrieth 1981).

The author is aware of the conclusions by Miller (1956) that teachers may be major obstacles to student learning and that traditional teaching is relatively easy, but helping a student to learn is an exhausting occupation.

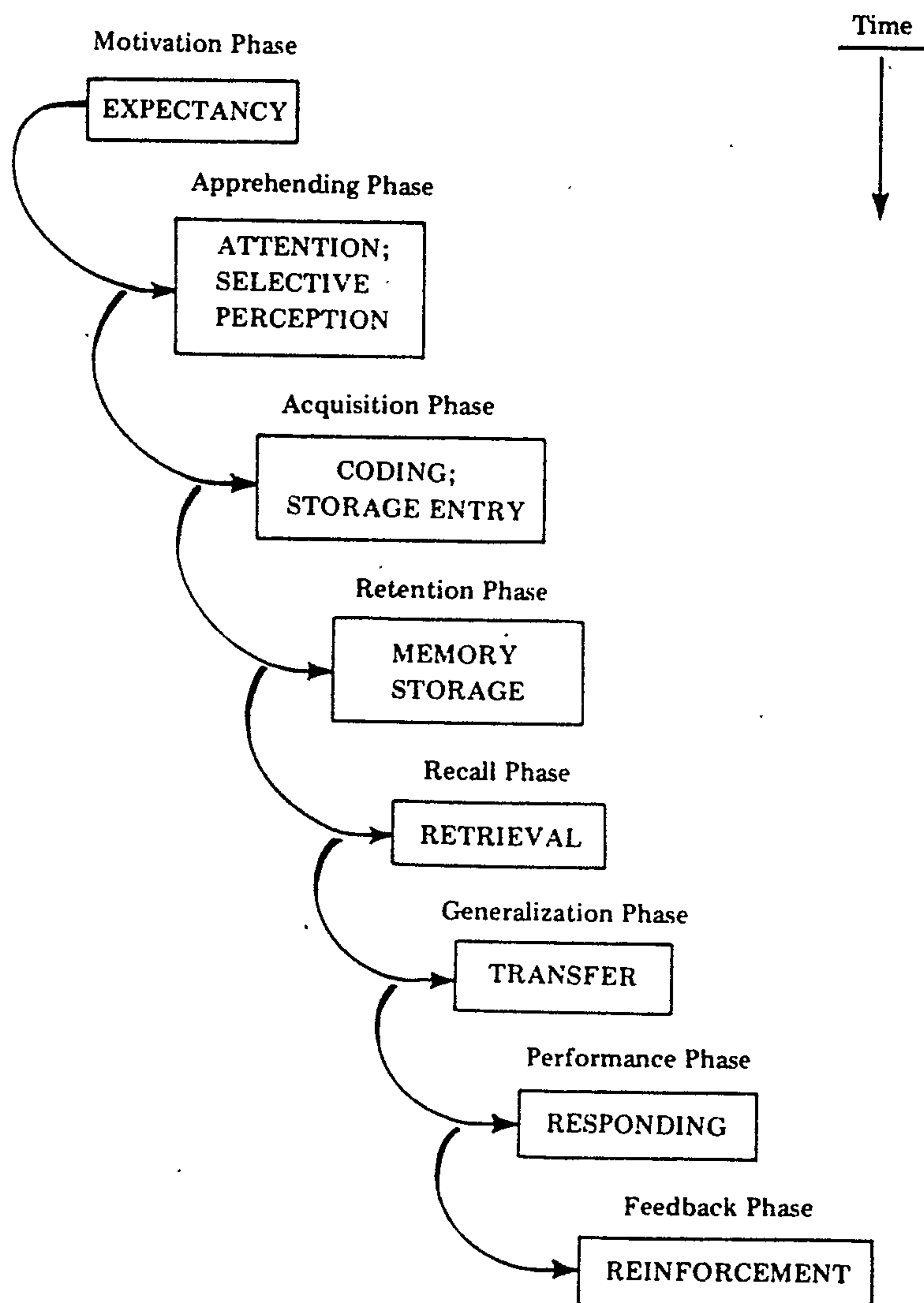
However, there is enough known about the principles of learning and there are numerous teaching methods that can make the teacher a valuable contributor and facilitator of learning rather than an obstacle to it.

Figure 21 from Gagne (1975) shows the phases of an act of learning and the processes associated with them.

The list following explains the processes of learning and how can external events provided by the teacher enable the learner to achieve these processes. The list is modified by the author from course material at the School of Medical Education, NSW University, Sydney.

Figure 21.

The phases of an act of learning, and the processes associated with them.



(Source: Gagne 1975)

Phase/Process	Can be achieved by:
Motivation: Willingness to learn Interest in learning	Telling students the goal. Allowing students to set goals. Demonstrating relevance of goals.
Attention: Seeing and hearing appropriate stimuli.	Involving students - activity. Providing a variation in activity. Using methods to draw attention to important information.
Coding, storage entry: Receiving information and storing it in the memory so that it is able to be recalled or recognized.	Providing pictures and diagrams. Providing examples with which students will be familiar. Relating new learning to information students already know. Assisting students to classify new information.
Retention phase.	Not known.
Recall, retrieval: Retriving information from memory so that it can be used when necessary.	Helping the learner to develop cues. Providing repeated practice at recall of new information. Developing patterns for recognition to trigger memory.
Transfer: Making use of information in a different context from the learning situation. Applying learned information to new problems.	Providing a variety of examples for practice in using knowledge. Encouraging problem-solving rather than rote learning. Emphasizing principles rather than facts.
Performance, application: Using knowledge to perform tasks or solve problems. Application is the "real" test of learning.	Providing many opportunities for practice. Integrating theoretical learning with practical learning. Emphasizing application of knowledge rather than memory of facts as the goal of learning.
Reinforcement: Strengthening of learning so that it will not be forgotten. Reward or satisfaction at having achieved the goals of learning.	Telling students when they have learned well, or providing con- structive criticism when they have not. Helping students to compare the standard of their performance with an ideal model. Providing many opportunities to revise learning and use knowledge.

The following six teaching/learning methods together with their guidelines are selected for achieving the objectives of the community dentistry programme:

A. Lectures, used to:

- Introduce and structure a topic to guide and motivate learning.
- Provide perspective and emphasize parts of a topic.
- Provide new information not easily available to the learners.
- Give a review at the end of a topic to sum up and help integrate learning.

The lecture can be supplemented and aided by handouts, printed notes, audio-visual aids and materials.

Although the lecture has been described as a method of transferring content from teacher notes to the fragmentary notes of the student without necessarily passing through the heads of either (Adler 1983), few additional measures undertaken by instructor and learner can transform it into a more profitable learning experience.

For the programme, instructor activities in the lectures include:

- informing of objective
- pointing out relevance
- reminding learners of known related information
- providing key questions and problems
- using examples and audio-visual material
- explaining ideas and emphasizing principles
- summarising important information
- asking the learners questions and providing feed-back
- informing of next topic.

As learning is more likely with learner active involvement, learner activities during the lecture may include:

- Provide questions for topic and identify problems.
- Fill in incomplete hand-outs.
- Form buzz-groups to work on a problem provided.
- Answer questions, oral or written on board or projected on screen.

More guidelines on the planning and use of lectures are contained in Ewan (1982); Cox, Ewan (1982).

The hand-outs contain the objective and related points of the topic, key question and spaces to be filled in by learners and references for follow-up readings. This reduces note-taking, omissions, inaccuracies and partly compensates for learner variations in note-taking abilities (Cox, Ewan 1982).

Carrier (1983) indicates that instructors who attempt to cover all their topic's material in the lecture regardless of how quickly they must speak will find little encouragement in the note-taking literature which suggests that the average note takers can only manage to record 20% of what is presented at the slow rate of 100 words per minute.

Printed notes containing material inaccessible to learners and factual content also save time and can be learned independently.

B. Small group tutorials and seminars.

These are used to apply knowledge and information gained at lectures and independent learning to a particular topic to answer the raised questions and solve problems.

The use of this method involves the learners in more active participation than the lecture, develops skills in teamwork, co-operation and communication. It is also well suited to promoting new ideas and attitudes and allows clarification of understanding of a topic by the closer interaction of instructor and learner. During the session the instructor can identify those learners in need of help and can become aware of the success or shortcomings of various parts of the programme. Maximum benefits to learners result in groups of eight to twelve members (Kemp 1977; Ewan 1982; Cox, Ewan 1982).

C. Role play

The method can be used in a lecture but is more suited to small group activity and is used to explore emotions involved with a topic, try out new behaviour and attitudes safely and explore relationships and why people behave as they do (Ewan 1982).

The learners can simulate the discussions of a health promotion committee, a health policy-making group, etc., to identify problems, formulate strategies, suggestions and policies. Moral dilemmas also can be posed to a simulation group.

D. Fieldwork or extramural activities

These are valuable teaching/learning activities in the community dentistry programme with its professed social sensitization objective and take the form of visits to health and dental clinics, polyclinics, mother and child centres, the aged and retarded institutions, waterworks, municipal food and water analysis laboratories, health administration offices, forensic laboratories, school health service, schools, pharmaceutical and medical equipment company and other relevant government and community organizations and

groups. None of these activities has been undertaken so far by the dental faculty.

The visits serve the objectives relating to the acquainting of learners with systems affecting health and oral health, understanding the organization and working of health and oral health delivery systems, sounding the feelings and attitudes of community groups and identifying problems.

Other extramural activities include the undertaking of oral health surveys for community groups with children and those with least access to dental care high on the list. During such surveys groups of patients - elderly, handicapped or infirm - may be identified and provided with the required dental services using portable and ambulatory dental equipment.

Results of extramural activities provide material and problems for small group activities and reports for other learners.

Fieldwork is suitable for:

- demonstrating skills to students
- applying information and practising skills by students
- advising students about their performance
- helping students recognise their attitudes and introduce them to new attitudes.

(Ewan 1982)

E. Independent learning

This individualized pattern of learning allows the learner to take increasing responsibility and become more self-reliant without close supervision. The learner will also realise that the classroom or even the dental school is not the only place to learn and are prepared for lifelong learning (Ewan 1982).

For the community dentistry programme this pattern's activities include:

- obtaining given references for topics and doing own search for relevant references;
- assigned reading in preparation for class and tutorial;
- preparing assignments on prescribed, selective and elective topics;
- preparing reports on extramural visits;
- studying programmed texts on community dentistry;
- computer assisted programmes can be obtained or developed for a number of community dentistry topics and used in independent learning;

Most expository factual information can be made available for independent learning freeing contact time for more fruitful learning.

F. Clinical and psychomotor instruction

This category includes the skills involved in performing examinations and surveys. The level at which these activities are undertaken is after the learners start clinical work and thereby there will be minimum need for instruction. The need to be observant and methodical in examining and recording cases and conditions will be stressed.

Psychomotor skills include proper handling, using and doing simple repair of instruments and equipment. Introductory sessions can be arranged before starting clinical and laboratory work and can be given by faculty staff and dental equipment engineers and maintenance staff.

Typewriting can be undertaken at special schools or using self-instructional manuals.

The use of the Arabic language in some lectures or part-of, small groups and other teaching/learning activities will be encouraged, but the use of English will also be strengthened to allow learners more accessibility and ability in the use of texts, periodicals and reports written in English. This means looking at the English language course and finding ways of making it more intensive and useful to dental students.

In this context an excellent programme developed by a dental educationalist relates English to preventive dentistry and provides a highly relevant arrangement for learning the language in a dental context and its use will be encouraged and may even be undertaken by the community dentistry programme.

7.11 ASSESSMENT OF LEARNERS

Assessment can have many uses apart from providing a pass, fail or grades list of students for the dental school administration and used for students' promotion and final competence certification.

Other uses can benefit the instructor, learner and ultimately, society. They can also improve methods of instruction, content and the methods of assessment themselves through analysis and feed-back.

Assessment of learners can be used to encourage them to keep up to date with their work and master contents as the instruction progresses by providing feed-back and diagnosing those with special learning needs. Perhaps the optimal use of assessment is to convert it into an opportunity and instrument of learning whenever possible integral with the problem-solving mode of instruction and learning.

The implications for the community dentistry programme are that assessment will be more frequent, varied and less obtrusive than currently used in the Faculty, and allow for learner participation. To allow for that the following 6 types have been selected:

A. Objective tests

These include true/false, matching, single word completion and multiple choice questions to be used to cover mostly the lower cognitive levels of topics - factual information for the programme.

The tests can be arranged for the end of a lecture and can be checked by each respondent and later in the course by another learner. The number of questions should not exceed five for each session with questions and answers projected on a screen.

At the end of a topic or a group of topics more questions may be used, e.g. ten questions taking about 25 minutes - and serve to

revise topics. More questions can be used for tests lasting two hours.

B. Short, open answer questions

These are also used to test recall of information requiring only a few lines to complete, with the question giving no cues to the answer. They can be printed on a sheet of paper with spaces provided under the question limiting the answer.

This format is useful in testing recall of definitions, a list of factors, points or groups, e.g.:

- Define health - community - community dentistry.
- List four methods for preventing periodontal disease on a community basis.
- List WHO oral health Global Goals for year 2000.

C. Modified essay questions (MEQ)

This type can be used to assess problem solving skills allowing a step by step progression through the problem.

This type was originally developed for the examination of the Royal College of General Practitioners. The MEQ offers an opportunity to demonstrate competence in application of knowledge to clinical problem solving by learners (Cox, Ewan 1982).

The MEQ format is based on a case history in which a patient's clinical problems are presented in successive stages each followed by one or two questions. MEQs can test patient management through the phases of diagnosis, investigation, treatment and counselling (Cox, Ewan 1982).

The MEQ method can be used for the programme by presenting various scenarios of the community (patient equivalent) from the following:

Community group: school children - age and number;

expectant mothers; special handicaps;

Level of oral disease - caries - periodontal;

Available services and manpower;

Different levels of fluoride in water.

Different patterns of social conditions; nutrition, dietary habits, oral hygiene, practice, etc.

Questions that can follow each progressive revelation of information can include:

- What oral health objectives can be set?
- What priorities of oral health care?
- What are the likely prevalences of caries and periodontal disease in the group?
- What are the most effective methods that can be used to realise the objectives?
- What is the cost/benefit?
- What manpower needed?

The questions can be varied in number requiring 1-3 hours to answer; can be more and answered as a term paper or during the whole course - the learner filling in as relevant stages of instruction are covered.

The scenarios can be varied for each group of students (work together) or even made different for each one - exhausting for instructor in setting and marking.

D. Essay questions

The usual essay-type question requiring an extended response is a popular form of testing.

This type can be used to test the learner's ability to relate, organise, integrate and evaluate ideas. It also allows free and lucid expression of interpretations and convictions and the selection of information based on initiative in planning an answer (Gronlund 1976; Cox, Ewan 1982).

The popularity and wide use of this format of testing, however, may relate more to the apparent ease of construction and short time needed for its preparation as well as permitting bluffing in providing the answer.

The essay question test has serious limitations:

- The scoring tends to be unreliable. Even with elaborate precautions scoring is less reliable than for objective tests.
- The scoring is time consuming, more so if it is done conscientiously and helpful comments are written on the papers.
- A limited sampling of achievement is obtained even for measuring complex achievement. For measuring knowledge of factual information, it is especially inefficient.

(Gronlund 1976; Adkins 1974)

Useful suggestions for improving the setting and scoring of essay questions are given by Adkins (1974), Gronlund (1976) and Cox and Ewan 1982).

For the programme, the lack of learners' facility in English coupled with the listed limitations will reserve the essay question to take home tests and term papers. The questions may be set in Arabic

to allow freedom of response in expressing feelings and ideas and thereby may indicate affective achievement. Another benefit of using essays in this form is that students should be able to defend, suggest, criticise, explain and convince in written form when dealing with oral health programmes and other issues, such as fluoridation in their communication with administrators and community groups. The production of oral health education mass communications is also suitable for the use of essays.

Examples of essay questions are:

- List and describe the main characteristics of dental services in the city.
- Criticise or defend the following statement.

Prevention of oral diseases (caries, periodontal or mal-occlusion conditions) is less costly than treatment and rehabilitation in the country.

Every patient should contribute:

- the full cost of dental treatment received
- part of the cost
- nothing of the cost.

Write an article for a local newspaper or radio programme to explain the issues of a proposed water fluoridation scheme. The issues are:

- Benefits of fluoridation, especially children, give evidence.
- Likely outcome if scheme abandoned regarding treatment needs and manpower requirement.
- Answers to objections and concern written in local press.

E. Other forms of assessment

These include take home tests, assignments, reports, review of literature, projects and oral health education material production. Assessment is also made of learner contribution in class, small group and extramural activities.

Attitudes assessment can be done by observational scales, self-report questionnaires, check lists and anecdotal records to help personal and social adjustments (Gronlund 1976). These forms of assessment can be used in the programme for the following outcomes and their representative behaviours modified from Gronlund (1976):

Skills: Speaking, writing, listening, oral reading, study skills and social skills.

Work habits: Effectiveness in planning, use of time, use of equipment, use of learning resources, demonstrating initiative, creativity, persistence, dependability.

Social attitudes: Concern for the welfare of the community and its oral health. Concern for social and dental services, desire to work towards improving the community oral health.

Scientific attitudes: Open mindedness, willingness to suspend judgement, sensitivity to cause and effect relationship, an inquiring mind.

Interests: Expressed feelings toward various educational, mechanical, aesthetic, scientific, social, recreational, professional activities.

Appreciation: Express feelings of satisfaction of being a dental professional and express enjoyment of tasks.

Adjustments: Relationship to peers, reaction to praise and criticism, reaction to authority, emotional stability, social adaptability.

An example of a check-list applied to a learner giving an oral health education to a class of twelve year olds or mothers, etc., can be listed and weighted as follows:

Often uses dental terms and never explains them	(-2)
Often uses dental terms and rarely explains them	(-1)
Rarely uses dental terms and sometimes explains them	(0)
Rarely uses dental terms and always explains them	(1)
Uses only terms suited to the audience vocabulary	(2)

(modified from Guilbert 1981)

7.12 RESOURCES AND SUPPORT SERVICES

Although the programme will use and share much of the existing resources and services, it is better to indicate here its special needs.

The programme will use the existing lecture theatres and will increase the requirements for instruments and materials already in use in the paedodontic and periodontic clinics as for topical fluorides, fissure sealants, oral health education aids, and prophylaxis instruments and equipment and hand instruments.

For other needs, the following is a guide list.

A. Facilities

The extra requirements will be to make available three small rooms of the existing ones; furnish and equip them for small group tutorials.

A resource centre and instructor's work room; where reference and printed material can be stocked for the programme use, individual learners receive consultations and instructors prepare programme material.

All these facilities should be near as possible to each other to facilitate access and supervision.

B. Equipment

The programme requires all the equipment needed for extra-mural activities which include a minibus for about twelve passengers, ambulatory dental unit, portable dental equipment for home treatment, folding dental chairs and lights.

The audio-visual section needs to increase the number or acquire the following:

- overhead projectors and materials
- slide projectors
- paper chart boards
- portable video camera and VCR
- desk top computer
- two recent-model photocopying machines
- six typewriters for student use (Arabic and Latin keyboards)

C. Library holdings

The library is generally well stocked but needs to acquire:

- All periodicals of community dentistry currently not subscribed to including back issues.
- Periodicals on health personnel education.
- All WHO oral health publications, including all technical report series, health for all series and annual reports.
- More text and reference books on public health, dental public health and community medicine and dentistry.
- Encyclopedias on education, like:
 The International Encyclopedia of Education, Research and Studies
 The Encyclopedia of Educational Research
- Books, handbooks and manuals on education, most of which are referred to in this thesis.

D. Personnel

The programme will be operational for more than one class or group at the same time and ideally should have at least three full-time instructors.

Instructors from other departments can be assigned for limited periods or to give certain classes and manage small group tutorials. This will improve communication within the Faculty and the participation of local staff will be specially valuable in providing role models.

The participation of the interns as facilitators during extra-mural, small group and clinical sessions may prove valuable for all concerned.

Personnel from the medical school, the university and other sources are also included in the instructional plan and their participation requires coordination and scheduling.

To widen the learning experiences of learners and impress the fact that the learners and dentistry are part of society efforts will be made to enlist the participation and contribution of resource persons besides dental Faculty staff.

The resource persons include:

- a medical practitioner
- a psychologist
- a sociologist-anthropologist
- a lawyer
- an education consultant
- a sanitary and water resources engineer/analyst
- a health administrator
- a forensic scientist
- an economist

- a social worker
- a nutritionist
- an architect
- a food and drug analyst
- a public health official
- a law enforcement agent
- a health professions association representative
- a road traffic accidents consultant.

The programme will also require the use of an existing laboratory to undertake simple research projects, including testing fluoride levels in various foods, drinks and water. This requires a fluoride specific calorimeter and other appropriate equipment.

The cost of all the required resources and support services is to be worked out and added to the annual Faculty budget by the administration.

Much of the physical and other resources constraints should be eased when the Faculty moves to its new building.

7.13 PROGRAMME IMPLEMENTATION

Implementation requires identification and anticipation of difficulties, problems and prior formulation of strategies to deal with them.

The programme implies a change in the undergraduate curriculum due to the actual introduction of community dentistry with its requirements and side effects.

Resistance to change is common and may come from teaching staff, students, administration and even the community. Reasons for such obstacles to change include inertia, insecurity, incompetency and lack of vision (Hershey 1986). Such attitudinal resistance is anticipated to be minimal as a department of community dentistry has already been suggested by the Faculty in recognition of the importance of the subject, as well as to meet social, political and student concerns over the issues of relevance, curriculum and professional development.

However, the strategies to overcome any resistance include wide dissemination of information regarding the programme's rationale and objectives as well as widespread involvement and participation by the parties concerned (Formicola 1986).

Meetings to discuss the programme can be arranged for Faculty administration, committees and staff in which updating the undergraduate curriculum will be stressed and a stock of selected reading made available, e.g. Blackerby's "Why not a department of social dentistry", WHO recommendations on dental education and some dental school programme booklets advocating and showing the extent of community dentistry teaching.

The instructional design of the programme together with the use of the principles of learning should make the programme popular with students whose reaction to the learning experiences will be sought.

Of more relevance in this case are the practical considerations of introducing the programme. These are mainly the problems of organizational structure of the curriculum, departments and resources, including the time factor. The curriculum is crowded but has outdated and unnecessary content. Departments are isolated and guard their clock hours jealously allowing for duplication of efforts and unnecessary repetition of teaching. Abilities and experience of a number of staff members in teaching community dentistry topics is left untapped.

To deal with all these difficulties and problems the following strategies are used:

Gradual introduction of the programme starting with the first group of objectives in the first preclinical year, followed by the second group of objectives in the preclinical years; and finally the group of professional development objectives in the clinical years. Thus, the optimum arrangement of teaching community dentistry subjects and topics throughout the undergraduate course will be realized.

Concomitant with the programme's gradual introduction, an extensive revision to update the undergraduate curriculum content to delete the obsolete, the unnecessary parts and repetitions.

The introduction of the programme represents a special opportunity to introduce educational innovations into the whole curriculum. Improvements in the teaching, learning and evaluation methods and resources can be attained. Strategies include informing,

demonstrating and encouraging other staff members in the use of these innovations. The chapter on recommendations contains the information of an educational unit in the Faculty and the training of teaching staff in the management of the teaching/learning situation.

Sharing programme responsibilities with other staff members close to each one's level of confidence. The members from diagnosis and oral medicine, paedodontics, periodontics and oral surgery can undertake teaching some topics and aiding in others.

As the formation of a department of community dentistry is probable, it should be in association with one of the clinical departments to reduce isolation and not to increase the formation of more departmental barriers. Paedodontics seems more suited for the purpose as the subject already includes parts of community dentistry and children form nearly half the community in the country.

Until such time as the professional development group of objectives are integrated in the clinical years course they can be made available to the internship year.

Ultimately, the community dentistry programme should be spread throughout the undergraduate curriculum and the internship year and integrated with the revised curriculum.

The level to which community dentistry topics will be treated, i.e. breadth and depth of content will be appropriate to the undergraduate stage and the cut-off point will allow for an anticipated development of a graduate programme to a diploma or master's level.

The three groups of learning objectives, social, public dental health and professional are to be introduced as community

dentistry I, community dentistry II and community dentistry III; which allows for modification of content and administrative dealings.

As the author is committed to implementing the community dentistry programme, it was inevitable that the programme represents a compromise between what is thought to be optimally desirable in the reorientation of the undergraduate curriculum to social needs and community requirements and what is felt to have more chance of acceptance and success in the short run.

For the future of dentistry in the country, the conclusions and recommendations provide suggestions and leads uncovered by the implications of the research undertaken in this thesis.

"The myriad of relatively untangible qualities inherent in the concept of community dentistry cannot be reduced to the writings and lectures of individual or departmental presentation, but should be transmitted to the student in an environment where the philosophies and principles are known and practised by faculty members. In addition, it would be well to ensure that present and future faculty members are provided the necessary exposure time to investigate and become familiar with the scope, content and meaning of a teaching programme of community dentistry."

(Gleeson, Granes, Soricelli 1964)

It is also not surprising that the extensive analysis undertaken in this thesis has resulted in the inclusion in the programme of the skills required to carry out primary oral health care which are far more extensive than are ordinarily included in the dental professional's education. According to Cox (1983), such skills for the health professional (which are similar for the dental professional) comprise:

1. Communication skills - to establish how the patient, community and colleagues see the problem.
2. Epidemiological skills - to comprehend the chain of events and ecology of disease and vectors.

3. Sociological skills - to understand the beliefs, habits, culture and expectations.
4. Team skills - to cooperate with other health workers and other sectors.
5. Educational skills - to inform, guide and persuade to change behaviour.
6. Leadership skills - to help marshal communities and all parties to action.
7. Organizational skills - to manage and supervise a joint attack on health problems.
8. Medical care skills - to provide episodic and chronic illness care.

(Cox 1983)

In effect, the community dentistry programme provides for the skills 1 to 7 as listed by Cox and serve to complement the over-stressed skill number 8 as well as shares in its realization by the preventive skills of dentistry.

7.14 PROGRAMME EVALUATION

Evaluation is planned for as a systematic continuous and integral part of the programme's improvement process using measurements and appraisals of all aspects of the programme's organization, implementation and results.

Evaluation is formative after each topic and summative at the end of the programme providing a feedback to improve the programme and thereby learning.

Criteria for evaluation are the programme effectiveness, acceptability and feasibility. These include achievement of objectives, appropriateness of teaching/learning methods and resources, assessment and logistic and time factors such as adequacy of space, equipment, effectiveness of student grouping, time needed for teaching and for student learning.

The instructor is the principal programme evaluator but participation by others is essential. The instructor has as sources of information the assessment of learners in all stages, own experiences and observations which should be written down, plus the contributions from other sources. In the assessment of learners, test and examination score analysis will provide a more specific basis for programme improvement.

Contributions from other sources are:

Learners can provide a valuable feedback during and after a learning activity and after the programme. Learners should be asked only what they are competent to judge, e.g. during a class: is the relevance of the topic clear from the objective and questioning provided?; after a class: has the choice of problem in the small group session improved the learning of the topic?

Other staff members can provide comments on all aspects that come to their notice regarding the programme and its effects on learners and other programmes. If not participating in the programme itself, they can be invited to attend some of its activities.

Staff members of the university education department can be consulted on any difficult educational problem and members of the community medicine asked about their programme arrangements and the possibility of sharing some activities as well as their evaluation of the programme.

Others inside the dental faculty from administration, the library and the audio-visual section might provide valuable suggestions regarding logistics and arrangements for the programme.

From outside the school, opinion may be sought from health professionals regarding the attainment of some of the long range objectives as for communication, teamwork and activities in the local health professionals organization. Others may indicate suggestions for more beneficial extramural activities.

External examiners and visiting staff can be consulted on specific problems encountered in the evaluation of the programme.

Research on the evaluation process itself can be used to correlate methods of evaluation used in their effectiveness in diagnosing problems and usefulness in indicating solutions. Research can also evaluate teaching/learning methods and resources.

The contributions of persons to evaluation can be sought orally in interviews or written in questionnaires and reports.

8. DISCUSSION AND CONCLUSIONS

Major development efforts are undertaken by almost all countries of the world, directed at the attainment of the wellbeing of their people by improving the living conditions and quality of life. Although most development efforts are directed at the economic and social sectors, health is becoming increasingly recognized as fundamental to development as well as a basic human right.

Oral health is part of total health and therefore shares the need for and contributions of health.

Many of the resolutions and activities of the UN are directed at improving the development of the poorer countries through international efforts. Similarly, WHO is actively pursuing improvements to the world health situation. Recent examples of WHO efforts are the "health for all by the year 2000" programme and the identification of primary health care as a key concept to its attainment as provided in the Alma-Ata Declaration.

Oral health is included in the health for all programme and has its "global goals for oral health by the year 2000". Six indicators were developed by WHO and the FDI and countries encouraged to set more ambitious goals for themselves.

Findings in this thesis indicate the need for coordinating planning efforts in the health and all other sectors. Rational integrated health planning takes into consideration the health services, their needed manpower and required training and education.

Manpower is recognized as the most precious resource of any country and oral/health manpower development has to integrate its elements of planning, production and management. Examples of such integration and consequences of its lack were provided.

The training and education of oral/health personnel need to be made more relevant to the oral/health problems and requirements and to the needs of the delivery system.

The oral health status and trends of oral diseases have been monitored by WHO using epidemiological data at its Global Data Bank, instituted in 1969. The bank data show that for dental caries in highly industrialized countries, the originally high prevalence is rapidly declining; whereas for developing countries shows dramatic increases in caries prevalence. The decrease in dental caries prevalence in Australia, Finland and Norway was in the order of 40%, in Ireland over 50% and in New Zealand over 63%, all roughly within the decade before 1982. Developing countries like Thailand showed an increase of 200% between 1960-1977; Nigeria an increase of about 142% between 1965-1973.

The trend of increasing dental caries in developing countries compounded by an already high periodontal disease level represents an added burden on strained resources. The treatment and rehabilitation approach alone have proved largely ineffective in improving the community's oral health in the developed countries and are certainly beyond the means of developing countries with the danger of relegating oral health to an even lower position on their list of priorities for health and other problems.

Effective strategies identified include the training of various categories of dental auxiliaries and change of emphasis through dental education to stress public dental health teachings and practices concentrating on the promotion of oral health and the preventive aspects and programmes such as fluoridation, school programmes and oral health education.

Dental schools in many countries have established departments to promote the teaching of community dentistry subjects in their curricula. The main objectives of teaching community dentistry are to produce a truly professional graduate with the necessary social sensitivity, skills and community orientation to be a full contributor to solving the oral health problems of the community.

The major objective of this thesis was to establish how can the undergraduate dental education make a maximum contribution to the oral health of the community through its curriculum for the undergraduate dentists by providing the learners with the necessary knowledge, skills and attitudes for sensitivity to social issues of dentistry and orientation to their community oral health problems and requirements.

The general concern of the author with dental education in Libya as a developing country represented in the local undergraduate curriculum and the oral health status of the community resulted in the development of a community dentistry programme to be introduced into the curriculum.

The situational analysis of the country revealed its major environmental, social, economic and health characteristics. Libya is an Arab country with a population of about 3.6 million people, about 47% of them under the age of 15. Urbanization is about 76%. Improved income and other conditions like housing, water supply, sanitation, transport and education combined with a social system providing free and improved health services gave rise to improved health status of the community and rising expectations. Infant mortality and child death rates have decreased by almost 50% in the last twenty years; crude death rate decreased by 40% and life expectancy improved by about 16% over the same period. The cure and rehabilitation health

system may be showing signs of diminishing returns in its investments and efforts are being directed more to prevention of diseases.

Analysis of the oral health situation revealed that the oral health problems are inadequately met. There are deficiencies in planning and organization of dental services, manpower development and public dental health measures. These deficiencies are manifested in low dental services coverage - 25%, unmet treatment needs - e.g., the F component for 12 year olds DMFT is 6% and only a fraction of the 23% of children in need of orthodontic appliances are treated.

An important finding, however, is the indication that dental caries which has consumed most of dentistry's resources may be increasing. The evidence and conditions for such increase are:

- Although the average DMFT for 12 year olds in the country is still low (1.5), it has reached 2.6 in some urban areas.
- The DMFT indices for 12 and 15 year olds show a small difference and are even reversed in some areas.
- Compared to the experiences of developing countries in general, and those of similar background - Jordan, Lebanon - the trend towards an increase is likely.
- Associated factors with increasing caries prevalence are present and include urbanization, lack of water fluoridation and lack of preventive services.

The present and likely problems of dental caries are already compounded by a high prevalence of periodontal disease as assessed by the CPITN index; low priority for oral health problems among the community and preference for surgical intervention.

Dental education should be made relevant to the present and foreseeable oral health problems of the community and the under-

graduate curriculum built on the role, functions and tasks necessary to prepare its learners to manage these problems.

Dental education in Libya is limited to the education of dentists so far. The undergraduate curriculum is treatment and rehabilitation oriented and stands to benefit from the inclusion of community and social objectives. For although the general health indicators of the population have improved dramatically, there are signs that fit into the pattern of developing countries showing an increasing dental caries prevalence with an already high periodontal disease. Societal and professional expectations seem opportune to widen the scope of the dentist's role beyond the treatment of individual teeth or individual patients to include activities and tasks in dental public health and professional growth. The oral health plans, programmes and delivery systems rest largely on such undergraduate preparation.

The theoretical background identifying the role of community dentistry in contributing to oral health and the analysis of the trend of teaching community dentistry in undergraduate curricula worldwide indicate the need to introduce the subject into the local Faculty curriculum. Further, it is no longer possible to assume that teaching abilities of the teacher are always present or will develop with time. The field of education provides for skills in instructional planning and managing the teaching/learning process. Also, learning can not be assumed to follow from teaching unless the conditions for learning are appropriate.

The community dentistry programme development made full use of instructional design planning relating aims and objectives to the teaching/learning methods and resources with the assessment of learners and programme evaluation providing continuous means of readjustments

and improvements strategy. The systematic process used in developing the programme allowed relating the theoretical background followed in this thesis to the needs revealed in the analysis of the local situation.

The programme aims relate to the social sensitization, community orientation and professional development of the learner to complement the training and education necessary for optimum contribution to the oral health of the community.

The programme provides for knowledge, skills and attitudes included in three main groups of learning objectives comprising social, public dental health and professional competencies and responsibilities. The objectives derive from the scope of community dentistry and its role in dental education related to the local conditions of the country and needs of the community and learners. The objectives were further analysed by employing a process of "questioning" which includes local situation problems and projects. Learner contribution to the process of analysis and "questioning" is stressed.

The subjects and topics were derived from the learning objectives and their scope can be modified by the analysis of the objectives, i.e. limited or increased according to desirability from the instructor point; interest from the learner point and time available.

The sequencing of the programme as a whole is achieved by the broad divisions used and topic sequence is achieved by structuring the analysis of the objectives and largely follows answers to questions and solutions to problems.

In the teaching/learning process the interactive methods used provide for better learning and are more suited to the development of

skills and attitudes which form most of the programme. The use of small group tutorials is particularly suited to solving problems, applying knowledge and attitudinal formation but the lecture method can also be made interactive by providing learner activities during the session.

The value of extramural activities and field work in providing experiential learning is also recognized in the programme. Learning of factual information is kept mainly for independent learning guided by references and helped by handouts as required.

Learning is made meaningful by applying the learning experiences to the local situation problems supplying relevance and motivation. The learners' active participation in learning through problem solving, data analysis, and application of knowledge and skills encourages critical thinking, teamwork and responsibility on the part of the learners. The instructor's main role is that of a consultant and a facilitator for learning, not just a dispenser of knowledge.

The use of various forms of tests, assignments and observations provide feedback to the learner making the assessment part of the learning experiences, as well as providing the final marks and grades necessary for the administration.

The assessment of learners draws attention to the value of including the higher levels of cognitive and affective domains and skills as well as the so far most predominant, straight recall of facts.

For the implementation of the programme, strategies are worked out to overcome expected and possible difficulties identified in the analysis of Faculty organization, staff and students. The strategies to overcome inertia, insecurity, incompetency and lack of vision are

essentially providing information about the programme rationale, objectives and requirements, as well as encouraging the involvement and participation of those concerned in the implementation of the programme. The social policies and concerns prevailing in the community and Faculty presently are favourable to curricular changes like the introduction of the programme.

Practical arrangements for implementation are worked out by introducing the three parts into the predental, preclinical and clinical phases of the curriculum. Ultimately, integration with a revised curriculum and teaching the programme throughout the course is planned.

Evaluation of the programme is integral and continuous providing feedback about all its working phases, output and outcome and used to modify and improve the programme and the intended learning. The instructor, and learner assessment are central to the evaluation process. However, opinions and observations from students, faculty and university staff, health professionals and experts, as well as research findings, with regard to all aspects of the programme are envisaged.

The author also acknowledges that the analyses of the world and local situations and explorations of community and oral health issues, may appear more extensive than what would be sufficient for the development of a programme in community dentistry. However, the issues explored in this thesis like development and health, the global oral health situation, planning, manpower and local situation analysis, served to clarify the ramifications of community dentistry, helped map out its "system" for the author and was of great benefit in formulating the programme. Leaving all the material in the

thesis is intended to provide more clues for and stimulate further, research topics and activities both locally and for others.

Further, the strategies used in the programme development generally may be profitably used by other community dentistry developers in similar situations, especially in developing and Arab countries.

The programme's introduction supplies the answer to a glaring deficiency that exists in the local undergraduate dental curriculum, not only keeping with a major trend in dental education worldwide but also recognizing the local community changes, requirements and aspirations as well as the learners' need for professional development.

Apart from the direct benefits of the teaching of community dentistry, the programme is a basis for improving the dental curriculum as a whole, oral health manpower development, oral health care and delivery systems and the oral health of the community which is the reason for being of dentistry altogether.

In effect, it is concluded that the programme might supply the foundation for all desirable changes, including the reorientation of dentistry in the country to the concept of primary oral health care.

9. RECOMMENDATIONS

The conclusions and recommendations are principally directed at the undergraduate curriculum and relate to the local Faculty situation. Some of the suggested improvements may be required for, or result from, the introduction of the community dentistry programme. Conclusions and recommendations concerning oral health and dental services in Libya are presented in more general terms.

A. The Curriculum

The curriculum requires a comprehensive revision which can be undertaken by a special committee, with few members, using an effective mechanism to implement its findings and recommendations.

The following issues provide a guide to the committee's tasks:

- Investigate the relationship between the undergraduate education and the actual tasks and activities undertaken by the graduates. Such job analysis may uncover redundant or deficient skills. The relevance to the oral health requirements and possible changes must also be considered.
- The contents of all subjects can be analysed to update it, removing obsolete material and including relevant advances and research findings.
- Content analysis will also reveal any unnecessary repetition within a subject or duplication by other subjects.
- The integration of teaching all subjects can be improved by integrating basic science subjects with clinicals and integrating between clinical subjects.

- The starting of clinical training after a period of three years at dental school is too long. Early clinicals can be introduced, starting with oral prophylaxis clinics on students themselves and on patients and preventive paedodontics can be introduced in the present first three years.

- After updating contents each subject can justify its curriculum hours by providing meaningful course objectives.

- Subject or department objectives can be developed guided by an improved and expanded institutional objectives for the Faculty.

- The sequencing of subjects as a whole in the course and the sequencing of topics within subjects. For example, paedodontics is taught in the last clinical year only at present.

- The providing for selective and elective topics can reduce student load and encourage special abilities and interests.

- The process of student selection can be improved to recognize the special requirements of understanding dental education.

B. Teaching, learning and evaluation

Teaching methods can use more tutorials and the lectures can be made more interactive. Other improvements may include:

- The use of handouts.
- More and better use of audio-visual aids.
- Judicious use of printed notes.
- More use of reprints from periodicals' articles.
- Learning may be aided when instructors know and apply the conditions they can supply for its enhancement.
- Encouragement of more independent learning and development of appropriate resources.

- Evaluation of students needs radical reappraisal. There should be less stress on testing for recall of facts and more on the higher forms of learning.
- Making the evaluation a learning process, not only a pass-fail event and providing prompt feedback to learners.
- Analysis of examinations to find what they measure and analysis of scores to measure student attainment in various types of tests and in individual questions.
- The use of objectives developed for subjects as a base for evaluation.
- The value of the present internship year training must be ascertained and reorganization undertaken to make the year of maximum benefit to the interns.
- Instituting a tutorship system to help students.

C. Staff development

Some of the issues concerning Faculty staff and their development include:

- The use of part-time instructors, especially in clinical and laboratory training.
- The use of interns as helpers in the teaching/learning activities as appropriate.
- The organization of seminars, workshops, etc., for staff members' training in managing the teaching/learning process, including the construction of objectives and evaluation. WHO and the Regional Centre may help in this training.

- The formation of an educational research and development unit or office to undertake and coordinate the recommendations and improvements suggested and test their use. The medical education and science faculties may also be involved.
- A concerted effort must be undertaken by government, university and Faculty authorities to secure the required number and calibre of permanent staff from national sources. Along these lines scholarships have to be increased, the archaic promotion system for staff changed and other forms of "incentivation" promoted.
- The dental Faculty and the health personnel association can work out a post-graduate (continuing) education programme.
- Writing for local and non-local periodicals encouraged.
- Research activities must include behavioural and social aspects of dentistry.
- Considering the possibility of publishing a dental journal.

D. General Recommendations

Some of the general recommendations regarding the oral health system are:

- The oral health policy developed more clearly and communicated to all concerned.
- The plans and programmes for oral health made realistically and based on epidemiological surveys.
- The oral health manpower development based on better methods than the dentist population ratio and related to the community requirements.

- Stress on promotion of oral health and prevention of oral diseases including oral health education of the public.
- Improved schools dental services to cover this large segment of the population.
- Development of operating auxiliary personnel - school dental therapists and dental hygienists. The first type is urgently needed.
- Development of dental surgery assistants to improve the dentists' productivity.
- Investigate the needs for fluoridation of water supplies and the feasibility of defluoridation in some areas.
- Including oral health education in schools curricula and training teachers for the purpose.
- A dental association or section must be organized to coordinate members' efforts and improve communication within and outside the profession.
- The country is signatory to the Alma-Ata declaration and has requested WHO's assistance in applying the concept of primary health care to its health system. Similar application may be considered for dental services.
- Closer cooperation and coordination between the medical, dental and science faculties, now all forming the one university should be easier. The three faculties can form joint curriculum committees to revise the teaching subjects to dental students.
- The need for a school of public health can be established and courses may include diplomas or Master's degree levels for dental graduates.

- The undergraduate medical curriculum can look into the need to include a dental short course for its students.

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