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THE ROLE OF DENTAL THERAPISTS IN THE PROVISION OF DENTAL SERVICES IN FIJI TO ACHIEVE W.H.O. GOALS FOR THE YEAR 2,000

by

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SUMMARY

As part of the project 'Health For All by Year 2,000', the World Health Organization (W.H.O.) has suggested the setting of objectives in oral health and the monitoring of the achievement of these objectives. A global goal of three Decayed, Missing, Filled (DMF) permanent teeth for twelve year children by the year 2,000 was proposed and has now received international recognition. However individual countries were encouraged to set goals which were appropriate to the particular conditions within each country, and which had a reasonable chance of being achieved. In line with W.H.O.'s oral objective, the Dental Department of Fiji has formulated as part of its next five year policy (DP9, 1986-1990) the reduction below 3 DMF teeth in the twelve year olds.

The author has looked at the providers of dental services in the school dental delivery systems in New Zealand and New South Wales in Australia, two systems which basically utilize dental auxiliaries and are preventive oriented. The prevalence of dental caries within each of these two systems has been drastically reduced by the implementation of comprehensive preventive programmes. Fiji, a developing island nation, could reduce its prevalence of dental caries in twelve year olds by adoption of some of the preventive components from these two delivery systems.

The Fiji Dental Department should also utilize the dental therapist in the school dental delivery programme

under the general guidance and direction of the dental officer. Cases beyond the scope of dental therapists should be referred to the dental officers for appropriate treatment. The measures recommended by the author to contain the prevalence of dental caries below 3 DMF teeth in the twelve year olds are:

1. Utilization of dental therapists in the provision of services to school children.
2. Provision of adequate facilities for gaining access to school children, that is, dental mobiles or suitable transporting systems should be provided to all the static dental clinics.
3. Extension of the school dental care delivery system to include the infants and kindergarten children in the scheme.
4. Institution of preventive measures in the school dental delivery system:
   (a) Fluoride mouthrinsing programmes.
   (b) Prolonged Fluoride Applications (P.F.A.) to permanent molars at six and twelve years of age respectively.
   (c) Early operative intervention to be discouraged in early carious lesion.
   (d) Early carious lesions to be chemically treated with fluorides.
   (e) Bite wing radiographs to be taken after the eruption of permanent molars to ensure early detection and diagnosis.

(f) Performance of non-iatrogenic dentistry.

5. Intensification of ongoing preventive programmes in schools:

(a) Tooth brushing scheme.

(b) Dental Health Education.

6. Institution of general measures:

(a) Fluoridation of all reticulated water supplies.

(b) Incorporation of the toothbrushing scheme and its importance to the dental health of the children in the curriculum of trainee teachers.

(c) Legislation of sales of fluoridated tooth pastes only.

7. An oral health survey will need to be conducted in the twelve year olds to estimate the baseline prevalence of dental caries. There should also be regular updating of the data to facilitate the continuing evaluation of the state of oral health in this target group.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the unfailing support and guidance of Associate Professor P.D. Barnard, to whom I am greatly indebted.

I wish to thank my sponsors - Australian Development Assistance Bureau (ADAB) and the Ministry of Health and Social Welfare for releasing me to attend this valuable course.

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TABLE OF CONTENTS

	Page
Summary	i
Acknowledgements	iv
Table of Contents	v
List of Tables	viii
1. INTRODUCTION	1
1.1 AIM OF THESIS	2
1.2 THE FIJI ISLANDS	3
1.2.1 Population	3
1.2.2 Economic Situation	4
1.2.3 Health Services	5
2. DENTAL SERVICES IN FIJI ISLANDS	14
2.1 HISTORICAL BACKGROUND	14
2.2 MANPOWER TRAINING	15
2.2.1 Dentists	15
2.2.2 Dental Therapist	15
2.2.3 Dental Technology	15
2.2.4 Junior Dental Assistant	16
2.3 PRESENT DENTAL DELIVERY SYSTEM	16
2.4 ADMINISTRATION	17
2.5 ORAL HEALTH PROGRAMMES	21
2.5.1 Preventive Programmes	21
2.5.2 Target Group Services	23
2.5.3 Demand Services	23
2.5.4 Manpower Production	24
2.5.5 Monitoring and Evaluation	24

		Page
2.6	DENTAL HEALTH STATUS	25
3.	DENTAL THERAPISTS	26
3.1	DENTAL THERAPIST - FIJI ISLANDS	26
3.1.1	Historical Background	27
3.1.2	Training Programme	29
3.1.3	Duties	32
3.1.4	Services Provided	36
3.2	NEW ZEALAND - SCHOOL DENTAL NURSE	37
3.2.1	Historical Background	38
3.2.2	Training Programme	40
3.2.3	Duties	41
3.2.4	Services Provided	42
3.2.5	Changes in the Provision of Services	43
3.3	NEW SOUTH WALES - SCHOOL DENTAL THERAPIST	53
3.3.1	Historical Background	53
3.3.2	Training Programme	56
3.3.3	Duties	57
3.3.4	Services Provided	58
3.3.5	Changes in the Caries Prevalence of School Children	59
4.	DEVELOPMENT PLANNING IN FIJI	66
4.1	FIJI'S DEVELOPMENT PLANS	66
4.2	HEALTH SECTOR - DEVELOPMENT PLANS	67
4.3	DENTAL SECTOR - DEVELOPMENT PLANS	68
4.4	WORLD HEALTH ORGANIZATION	69

		Page
4.5	ORAL HEALTH UNIT OF W.H.O.	70
4.6	ORAL GOAL FOR YEAR 2,000	73
4.7	FIJI GOVERNMENT - DP9 ORAL OBJECTIVES	78
5.	DISCUSSION	80
6.	CONCLUSION	87
7.	REFERENCES	90

LIST OF TABLES

Table		Page
I	Organization of Health Services at Divisional Level	8
II	Organization of Health Services at Subdivisional Level	9
III	Organization of Health Services at Area Level	11
IV	Organization Chart - Dental Division	18
V	Dental Services Organization at Divisional Level	19
VI	Dental Services Organization at Subdivisional Level	20
VII	Dental Health Status - Fiji	25
VIII	Mean DMFT and DMF scores for 8- and 9-year-old Children by International Collaborative Study	46
IX	Caries-free Permanent Teeth - 8- and 9-year-old New Zealand Children	51
X	New South Wales School Dental Service Coverage	60
XI	DMFT - Age 12 Years in Australia	62
XII	New South Wales School Children - 12 Years 1954-1984	63

1. INTRODUCTION

As part of the project 'Health For All by Year 2,000', World Health Organization (W.H.O.) has suggested the setting of goals in oral health and the monitoring of the achievement of these objectives. A global goal of three Decayed, Missing, Filled (DMF) teeth for twelve year children by the year 2,000 was proposed and has now received international recognition. However individual countries were encouraged to set goals which were appropriate to the particular conditions within each country, and which had a reasonable chance of being achieved.

Fiji, a member state of the Western Pacific Region of W.H.O. is actively involved in pursuing its oral objectives. Fiji has five year development plans which are not rigid or fixed. They provide an overall framework for guiding public sector resource allocation in a coordinated manner for achievement of National objectives. In line with the W.H.O.'s oral objective, the Dental Department of Fiji has formulated as part of its next five year policy (DP9 1986-1990) the reduction below 3 DMF teeth in the twelve year olds and the attainment of community periodontal needs to fifty percent or less in the 15-29 year age group. For the purpose of this thesis, the author will be concentrating on the first objective, that is, the reduction below three DMF teeth in the twelve year children and how the dental therapists employed within Fiji's dental service could be utilized for this purpose.

While dentistry is still considered by society at large to be a service provided by one individual for another, it has followed the traditional tendency of health professionals to employ auxiliary personnel. Whenever the demand for a service is such that those who attempt to meet such demand are unable to do so, there is a move towards greater utilization of auxiliary personnel. Fiji's Dental Department initiated the training of dental therapists in 1973 and recently their training curriculum has been modified to cater to the needs of the population with the available resources.

1.1 AIM OF THE THESIS

The aims of this thesis are to:

(i) Present a brief description of the dental services in Fiji.

(ii) Define the utilization of dental therapists in Fiji as compared to utilization in some other countries, e.g. New Zealand and New South Wales in Australia.

(iii) Discuss the development plans and the defined oral health objectives of WHO and the Fiji Government.

(iv) Present guidelines for utilization of dental therapists for achieving a specific oral health objective for Fiji.

1.2 THE FIJI ISLANDS

Fiji is a developing Pacific Island nation - a typical tropical country consisting of 332 islands which vary in size from 10,000 square kilometres to tiny islets a few metres in circumference. These islands are spread over some 230,000 square kilometres in the South West-Pacific. The total land area is 18,333 square kilometres. The largest island, Viti Levu is 10,429 square kilometres and the second largest, Vanua Levu is 5,556. Other main islands are: Taveuni 470, Kadavu 410, Gau 140, Koro 104, Ovalau 101, Rabi 69, Rotuma 47 and Beqa 36 (Fiji Today - 1983-84 p6).

Fiji is known as the hub of the South-West Pacific, being the crossroads of air and shipping services between North America, Australia and New Zealand.

Fiji became independent in 1970 from the United Kingdom and adopted a Democratic System of Government based on the Westminster System.

1.2.1 Population

Fiji's population in June 1983 was 671,712. This compares with a population figure of 588,068 in the 1976 census. The ethnic breakdown is as follows:

Indians	-	50.0 percent
Fijians	-	44.8 percent
Others	-	5.2 percent.

Distribution, divisionally is as follows:

Central Division	-	237,961
Western Division	-	264,621
Northern Division	-	121,134
Eastern Division	-	47,996.

(Fiji Today 1983-84)

Crude birth rate and crude death rate were 31.8 and 5.3 per 1,000 population respectively; therefore the natural increase was 2.7 per cent (M.H. & S.W., Annual Report 1983). This is a slight increase from 1982 when the rate was 2.6 per cent (M.H. & S.W., Annual Report 1982).

The projected population increase, at this rate, for year 2,000 is 1,066,192, that is almost double the present population (The Situation Analysis of Fiji in Figures, 1984).

1.2.2 Economic Situation

Sugar is the main export earner followed by gold, copra, fish and coconut oil. The main economic aim of the government is to break away from the country's dependence on sugar by diversifying into broader agricultural products and secondary industries (DP8 - 1981-85, p17-19).

Through diversification, government is also trying to reduce its trade deficit. The country had a total export figure of $244,901,617 in 1983. The import figure for the same period was $493,205,957 and thus the trade

deficit for that period was $248,304,340 (Fiji Today 1983-84, p15).

Government is placing great emphasis on projects which help promote creation of job opportunities and to this end has achieved self-sufficiency in chicken, pork and beef production. To protect local industries, government has imposed duty on specific imports like garments, cosmetics and footwear.

In Fiji the fruits of development have not been spread evenly. The bulk of the benefits has accrued mainly to the urban and semi-urban areas, leaving the rural and peripheral zones to struggle for a better economic deal under conditions of considerable handicap characterized mainly by inadequate access and lack of reliable and regular links with the centre (Lasaqa 1984).

The Government also recognises this and has formulated as part of its economic policy the need to "ensure more equitable distribution of the benefits of development" while at the same time striving to ensure the growth of the overall economy (DP8, 1981-1985 p17).

1.2.3 Health Services

The delivery of health services in Fiji is the responsibility of the Minister for Health and Social Welfare who is also responsible for the formulation of health policies. The Permanent Secretary for Health and Social Welfare is responsible for the implementation of the health policies. He also advises the Minister on all

aspects of health services. Assisting the Permanent Secretary at Headquarters are:

(i) Director of Hospital and Support Services

(ii) Director of Preventive and Primary Health Services.

(iii) Controller of Nursing Services.

The administrator in charge of the Dental services of the nation is known as the Assistant Director for Dental Services (A.D.D.S.) and he is responsible to the Permanent Secretary for Health and Social Welfare through the Director of Preventive and Primary Health Services.

Administratively, the nation is divided into four divisions. These are the Central, Western, Northern and Eastern Divisions. Each division is further subdivided into subdivisions (19). For ease of administration, the Ministry of Health and Social Welfare has divided these subdivisions into medical areas (64). All medical areas are further subdivided into nursing districts (89) (Ministry of Health & Social Welfare, Annual Report, 1983).

1.2.3.1 Services Provided

The type of services available at Government facilities vary considerably from simple treatment at nursing stations and health centres, to more sophisticated diagnostic procedures and care in the main specialist hospitals, where specialized services are available.

The curative services at Divisional levels are provided by four Divisional Hospitals. These Divisional

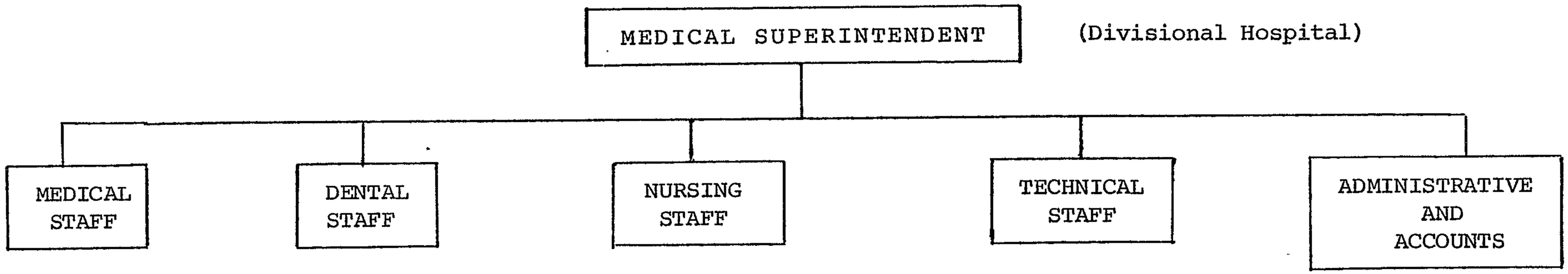
Hospitals are under the control and supervision of Medical Superintendents with the exception of one (Levuka Hospital), which is administered by the Divisional Medical Officer (D.M.O.), Eastern. Each Division also provides preventive and primary health care and general public health services under the direction and supervision of a D.M.O. He is assisted by a Divisional Dental Officer (D.D.O.), Divisional Health Sister, Divisional Health Inspector and other supportive professional and administrative staff (Table I).

The administrative structure of a subdivision is similar to that of a Division. Ten of the nineteen subdivisions have general hospital facilities. The remaining nine subdivisions have health centres, four of which also have adjacent maternity units. All subdivisions are under the control of subdivisional medical officers (SDMO). They are assisted by one or more medical officers, the subdivisional dental officers, subdivisional health inspectors, subdivisional health sisters and other supportive staff are as shown in Table II. At this level the health services are completely integrated as the SDMO is responsible for both curative and general public health services.

As stated previously, the 19 subdivisions are further subdivided into 64 medical areas, 46 of which have health centres, which provide out patient services only. In addition there are 4 medical areas which have area hospitals that provide both in-patient and out-patient services as well as preventive services. Mostly, the providers of the service at this level are the medical

TABLE I

ORGANIZATION AT DIVISIONAL LEVEL



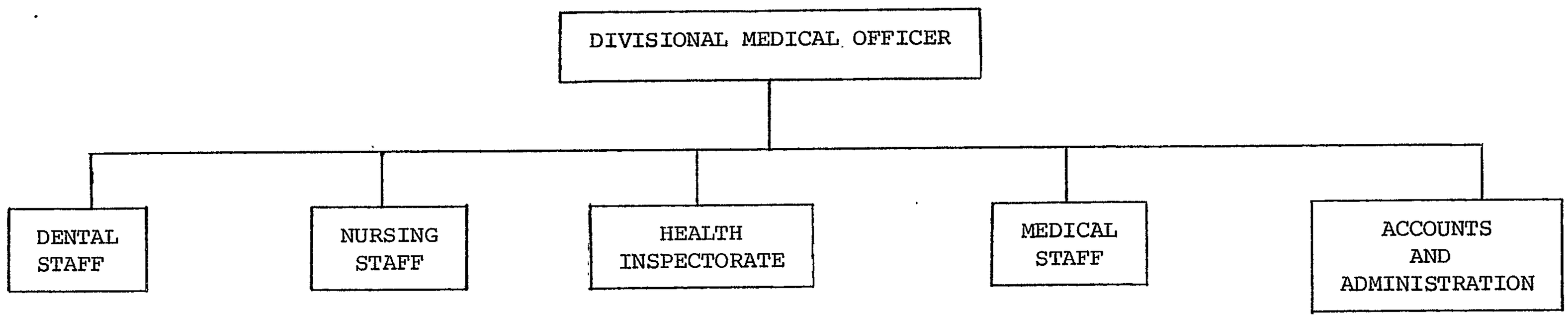
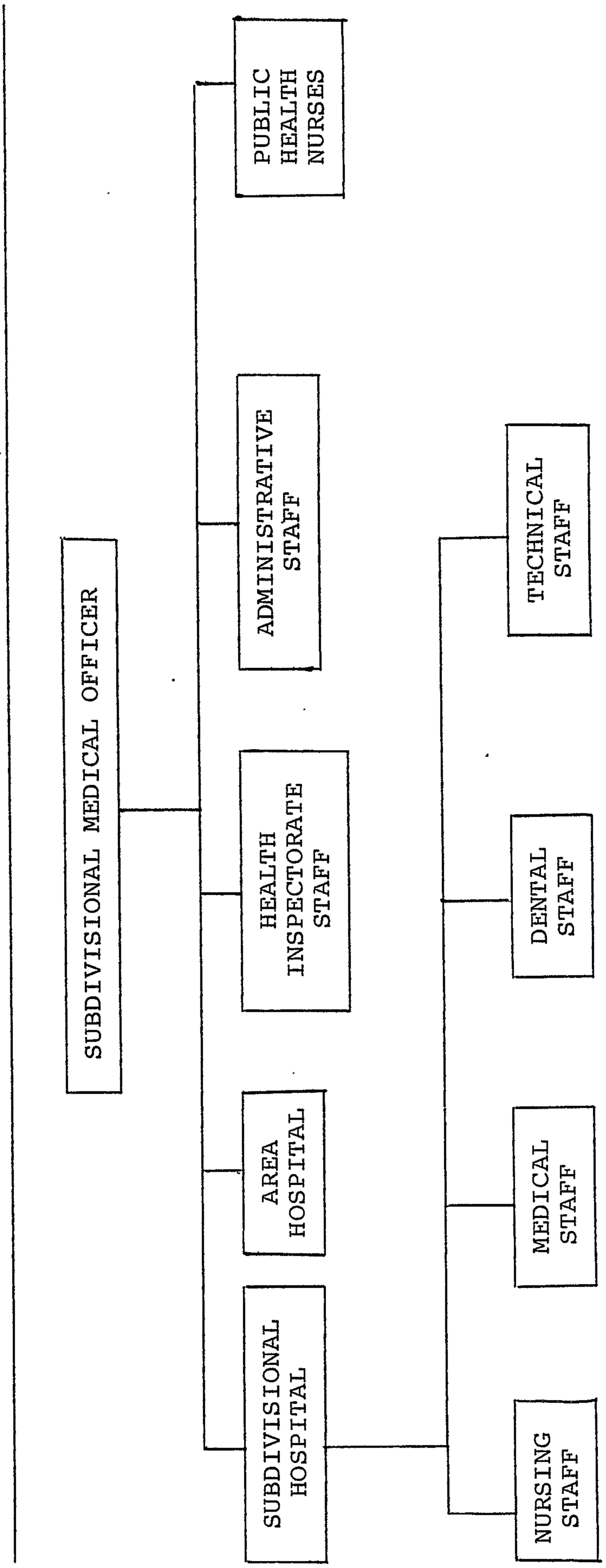


TABLE II

ORGANIZATION AT SUBDIVISIONAL LEVEL



assistants assisted by nurses.

The last link in the Government health service network is a Nursing District under the control of a district nurse (Table III). These nursing stations form the focal point for primary health care and the nurses provide primary preventive and limited curative services to people. In 1983 there were 94 single nursing stations throughout Fiji. The nurses here serve different numbers of people ranging from 200 in an island set up, to about 6,000 in an urban area.

In adition to the above health service network, there are also 3 specialist hospitals:

(i) St. Giles Hospital for Mental Disorders.

(ii) Tamavua Hospital for Tuberculosis.

(iii) P.J. Twomey Hospital for Leprosy.

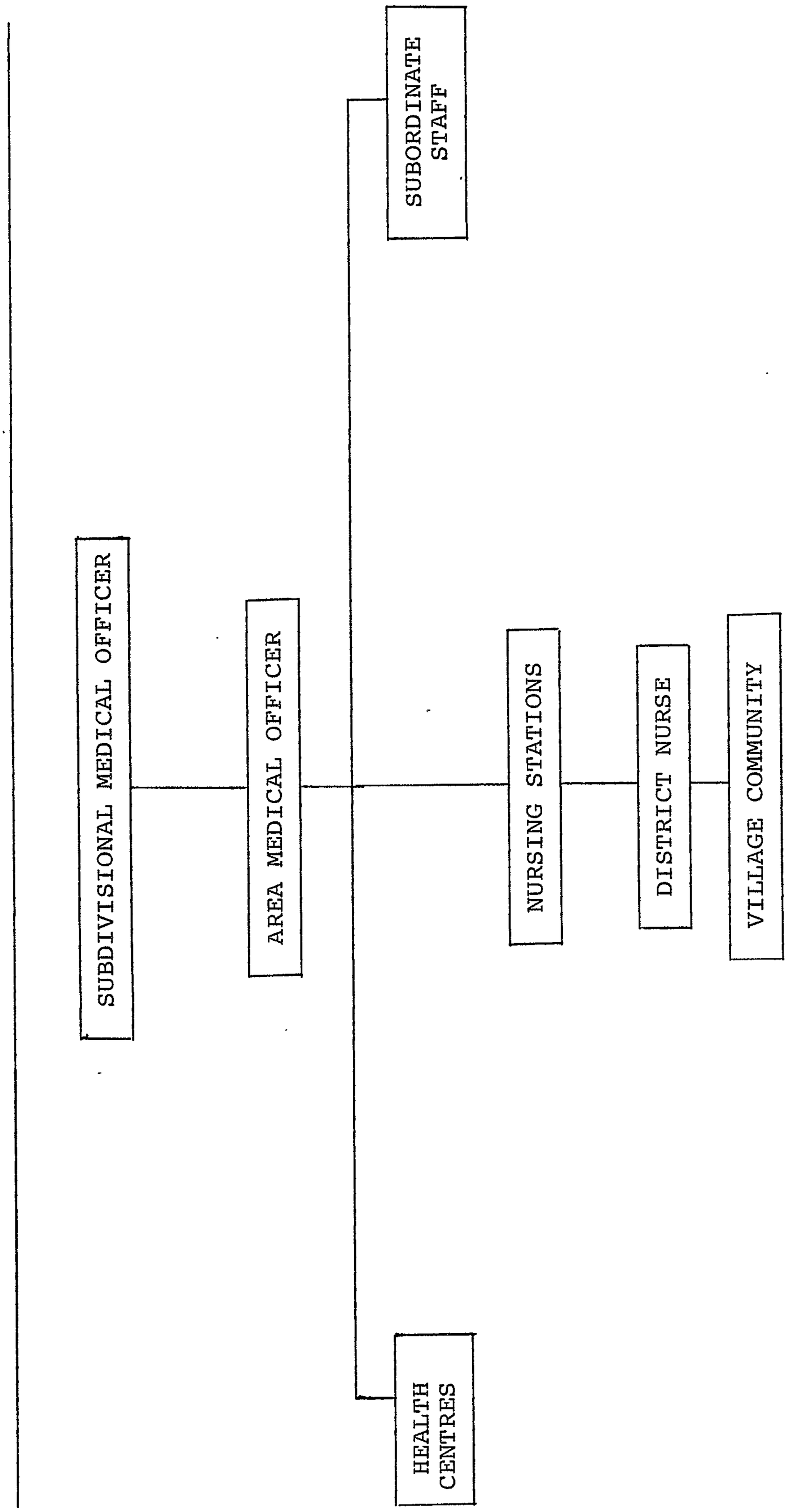
All of these hospitals are located in Suva, the capital city. To supplement the Government health service delivery system, there are also 2 private hospitals, 61 private doctors, 13 private dentists and 27 chemists. The doctor/ medical assistant to population ratio for the year 1983 was 1:1691. (Ministry of Health & Social Welfare - Annual Report 1983, pp25-27).

1.2.3.2 Primary Health Care

Definition: 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

TABLE III

ORGANIZATION AT AREA LEVEL



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 (W.H.O. 1978).

Over the past several decades, it has been recognised, and now it is accepted as obvious, that physicians acting as the sole providers of medical care (even when assisted by nurses and other personnel) cannot reach more than a tiny percentage of the population in need (Council for International Organizations of Medical Sciences - 1983). Fiji's Ministry of Health realised this and trained a cadre of workers known as medical assistants. Even with these workers employed there was not enough man-power for total coverage. The next step, recommended by W.H.O., was introduction of voluntary village health workers in an effort to reach the Ministry's commitment of attaining the global target of 'Health for All by the Year 2,000'. This global target has been advocated by W.H.O. in 1977 for all its member countries and Primary Health Care is the key to attaining this target (W.H.O. Primary Health Care 1978).

In the Fiji National Development Plan 8 (1981-1985), the Ministry of Health and Social Welfare has listed the essential components of primary health care. They are:

(i) Promotion of proper nutrition.

(ii) Environmental and basic sanitation.

(iii) Prevention of infectious and acute diseases.

(iv) Control and surveillance of chronic and non-

communicable diseases.

(v) Family planning, maternal and child health care.

(vi) Health education.

(vii) Safe drinking water.

(viii) Appropriate health care.

(ix) Essential drugs.

The implementation of this programme is the direct responsibility of the Director of Preventive and Primary Health Services, delivered through the Primary Health Care Scheme.

2. DENTAL SERVICES IN FIJI ISLANDS

2.1 HISTORICAL BACKGROUND

Professional dental services began in 1921 when an English dentist, Mr L.B. Hart, opened the first dental practice in Suva. He was followed by Mr M.J. Mount in the 1930's who as an Honorary Dentist of the Colonial War Memorial Hospital was instrumental in the training of medical students in 1941 (San Juan, 1982). In 1943, Ratu Vosailagi graduated with a Bachelor of Dental Surgery from the University of Otago in New Zealand. He took over the local training of dental officers on a small scale. In 1951, a significant development in the annals of dentistry in Fiji took place. As a result of the closure of the Guam Dental School, 29 partially trained dental students sought admission then to Central Medical School (later renamed Fiji School of Medicine). An American Dentist, Dr H.L. Cloud, was commissioned to teach. Since 1953, regular intake of dental students were taken for training at F.S.M., until 1983 (Kurisaqila, 1984).

At this time the decision was made by the Ministry, and approved by the Cabinet, to bring the Diploma course in Dentistry at the Fiji School of Medicine to an end. The last lot of present dental students will graduate in 1985.

Years of frustration in an attempt to upgrade the training of dental students locally, plus the dwindling number of dental student's seeking training at F.S.M. culminated in the decision to end the diploma course. Undergraduate students interested in pursuing a dental

career will be sent to recognised overseas schools by the Fiji Government (Ministry of Health and Social Welfare, Annual Report 1983, p 43, 44).

2.2 MANPOWER TRAINING

Although the Diploma course in Dentistry has been terminated, the dental auxiliaries are still being trained at F.S.M. Students from neighbouring Pacific Island nations are still sent to fulfil the respective manpower requirements for those countries.

2.2.1 Dentists

The Diploma course in Dentistry at the Fiji School of Medicine will come to an end in 1985 when the last lot of present dental students will graduate. Dentists for future requirements will be trained at recognised overseas universities.

2.2.2 Dental Therapist

A three year course designed to train operating dental auxiliary with sufficient skills and knowledge in simple fillings, prophylaxis, simple extractions and dental health education to both children and adults.

2.2.3 Dental Technology

This is also a three year course where a non-operating dental auxiliary is trained. On completion of training, this personnel assists the dental officers in carrying out certain technical laboratory procedures in the

fabrication of orthodontic and prosthodontic appliances. Graduates are also expected to help in the service and maintenance of dental equipment.

2.2.4 Junior Dental Assistants

This is a one year apprenticeship requiring theory and on-the-job training. Upon completion of the course, these personnel work as chairside assistants for both dental officers and dental therapists.

2.3 PRESENT DENTAL DELIVERY SYSTEM

As of the 1st April, 1985, there were forty-seven dentists employed in the Government sector and thirteen privately operating dentists in Fiji. Also employed in the Government sector were forty-seven dental therapists, fifty-two junior dental assistants and twelve dental technicians (Dental Staff Deployment Chart - 1985). The dentist/population ratio for Fiji at the moment is 1:11,195 and with the inclusion of dental therapists the ratio is one operator to 6,277 persons.

The private dentists provide treatment on a fee for service basis. Thus, this group provides services to the elite group and those who can afford to pay for the service. Services which the Government dental services cannot afford, e.g. cosmetic dentistry, precious metal works, ceramics - are provided by this group as well as basic dental services.

The Government employs dentists and dental therapists who cater to the demands of the rest of the population who seek dental care at the Government institutions. The type

of services available here vary considerably from simple treatments (simple extractions, dressings, fillings and oral health education) at clinics manned by dental therapists to more complex treatments (prosthetics, endodontics, orthodontics, surgical procedures) at all divisional clinics.

2.4 ADMINISTRATION

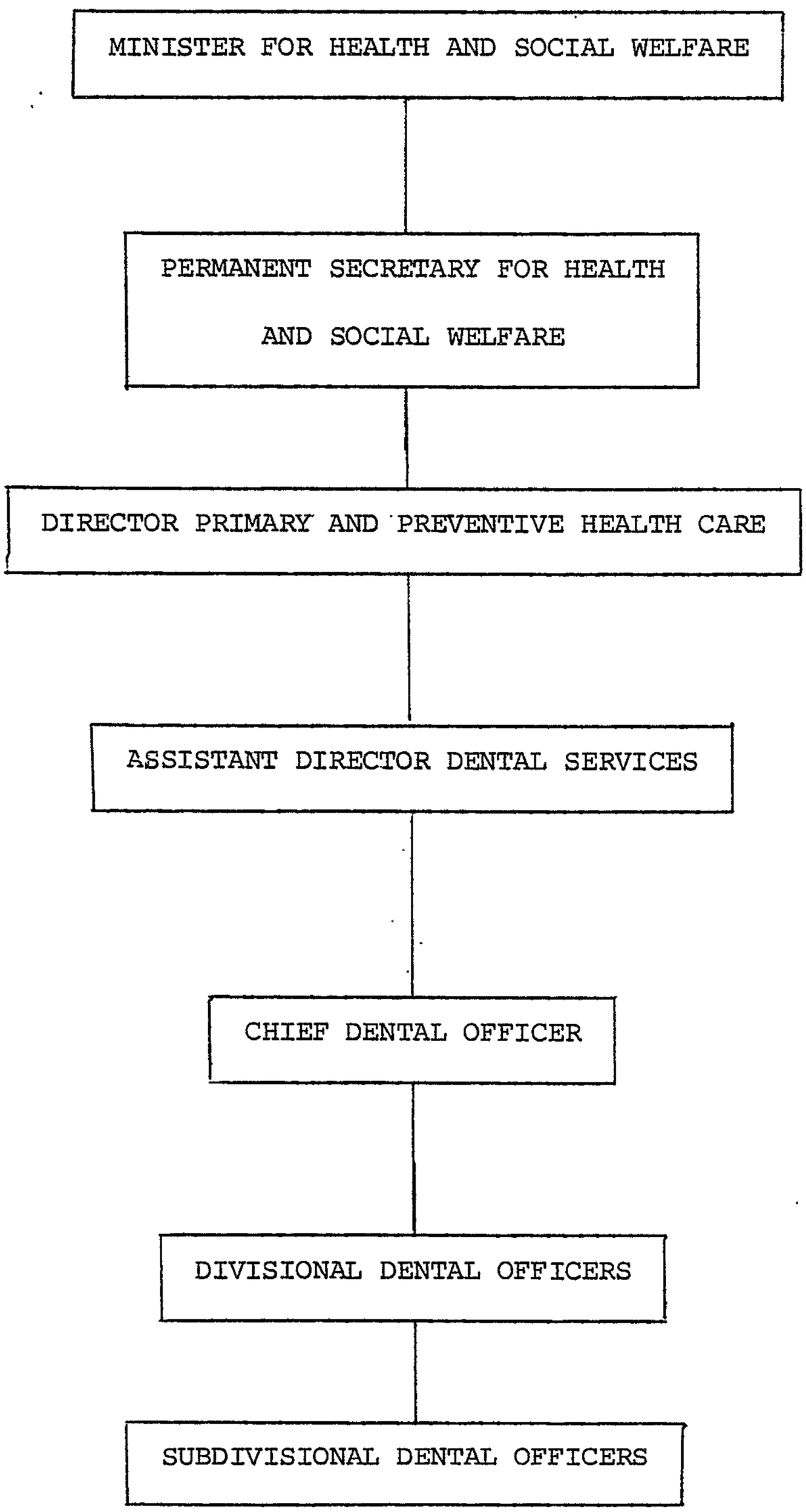
Oral health forms an integral part of the total health care systems in Fiji. The day to day administration of dental services in the Government institution is the responsibility of the A.D.D.S., who is responsible to the Permanent Secretary for Health, through the Director of Primary and Preventive Health Services. The Chief Dental Officer (C.D.O.) who is based at the main dental clinic is the first assistant in all professional and administrative fields. Under him are the three Divisional Dental Officers (D.D.O.), who are responsible for the administration and delivery of dental services in the respective Divisions (Pal, 1983) (Table IV).

The Central/Eastern Division is headed by a D.D.O. and there are eleven clinics here. One is the main Divisional Clinic based at Suva which acts as a referral centre for the other subdivisional dental clinics and this clinic also is a clinic teaching centre for the dental auxiliaries at F.S.M. Four of the eleven clinics are headed by dental officers at the subdivisional level. These subdivisional dental officers (S.D.D.O.) are assisted by dental therapists and dental assistants in the provision of services

TABLE IV

ORGANIZATIONAL CHART

DENTAL DIVISION



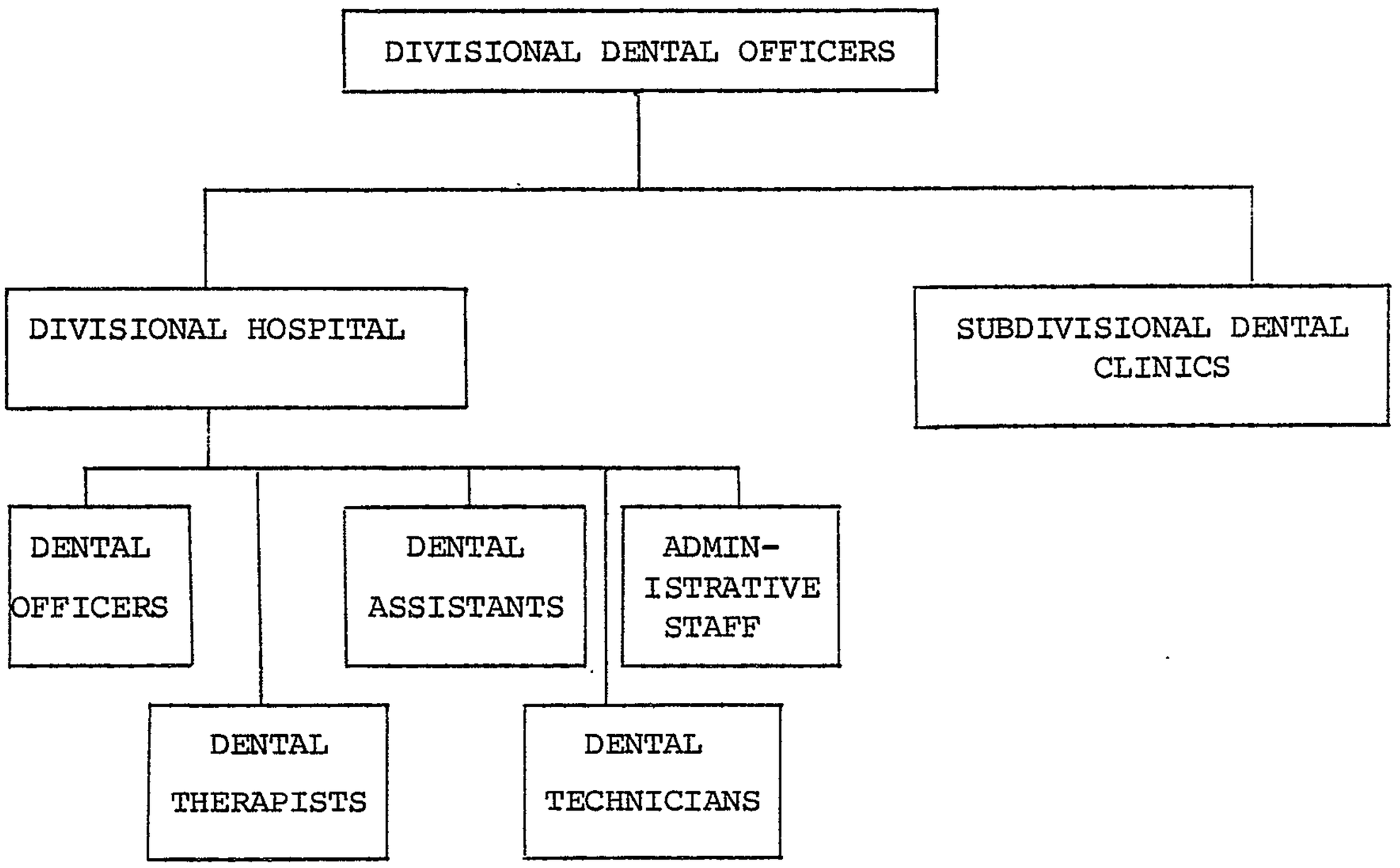
to the community. The other six dental clinics, two at medical area levels and four at subdivisional levels, are each manned by a dental therapist and dental assistant who work under general direction of the respective Subdivisional and Divisional Dental Officers.

The D.D.O. Western leads the Western Division. There are six dental clinics in this Division and the main Divisional Clinic is based at Lautoka which is a referral centre for this Division. The five subdivisional clinics are manned by S.D.D.O, dental therapists and dental assistants (Table V).

TABLE V

DENTAL SERVICES

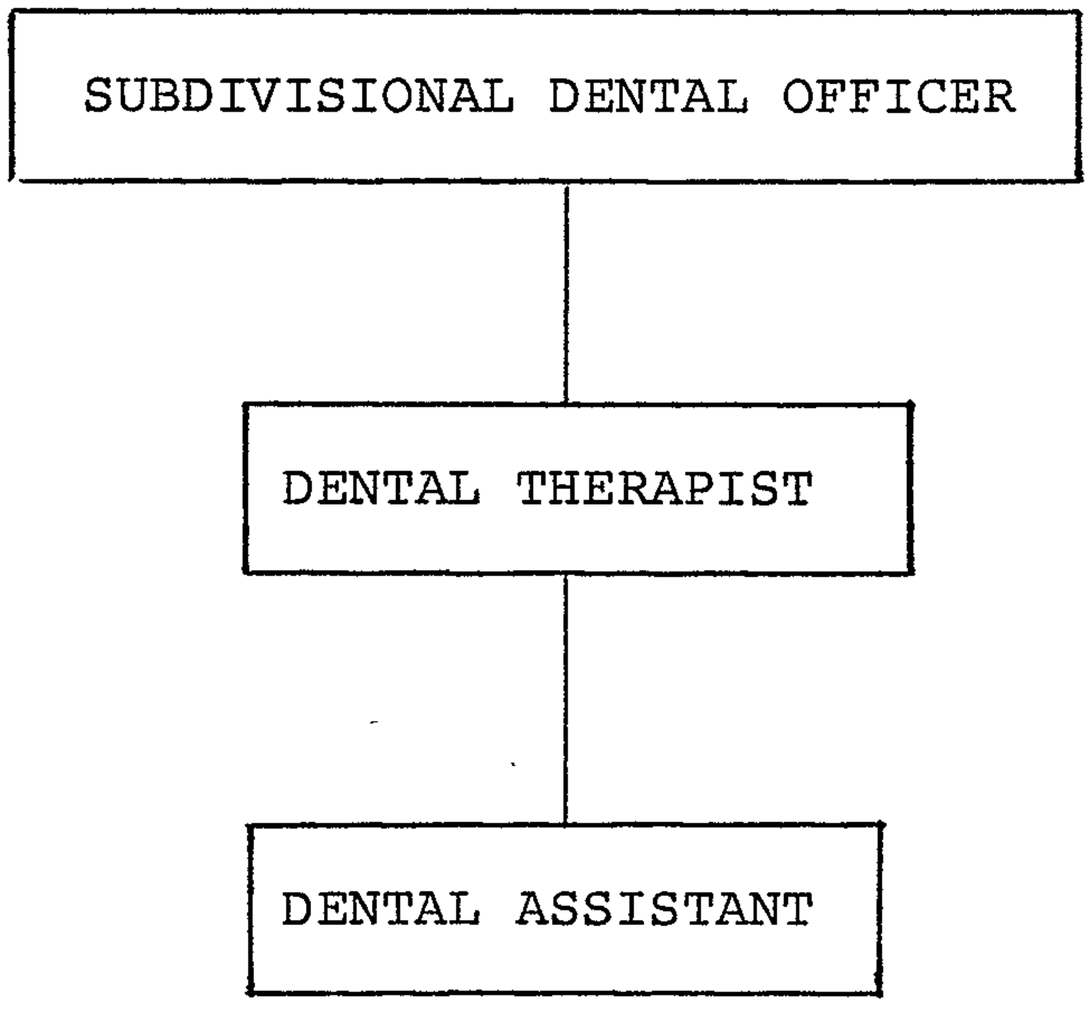
ORGANIZATION AT DIVISIONAL LEVEL



The Northern Division is in charge of D.D.O. Northern who is based at the main Divisional Dental Clinic at Labasa. Besides the main Divisional Dental Clinic, there are three other Subdivisional Dental Clinics. One of these is led by a dental officer assisted by a dental therapist and dental assistants. The other two subdivisional clinics are each staffed by a dental therapist, who is in charge, assisted by a dental assistant (Table VI).

TABLE VI

DENTAL SERVICES ORGANIZATION AT SUBDIVISIONAL LEVEL



Dental technicians are only posted to the three Divisional Dental Clinics at Suva, Lautoka and Labasa respectively because of facilities not being available at other dental clinics (i.e. dental laboratory).

2.5 ORAL HEALTH PROGRAMMES

The oral health care delivery system in Fiji is based on the five point coordinated approach as recommended by WHO. These points, once again, are:

(i) Preventive programme (including health education).

(ii) Target group services (school dental services).

(iii) Demand services for all non targeted sectors.

(iv) Manpower production in amount and kind.

(v) Monitoring and evaluation.

(Singh, 1983)

2.5.1 Preventive Programmes

The preventive programmes undertaken are:

1. Fluoridation of the water supply. The water supply of Suva City has been fluoridated since 1969. An effort is being made to fluoridate all the reticulated water supply in Fiji.

2. Establishment of Oral Health Unit. This Unit is headed by a dental officer (Oral Health Educator) and was established in 1983. There are divisional oral health educators, mostly dental therapists and activities performed by them are:

   (i) Oral health education talks to school children and community at large and during primary health care seminars.

   (ii) Toothbrushing demonstration and supervision in schools.

   (iii) Advice on diet and school canteens.

(iv) Distribution of dental posters and flip charts to schools.

3. Topical fluoride in non-fluoridated areas. This is a pilot project conducted with the help and advice of the South Pacific Commission. The methods used are:

(i) NaF rinse. (3,000 children 6-13 years) NaF is available in powder and tablets. They are dissolved in water to give a 0.2 percent NaF solution. The children are asked to rinse the solution in their mouth for one minute before throwing it out. There are about twenty rinsing sessions per year and they are supervised by members of dental staff and teachers.

(ii) SnF_2 Brush In Programme. (1,000 children 6-13 years) A 10 percent SnF_2 paste is used and the children brush their teeth for about three minutes. This is done six times a year.

(iii) APF-SnF_2 - Double Brush In Programme. (1,500 children 6-13 years) A 1.23 percent APF gel followed by 10 percent SnF_2 paste are used for brushing and this is repeated three times a year (Yasa, 1982, p 9 & 10).

4. Toothbrushing Programmes. This programme started in 1957 in all the schools of the country. One observation in 'Report on a Dental Survey of Urban School Children in Fiji in 1978' was that though the school toothbrushing scheme was a potential potent weapon for bettering the oral health of the children, it failed to achieve this through lack of dental service involvement. At

present there is a great emphasis being placed on tooth-brushing programmes in schools by both the education and dental departments. Toothbrushing competitions are organised amongst schools in the subdivisions to rejuvenate this project.

2.5.2 Target Group Services

A particular emphasis is given to the oral health of the primary school children. Free treatments are provided to all school children under fifteen years of age. The primary schools are visited from all static clinics by the dental personnel with their mobile dental equipment. Basic therapeutic services are provided and emphasis is placed on oral health promotional activities, e.g. oral health education and advice, food and nutrition counselling, toothbrushing demonstrations, etc.

The kindergarten school children are also given attention by the school dental teams in terms of oral health education and provision of emergency treatments. Greater emphasis is now placed on including this group of children under the school dental service scheme.

2.5.3 Demand Services

The dental services besides provision of above services provides the public demand services which is within the financial means of the Government. Services are provided on a fee (the minimal) for service basis to the general public. This service is also provided by dental private practitioners, who practise mostly in the urban areas where the demand is greatest for their services.

2.5.4 Manpower Production

Manpower production is related to the service needs. The Minister for Health on the training of future dentists at overseas Universities has said that "it will give us a better opportunity to devote our attention to training of dental therapists to meet the basic dental health needs of our community, especially the underprivileged people. In this respect we, a member country, fully support the fourth resolution of the W.H.O. Regional Committee for the Western Pacific 34th Session held in Manila in 1983 which specifically requests the member states to use dental auxiliaries and other available manpower for the underserved communities at primary health care level. This will be one of the major strategies for the Oral Health for All by Year 2,000".

On the role and function of dental officers, he has said they will not be wasting a lot of time on routine work but will be performing complicated procedures, beyond the scope of paradentals for which there will be a greater demand with a generally better educated community (Kurisaqila, 1984).

2.5.5 Monitoring and Evaluation

There is a new treatment form being designed to enable measurement of the work carried out in a school and evaluation of work performed in schools would be possible once these forms are used by all clinics, and submitted for evaluation (Singh, 1983).

2.6 DENTAL HEALTH STATUS

Epidemiological surveys were conducted on request of the Fiji Government in 1965 by Wong; 1978 by Speake, J.D. et al.; 1980 by Speake, J.D. and McKegg, R.W. Results show an increase in the prevalence of dental caries amongst school children from a 'low' in 1965 to a 'moderate' status in 1980. This is based on W.H.O. classification where low is 1.2-2.6 DMFT and moderate 2.7-4.4 DMFT (Table VII).

TABLE VII

DENTAL HEALTH STATUS - FIJI

Age	1965 - Wong	1978 - Speake et al.	1980 - Speake and McKegg
Yrs	mean DMFT	mean DMFT	mean DMFT
7-8	0.5	1.0	0.8
10	0.9	1.7	1.8
12	1.6	3.0	4.0
14	2.5	4.0	4.7
	Urban & rural	Urban	Urban & suburban

Adapted from: Hussein, 1981

3. DENTAL THERAPISTS

DEFINITION OF OPERATING DENTAL AUXILIARIES

Personnel who by virtue of having undergone formal training, perform a limited range of diagnostic, preventive and curative services in dentistry, and whose work is supervised by a dentist either directly or indirectly, depending on national regulations. Such personnel have usually not completed dental health education at university or equivalent level (W.H.O., 1977, p10).

In this chapter, three types of operating auxiliaries will be discussed. These are the school dental nurses, trained and employed by the New Zealand Government for rendering services to the pre-school and school children, and the school dental therapists trained and employed by the New South Wales (N.S.W.) Health Department, and the dental therapist trained and employed by the Fiji Government. The school dental therapists' (N.S.W.) treatment is restricted to children (infant school and school children) whereas dental therapists in Fiji besides rendering of treatments to pre-school and school children, also provide treatments to the adult population.

3.1 DENTAL THERAPIST - FIJI ISLANDS

Definition:

In the context of the health services delivery of Fiji, the dental therapist, who was hitherto known as the dental hygienist therapist, is a clinically operating member of the dental health team. He/she is trained

specifically to carry out preventive and curative dental operations under the general direction of the dental officer in the dental public health service of the country (Ministry of Health and Social Welfare, 1984, p33).

3.1.1 Historical Background

Fiji until 1972 had only dental hygienists and dental officers trained and employed in the dental division of the Ministry of Health. Consideration was given for training of school dental nurses similar to those trained in New Zealand by an International Mission on Medical Education in 1971. It was suggested that in a few years there would be a strong case for training dental auxiliaries with a wider range of skills than a dental hygienist. These hygienists spent the bulk of their time performing non-operating duties, normally performed by dental assistants. A very small percentage of the hygienists' clinical time was spent in performing scaling and polishing of teeth and providing oral health education. W.H.O. expert, Wong, who had conducted an oral health survey in Fiji in 1965, had suggested the introduction of dental assistants into the framework of dental services so that dental hygienists could be fully utilized clinically.

The Chief Dental Officer (C.D.O.), 1972, Dr. D.E. Narayan decided in consultation with the health policy-makers that Fiji needed a versatile operating auxiliary trained to deal in areas where the need was greatest. The findings of the survey conducted in 1965 showed the areas in which the need was greatest. These were:

(i) preventive dentistry

(ii) oral health education

(iii) simple restorative dentistry and exodontics on children

(iv) preventive and prophylactic treatment of periodontal disease in children and adults.

It was thus envisaged that Fiji needed a multi-purpose operating auxiliary - the dental therapist. It was also felt that the introduction of this personnel would reduce the escalating cost of dental care. In order to enhance the status and career prospects of dental therapists, a three-year training period was accepted, as dental hygienists were trained for two years. Once qualified, the dental therapists would be capable of carrying out tasks without direct supervision, thus releasing the dental officer physically from one clinical area to more involved procedures and administrative duties.

The dental hygienist's course was abolished and the dental therapist's course was initiated in 1973. They were initially trained to deal with dental caries and perio-dontal problems in Fiji and the duties were clearly defined and specified. In 1974, a junior dental assistant's course was initiated for the performance of non-clinical duties previously performed by dental hygienists (Narayan, 1982, pp174-176).

The dental therapists' training curriculum was restructured in 1984. The reasons for this given by the Minister for Health and Social Welfare was that it would

meet the basic dental health needs of the community, especially the underprivileged groups. He also said that Fiji as a member country, fully supports the fourth resolution of the W.H.O. Regional Committee for the Western Pacific's 34th session held in Manila in 1983 which specifically requests the member countries "to use dental auxiliaries and other available manpower for the under-served communities at Primary Health care level". This is one of the major strategies for accomplishing the oral health for all by 2,000.

3.1.2 Training Programme

Males and females are both accepted to the course and the entrance qualification is a pass in the New Zealand University Entrance Examination or its equivalent. A minimum of thirty per cent in English is mandatory and a pass in three other science subjects, preferably, one of which would be in Biology.

The duration of the course is three years of which the first two years are institutionalized in four semesters. The third year is designated as the "Field-work Phase" where the trainee dental therapist is assigned to work under the direct supervision in one of the dental clinics.

The dental therapy curriculum is designed and constructed in terms of topics or modules, wherein the educational or instructional objectives are defined with respect to individual topics of study. There are 39 modules and at times one module of instruction in one topic

DENTAL THERAPISTS' TRAINING MODULES

Year 1

TIMETABLING AID

Modules

Year 1. FIRST Semester 20 weeks		HOURS 800	JAN.	FEB.	MAR.	APR.	MAY.	JUN.
001	Orientation	40						
002	Chairside Assisting	200						
003	Dental Materials 1.	10						
004	Dental Equipment	15						
005	General Anatomy & Physiology	20						
006	Dental and Oral Anatomy	40						
007	First Aid and Emergencies	10						
008	Oral Health Education 1.	20						
009	Preliminary Operative Dentistry	350						

Modules

Year 1. SECOND Semester 20 weeks		HOURS 800	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
010	Health Science Communication	15						
011	Clinical Operative Dentistry 1	400						
012	Anaesthesia in Dentistry	20						
013	Exodontia	60						
014	Pharmacology in Dentistry	20						
015	Dental Radiography	30						
016	Oral Examination & Treatment Planning	40						
017	Preventive Dentistry 1.	90						
018	Public Health Dentistry 1. (including surveys assistance)	30						
019	Oral Health Education 2.	40						

■ Year 2

TIMETABLING AID

Modules

Year 2 FIRST Semester 20 weeks		HOURS 800	JAN.	FEB.	MAR.	APR.	MAY.	JUN.
020	Clinical Operat. Dentistry 2	380						
021	Oral Microbiology	20						
022	Behavioural Sciences	20						
023	Oral and General Pathology	20						
024	Preventive Dentistry 2	50						
025	Primary Health Care 1.	30						
026	Oral Health Education 3	100						

Modules

Year 2 SECOND Semester 20 weeks		HOURS 800	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
027	Clinical Operat. Dentistry 3	580						
028	Dental Materials 2	20						
029	Preventive Dentistry 3	40						
030	Public Health Dentistry 2	30						
031	Oral Health Education 4	40						
032	Oral Surgery & Sterilization	20						
033	Diet and Nutrition	20						

■ Year 3

TIMETABLING AID

Modules

Year 3 TWO Semesters 40 weeks		HOURS	JAN. FEB.	MAR. APR.	MAY. JUN.	JUL. AUG.	SEP. OCT.	NOV. DEC.
034	Clinical Dentistry	600						
035	Public Health Dentistry 3	70						
036	Primary Health Care 2.	80						
037	Management of Clinic Time.. Treatment-groups, Patient Recall system..	20						
038	Inventory control.. Dental Stores Logistics, maintenance	20						
039	Service procedures, Administration & General Orders	10						

is an extension of another similar module of knowledge and skills (Curriculum in Dental Therapy, 1984).

3.1.3 Duties

Functioning under the aegis of the Ministry of Health of Fiji, the Dental Therapist has duties and responsibilites which are listed in six main categories.

3.1.3.1 General Service

(i) Oral examination of the patient and recording of the oral health status in a prescribed service chart.

(ii) Clinical diagnosis and treatment planning. This includes recognition of oral and dental abnormalities for referral to the Dental Officer.

(iii) Removal of supra and sub-gingival calculus with appropriate dental instruments, and the giving or prescribing the necessary treatment for the gums.

(iv) Recognition and treatment of common mouth ulcers.

(v) Application and removal of rubber dams for tooth-isolation when needed.

(vi) Taking impressions in the mouth with suitable impression-compounds and casting study and other models.

(vii) Taking intra-oral radiographs and processing them if the need arises.

(viii) Management of general dental emergencies in the dental clinic.

(ix) Rendering of first-aid measures.

3.1.3.2 Preventive Services

(i) Oral Health Education of the public is an important aspect of the Dental Therapist's duties and responsibilities, particularly with schoolchildren, teachers, and community groups and on an individual basis at the dental chair.

(ii) Patient Instruction-in-oral-hygiene (IOH) at the chair, including counselling on cariogenic foods and drinks especially after giving oral prophylaxis.

(iii) Oral Prophylaxis treatment through scaling and polishing and tooth brushing techniques with fluoride toothpastes for plaque control.

(iv) Topical application of fluorides, applied directly by the operator on the tooth surface, or indirectly through organized classromm mouthrinses with weak solutions of fluoride, for caries control.

(v) Application of pit-and-fissure sealants for control of incipient caries.

(vi) Functional knowledge of monitoring methods used in the service, and interpretation of dental epidemiology in a preventive programme.

3.1.3.3 Restorative Services

(i) Preparation of cavities in primary and permanent teeth that have been attacked by caries and their restoration with composite resins, silicates, amalgam, or other intermediate restorative material as the case may be.

(ii) Care of traumatic pulp exposures and the placement of

sedative dressings and "pulp capping".

(iii) Pulpotomy of primary teeth, mainly.

(iv) Pulpotomy using calcium hydroxide, of permanent teeth (anteriors mainly) and the placement of a filling prior to referring to a Dental Officer. This is in an emergency when the Dental Therapist is not in the same premises as the Dental Officer. Crown forms may be used as a temporary measure.

(v) Finishing and polishing of all dental restorations which are of a permanent nature.

3.1.3.4 Surgical Services

(i) Administration of local anaesthetic using infiltration technique and mandibular nerve block for extraction of teeth.

(ii) Uncomplicated extraction of primary teeth.

(iii) Uncomplicated extraction of permanent teeth.

(iv) Extraction of residual roots of teeth, not covered by tissue.

(v) Control and treatment of post-extraction haemorrhage.

(vi) Irrigation of the mouth and removal of surgical sutures.

(vii) Insertion and removal of packs used for the treatment of alveolitis after extraction or "dry socket".

(viii) Pre- and post-operative instructions after extractions.

3.1.3.5 Primary Health Care

(i) Active participation in activities oriented to Primary Health Care, especially those Dental Therapists who

are posted to rural, remote or/and underserved areas.

(ii) Collaborating with PHC workers in identifying and resolving social and economic problems in the community and upraising the quality of life of the individual and the community.

3.1.3.6 General Management Responsibilities

The Dental Therapist, as a member of the Dental Health Team, will perform her duties according to established procedures in connection with patient-management, assisting the Dental Officer, and supervision of the Dental Clinic. Included in his/her responsibilities are the following:

(i) Reception and registration of patients at the dental clinic.

(ii) Collection of revenue according to prescribed government fees for dental services.

(iii) Maintenance of patients' treatment records, including filing and retrieval procedures of such clinical records or charts.

(iv) Compilation according to prescribed forms and submission to the proper authority, monthly and annual treatment returns and other information that may be required by the Ministry of Health or head of department.

(v) Requisitioning all clinic sub-store requirements, receipting and maintaining adequate records of items in stock.

(vi) Maintenance of all inventories of government property such as clinic furniture, dental chairs, heavy movable

equipment, dental operatories, and hand-equipment.

(vii) Maintenance of all dental equipment in the best working condition and/or arranging for their repair and servicing when necessary.

(viii) Maintenance of clinic cleanliness and general hygiene. Ensuring proper sterilization procedures in the dental clinic and in centres where dental treatment is given.

(ix) Assisting the Dental Officers as required especially for indenting for dental items periodically.

(x) Supervision of Junior Dental Assistants and sub-clinical workers.

(xi) Performing such health-care duties related to community welfare as may be prescribed from time-to-time by the Permanent Secretary, Ministry of Health and Social Welfare.

(Adapted from 'Curriculum in Dental Therapy 1984')

3.1.4 Services Provided

On completion of the course the dental therapists are posted to the divisional dental clinic or the sub-divisional dental clinics where they work under the general direction of the dental officer either in the static clinic treating the adults, or children in the mobile school clinics. At some subdivisional clinics and medical area dental clinics, the dental therapists are the sole providers of dental care assisted by the junior dental assistants. Here the therapists provide treatment to the adults on certain days from static clinics and on other days they

provide treatment and health education talks to the school children at the schools.

The clinical duties include, briefly, the treatment of carious lesions in primary and permanent teeth through removal of carious tooth tissue and using proper restorative material, the extraction of irreparable teeth, taking and processing intra-oral radiographs, oral prophylaxis through scaling and polishing of teeth and "plaque control', topical applications of fluoride and emergency repair and treatment of fractured teeth.

With the establishment of the Oral Health Education Unit in 1983, senior dental therapists are assigned to this unit at the Divisional levels. Their duties involve organizing and conducting oral health education activities at the Divisional, Subdivisional and community levels and participating in primary health care seminars in the dental health education of the populace.

3.2 NEW ZEALAND - SCHOOL DENTAL NURSE

Definition

This is a person who is permitted to diagnose dental disease and to plan and carry out certain specified preventive and treatment measures, including some operative procedures in the treatment of dental caries and periodontal disease, in defined groups of people, usually school children (Elderton, 1981, p208).

3.2.1 Historical Background

The proposals for a State Dental Service in New Zealand which had been advanced since 1912, had not presupposed the use of fully qualified dentists. Dr. K. Cox in 1913, in his presidential speech to N.Z. Dental Association (N.Z.D.A.) had mentioned the use of 'oral hygienists' and Dunn (who later became the supervisor of training of dental nurses) wrote a paper in 1917 which introduced the term 'dental nurse' (Fulton, 1950, p61).

These statements were preceded by the disclosure of examination results of 7,661 school children carried out by medical inspectors, which revealed that 72 per cent of the children examined had defective teeth. It was envisaged that:

(i) A great number of dentists were required for proper coverage of schools. This would have led to a dental shortage as there was only one training school with a yearly output of twenty dentists.

(ii) Since the prospects for private practice were bright, there would be a tendency for dentists to resign and go into private practice.

(iii) A career of elementary techniques would cause a dentist to lose his facility in the higher branches of dentistry and therefore the dentist would find the service unattractive.

(iv) For operators who would be working in school clinics, instructions and practice in every branch

of dentistry was not essential.

Thus in 1921 when T.A. Hunter became the first director of dental division, he announced the training of school dental nurses who would be used to improve the oral health status of school children. The training program was to last for two years and women were to be chosen because they were temperamentally and psychologically more suited than men to deal with and treat the young (Fulton, 1950, p65).

The first training school was located in Wellington and the course started in 1921 with the first lot of 29 students graduating in 1923. The second school started at Auckland in 1951 and the third school started in 1955 at Christchurch (Berman, D.S., 1964, p96). The training prepared the school dental nurses to treat school children up to the age of thirteen (Hunter, Hollis & Drinnan, 1980, p2268).

In 1950 more than eighty per cent of all children waited until they had commenced their school career before enrolling for school dental service care. Since then the average age of enrolment has steadily decreased. Today more than 60 per cent of all children in N.Z. are under routine care as preschool patients and 95 per cent of students up to the age of thirteen receive routine care under the scheme (Lobene & Kerr, 1979, p18).

3.2.2 Training Programme

The course of training extends over a period of two years and women of seventeen years of age who possess a school certificate (minimum qualification) or have passed the University Entrance Examinations are chosen.

Altogether 2,600 hours of clinical and classroom work is entailed for the course. The subjects taught during the first year are:

(i) Orientation and induction

(ii) Hygiene

(iii) Applied art

(iv) General anatomy, histology and physiology

(v) Dental histology and anatomy

(vi) Clinic hygiene and chairside observation

(vii) First aid

(viii) General pathology

(ix) Dental pathology

(x) Use and care of equipment

(xi) Operative dentistry

(xii) Pharmacology and therapeutics

(xiii) Clinical records

(xiv) Local anaesthetics and extractions

(xv) Public health and child welfare

(xvi) Orthodontics

The subjects taught during the second year are:

(i) Clinical dentistry

(ii) Organization and administration

(iii) Dental health education

(iv) New Zealand primary school system.

(World Dental Therapy Schools, 1979, p52)

At one stage, there were three schools for dental nurses, but now there is only one school remaining as two were closed by the Government (Liggins, 1981, pp124-125). The schools were headed by Principals who were dentists, and staffed by graduate dental officers with training and experience in teaching methods, and also by experienced dental nurses who were known as tutor sisters. On completion of the two academic years of study and training, the students were examined by boards of examiners, which also included practicing dentists (Logan, 1978, p30).

3.2.3 Duties

The functions that dental nurses are licenced to perform only as employees of the N.Z. school service are:

(i) Oral examination.

(ii) Oral prophylaxis

(iii) Topical fluoride application and recommendation of dietary fluoride supplements where appropriate.

(iv) Removal of incipient caries and caries susceptible areas.

(v) Cavity preparation and placement of silver amalgam, silicate cement restorations in deciduous and permanent teeth.

(vi) Polishing of all restorations.

*(vii) Administration of local anaesthesia by infiltration and mandibular nerve block techniques.

(viii) Pulp capping.

(ix) Extraction of deciduous teeth.

(x) Individual patient counselling on tooth brushing technique and oral hygiene.

(xi) Classroom dental health education.

(xii) Parent-teacher health education for influencing dietary habits and health practices in the home, and

(xiii) Referral of patients as required.

(Logan, 1978, p27)

3.2.4 Services Provided

The New Zealand school dental nurse's scope of treatment is confined to school children up to the age of completion of primary school education, that is, 12 or 13 years of age. Upon completion of her training course, each school dental nurse is assigned to a school where she is employed by the government to provide regular dental care to between 450 and 700 school children. The lower figure applies to areas without fluoridation and the higher figure, to areas with fluoridation for a considerable period of time. Each school which takes more than 100 children has its own dental clinic which may be part of the structure

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* As the need for extractions of permanent teeth declined, the rendering of anaesthesia by mandibular nerve block technique was phased out of the curriculum. (Logan, 1978, p27)

of the rest of the school or it may be housed in a separate building. When a school dental nurse is assigned to a school she is accepted as a member of staff of that school in the same way as the teachers are (Elderton, 1981, p209).

New Zealand is divided into 15 dental districts, each with a Principal Dental Officer and a Supervising Dental Nurse, who, in addition to general dental public health duties, manage the school dental service in their district. In the larger dental districts there may also be a Senior Dental Officer and another Supervising Dental Nurse (Hunter, Hollis & Drinnan, 1980, p2269). School dental nurses work under remote supervision of district dentists and dental nurse supervisors. The dental officers are primarily concerned with continuing training and quality control of clinical work. The dental nurse supervisors visit the clinics periodically to advise on clinic maintenance, work organization and recording procedures (Logan, 1978, p29).

3.2.5 Changes in the Provision of Services

The school dental service program has been modified as a result of the availability of the results of the Canterbury section of the International Collaborative Study (I.C.S.).

The I.C.S. originated from the need felt by the United States Public Health Service and the W.H.O. for objective data concerning the relative effectiveness of various national dental care delivery systems. The survey

was initially conducted in seven countries and these were Australia, New Zealand, Norway, Japan, U.S.A., Canada and Germany.

The results showed that D.M.F. scores for Canterbury (N.Z.) were amongst the highest in any of the regions surveyed. For the age group 8-9 years 90 per cent of total D.M.F. score was made up of filled teeth component and for 13-14 year olds, almost all of D.M.F. score was made up of filled teeth. The next group, 35-44 year olds, almost two thirds of the D.M.F. score was made up of missing teeth (Hunter, Hollis & Drinnan, 1980, p2268).

The results for 8-9 year olds when compared with the results of a survey conducted by Fulton in 1950 suggested that there had been little change in caries prevalence between 1950 and 1973. (Hunter & Drinnan, 1977, p144) (Refer Table VII)

The program was modified and emphasis was placed on a goal for reducing the need for fillings by 10 per cent nationally for the year 1977.

The components of the modified programme were:

(i) Preventive appointments to be given to the children by school dental nurses and, during the appointment, no curative treatment was provided. Suggested activities were:

(a) Oral prophylaxis.

(b) Examination and diagnosis.

(c) Topical application of fluoride for children from non-fluoridated areas; and

(d) Dental health counselling.

TABLE VIII

MEAN DMFT AND DFT SCORES FOR 8- AND 9-YEAR-OLD CHILDREN BY INTERNATIONAL COLLABORATIVE STUDY REGION

	Permanent teeth				Primary teeth		
	D	M	F	DMFT	d	f	dft
Sydney (Australia)	1.3	0.1	0.9	2.3	1.9	1.3	3.2
Trondelag (Norway)	0.6	0.1	3.3	4.0	4.1	1.5	5.6
Canterbury (New Zealand)	0.3	0.0	2.9	3.2	0.3	5.7	6.0
Hanover (Federal Republic of Germany)	2.2	0.0	1.0	3.2	3.0	1.5	4.5
Yamanashi (Japan)	1.7	0.0	1.2	2.9	4.4	1.8	6.2
Baltimore (United States of America)	0.3	0.0	0.4	0.7	0.9	1.2	2.1
Ontario (Canada)	0.7	0.1	0.8	1.5	1.2	1.7	2.9
New Zealand (1980)	0.1	0.0	1.2	1.4	0.3	4.2	4.5

Components may not add to DMFT and dft because of rounding

The purpose of this appointment was defined as education and modification of the patient in personal practices conducive to dental health, the provision of clinical preventive measures and the detection of disease. Although the aims of this appointment were being met by existing school dental nurses in the provision of their services, prevention was needed to be given added emphasis. The need for prevention was not to be limited to the preventive appointment but was to be reinforced during the treamtnet courses.

(ii) The criteria for diagnosis of caries to be reviewed. Formerly, if the explorer caught in the crevice on an occlusal surface or on an unfilled interproximal surface, that surface was presumed to be decayed by both dentists and school dental nurses. The procedure for detection of caries has changed since the use of fluorides and now there is active discouragement within the school dental service of early operative intervention in an early carious lesion. The carious process is usually irreversible when it reaches dentin, and this is now taken as the point when a cavity should be prepared. The clinical problem is to decide when the carious process has reached the dentine. Questionable lesions receive topical fluoride treatments and are left without fillings for 3-6 months and then checked again for progression (Hunter, Hollis & Drinnon, 1980,

p2271). The "when in doubt, fill" philosophy has been replaced by "when in doubt, watch and fluoridate" (Jones, 1984, p121).

(iii) In the approach to oral health education, greater emphasis was placed on individual counselling and parental involvement was to be increased.

(iv) Introduction of a personal prevention programme for the student dental nurses, and

(v) Intensification of continuing education courses for dental nurses.

Over the first year of target setting, the mean number of fillings per child per year fell from 3.3 to 2.4, a reduction of 27 per cent and well in excess of the target of a 10 per cent reduction (Hunter, Hollis & Drinnan, 1980, p2271).

Despite the success of the programme, the experience of the first year suggested some further modifications. Because of differences between districts and between clinics in the average number of fillings per child per year, a common target for all clinics was inappropriate. Therefore, 1978 targets were set at three levels:

(i) A national target of 10 percent reduction in the need for fillings, and

(ii) depending on local conditions, a district target, and

(iii) a target for each clinic.

This modification required all staff to participate in target setting.

A second change was that the preventive appointment which was a recommendation only in the first year, became mandatory.

Now every school dental service patient has preventive appointments at regular intervals, normally every six to seven months (Hunter, Hollis & Drinnan, 1980, pp2270-2271). No child in the country misses a prescribed preventive appointment at periodic intervals. If a child moves from one end of the country to another, the records follow and another school dental nurse could complete the prescribed procedure (Jones, 1984, p121).

After the 1973 survey and the consequent modification of the programme, another survey was conducted in 1978. Some schools were selected and the same process was used to select the children (8-9 year olds). Both studies were taken at the same time of the year and dental examinations were carried out by two examiners, one of whom had been involved in the 1973 survey.

The decrease in the D.M.F.T. score for permanent teeth between 1973 and 1977 was a substantial figure of 40 per cent, well in excess of the national target of 10 per cent reduction. The percentage of children with a caries free permanent dentition changed from 11 per cent in 1973 to 31 per cent in 1978 - a dramatic increase (Hunter, Hollis & Drinnan, 1980, p2268).

Although a direct cause and effect relationship was not demonstrated, there was no question that the fundamental

change in the direction of school dental service had been associated with a reduction in caries prevalence since there had been no change in the fluoridation status of the survey area. Only 2 schools of the 20 surveyed were in a fluoridated area. (Hunter, Hollis & Drinnan, 1980, p2273).

The department of health conducted another survey in 1980 when a national sample of 8-9 year olds were examined. Here almost 46 per cent of 8-9 year olds had caries-free permanent dentition. (Refer Table IX) The D.M.F. score in 1973 (I.C.S.) for Canterbury was 3.2 (second highest) and in 1980 it had gone down to 1.2 (lowest). The overall difference in D.M.F. scores between 1973 and 1980 for N.Z. was 50 per cent (Hunter, 1985, p25).

The N.Z. dental service presently has 1,434 treatment centres in schools throughout the country. In the 1982-83 school year, comprehensive dental services were provided to 87,953 preschool and 98 per cent of all primary school children were enrolled for care. The school programme participation is by consent; children may be treated in the private sector if so desired (Jones, 1984, p121).

In 1972, 200 dental nurses per year were graduated from 3 schools but in 1983 only 30 students graduated from the one remaining school. Several factors have contributed to this decline and they are:

(i) Declining birth rate which has led to a fall in the school rolls.

TABLE IX

CARIES-FREE PERMANENT TEETH

8-9 YEAR OLD N.Z. CHILDREN

Year	Study	Per cent
1950	Fulton	7
1973	W.H.O./I.C.S.	11
1978	N.Z. GOVERNMENT	31
1980	N.Z. GOVERNMENT	46

(ii) An extraordinary decline in dental caries and resultant treatment need. This reduction is largely attributed to:

(a) Optimally fluoridated water supplies in 1970's. Of the total population, 64 per cent now have access to this.

(b) Fluoridated dentifrices gained widespread use when restrictions on sale were relaxed. Previously sale of fluoridated dentifrice was restricted to pharmacy distribution.

(c) Preventive appointment in school children where fluoride is applied topically and fluoride tablets are also distributed to children in fluoride deficient zones.

(d) Modifications in diagnostic criteria have also had an impact.

(e) Pre-school children coverage by school dental coverage has increased. The percentage of caries-free 5 year olds increased from 34 per cent in 1977 to 44 per cent in 1982. A national target of 50 per cent of the 5 year old children caries-free by 1988 appears to be within reach. Almost 90 per cent of those 5 year olds were enrolled in the school system prior to the first school year.

Treatment needs in N.Z. have been reduced by 69 per cent in 11 years. D.M.F. and caries-free 10-year targets established in 1978 for children in 1988 have already been

met and further revised. In the fluoridated city of Timaru, the D.M.F. in 8- to 9-year olds from 1973 to 1981 has declined from 3.16 to 0.89. Now 59 per cent are caries-free.

(iii) The final factor is the changing patterns in the employment of dental nurses. They are remaining longer in service, taking fewer leaves of absence and postponing vacation time (Jones, 1984, p121).

3.3 NEW SOUTH WALES: SCHOOL DENTAL THERAPIST

Definition:

This is a person who is permitted to carry out to the prescription of a supervising dentist certain specified preventive and treatment measures including the preparation of cavities and restoration of teeth in school children.

3.3.1 Historical Background

The school service came into being in the State of New South Wales (N.S.W.) in Australia in 1915 (Handbook of Dental Services, p80). This was preceded by the concern expressed by the Dental Association as early as 1904 for the need for dental attention of school children to the Minister for Public Instruction.

The early school services were mainly mobile and were provided by dentists assisted by dental chairside assistants. Proposals to employ and train dental nurses in the N.S.W. school dental service started as early as

1925 when Mr. S.H. Smith, Under Secretary, Department of Public Instruction, drafted a letter to be sent from the Minister of Education, Mr. T.D. Mutch, to the Minister for Health, recommending the above. No action was taken by the Dental Board. In 1926, the Dental Board resolved to recommend that a scheme based on the N.Z. scheme be instituted and Dr. Sutton recommended that legal provision for such officers (dental nurses) to be made in the amendment to the Dental Act which was before Parliament. When the Bill was passed in 1926, this amendment was not included. It was not until 1964 that amendments were made to the Dental Act to permit the training and employment of the school dental therapists in the State. Two dental nurses (from N.Z.) were employed as early as 1925 in the school dental service but would only act as dental assistants. In 1965, three school dental nurses were granted employment and 4 previously employed as dental assistants commenced duties as school dental therapists (Handbook of Dental Services, p86).

In March 1969, the N.S.W. branch of Australian Dental Association issued a report entitled, "A Long Term Policy for the Provision of Dental Services in N.S.W.", to the Minister for Health and a Committee was set up by the Minister to consider this report. Members of the Committee consisted of representatives of the Government and Dental Profession. This Committee realised there was a vast back-log of dental treatment requirements particularly for school children which could be overcome by using auxiliaries,

similar to those developed in N.Z. (Report on Dental Services in N.S.W. to the Minister for Health, 1972, p6).

In 1970 the then Minister for Health, Mr. Jago, approached the Premier, Sir Robert Askin, for funds to construct a training school for school dental therapists at Westmead, Sydney. The approval was granted in 1972 by the Treasury. However, in 1973 the Federal Government offered financial aid to the Australian States for developing a comprehensive school dental service scheme in all the States along the following principles:

(i) that the service would be staffed basically by school dental therapists working under the general direction and control of dentists;

(ii) that the programme would be implemented gradually with a target of covering all infant and primary school children by 1982 and then expanding to cover secondary school children, i.e, under 15 years;

(iii) that treatment would be provided at school dental clinics, fixed or mobile types, located in school grounds;

(iv) that the service would offer free dental care and treatment to each child;

(v) that dental health education would be regarded as an integral part of dental care and would accordingly be provided to all school children.

Financial assistance was offered by the Commonwealth Government for:

(i) the training of school dental therapists;

(ii) the recruitment of dentists into the programme;

(iii) the construction and equipping of clinics.

(Wright, 1985)

The training school for therapists started in 1974 when 10 trainee students who had completed their first year in N.Z. commenced second year training at Westmead therapist training school. A second school at Newcastle also started with a first year intake in 1974. Then in 1975/76, the training schools at Sylvania and Shell Harbour started (Davies, 1985).

3.3.2 Training Programme

The training lasts for a period of two years and only females who have completed secondary school education and are between the ages of 17-25 are considered for the course.

The subjects studied in the first year include Anatomy and Physiology, Detailed Anatomy of Head and Neck, Dental Anatomy, Pathology, Dental Pathology, Histology, Dental Histology, Preventive Dentistry, Operative Dentistry, Dental and Health Education, Nutrition, Hygiene and Diet, Pre-Clinical tooth carving and Phantom Head Operative dentistry. The subjects taught in the second year are, clinical treatment of patients under supervision, lectures on X-ray techniques and revision lectures (Barnard, 1984a, pp31-32).

The schools are headed by dentists and staffed by tutor dentists and tutor sisters. Each school is responsible to its own region. There also is a Curriculum Committee and an Examination Board. These bodies endorse the curriculum and the examinations presented by the Directors of School of Dental Therapy (Wright, 1985).

At present, out of 4 schools, only two, Westmead and Shell Harbour therapist training schools are still training school dental therapists. The Newcastle school closed in 1981 due to inadequate buildings and Sylvania closed a few years later due to limitations of finance. (Davies, 1985) It is important to mention at this stage, that the Commonwealth Government withdrew from the School Dental Service in 1981 (Wright, 1985).

3.3.3 Duties

These are defined in the School Dental Therapists Regulation under the Dental Act. Treatment consists of:

(i) Prophylaxis of deciduous and permanent dentitions.

(ii) Intra-oral radiography.

(iii) The application of fluoride to all teeth or such other similar prophylactic solutions.

(iv) The treatment of periodontal conditions not involving surgical techniques requiring incisions.

(v) Supra-periosted injections of local anaesthetics.

(vi) Mandibular nerve block injections of local anaesthetics.

(vii) The extraction of deciduous or permanent teeth not involving surgical techniques requiring incisions.

(viii) The restoration of deciduous or permanent teeth by the use of regular filling materials.

(ix) The pulp capping of deciduous and permanent teeth and the pulpotomy of deciduous teeth.

Maintains a treatment chart for each child.

Maintains daily, weekly and yearly statistics of the number of children treated, and the number of fillings, extractions, etc.

Responsible for sterilising instruments, and maintenance of clinic instruments and equipment.

Requisitions for clinic stores and supplies to be supplied by the Division.

Carries out Dental Health Education both in the clinic and in the schools at the invitation of, or with the permission of, the School Principal.

Performs any other duties as required not in contravention of the Dentist's Act.

* Duties can vary slightly from region to region (World Dental Therapy Schools, 1979, pp1-2).

3.3.4 Services Provided

In N.S.W. the school dental therapist is employed by the Health Department to provide dental care to infants and primary school children in schools throughout the health regions of the State (Minns, 1974). A regional

dental officer supervises only from six to ten therapists and has a chair in the central clinic for each region where he performs operative tasks for children whose problems are beyond the usual range of work needed. The dentists in the programme make the initial examinations for the school children and repeat these examinations at intervals greater than two years. The intervening examinations, as well as simple operative dentistry including cavity preparations are performed by school dental therapists (Dunning, 1980, p51). Since 1976 the emphasis in training schools and field services were more preventive orientated.

The target of total coverage of all infant and primary school children by 1982 was not being achieved. The coverage in 1982 was 29.94 per cent (Refer Table X). This was mainly due to inadequate numbers of therapists trained because of lack of finance when the Commonwealth Government withdrew from the scheme.

Currently in N.S.W. there are some 58 mobile clinics and 92 fixed clinics in operation in the school dental services. There are 245 field therapists and 6 tutor therapists employed by the Health Department to provide services to the infants and school children.

3.3.5 Changes in the Caries Prevalence of School Children

A survey by Barnard in 1954-55 in Sydney revealed that the mean DMF index for children aged thirteen and fourteen years was 11.0 (11.7 with radiographs examination).

TABLE X

N.S.W. SCHOOL DENTAL SERVICE

Year	Percentage covered	Number of children covered
1976	6.5	50,560
1977	8.9	59,100
1978	13.5	94,608
1979	19.4	123,052
1981	25.3	182,517
1982	29.9	188,350
1983	33.1	208,071

Note: in 1983:

(i) 250 school dental therapists

(ii) 61 dentists.

The I.C.S. on dental manpower in 1972 revealed that in the Sydney area the mean DMF index for children in this group was 6.0. Since fluoridation commenced in 1968, it would not have contributed significantly to this decline in caries prevalence (Carr, 1983, p271).

The contributing factors to the decline in the prevalence of dental caries could have been:

(i) increase in use of topical fluorides by dentists since the mid 1960's;

(ii) use of fluoride toothpastes. By 1971, fluoride toothpastes had increased to 26 per cent of the market and by 1976 to 62 per cent of the market;

(iii) the profession was more preventive oriented during the 1960's following the formation of the Dental Health Foundation in 1963 (Barnard, 1984b, p4).

Twelve year old children in Australia were showing a decline in dental caries from 4.8 in 1977 to 3.0 in 1982, and to 2.6 in 1984. In N.S.W. (including non-fluoride areas) the figures were lower, progressing from 4.0 in 1977 to 1.9 in 1984 (Refer Table XI). The number of caries-free children increased from one per cent in 1954 to thirty-seven per cent in 1984 in N.S.W. (Refer Table XII). By 1982, fluoride toothpaste was on 94 per cent of the market and twelve year olds in 80 per cent of the state had fluoridation all thier lives. Utilization of dental services continued to increase with greater use of preventive services in government and private practice. The school dental service was increasing its coverage with

TABLE XI

DMFT AGE 12 YEARS

1977 - 1984

YEAR	AUSTRALIA	NEW SOUTH WALES
1977	4.8	4.0
1978	4.5	3.6
1979	3.9	2.9
1980	3.6	2.6
1981	3.2	2.4
1982	3.0	2.4
1983	-	2.1
1984	2.6	1.9

(Barnard, 1984b)

TABLE XII

N.S.W. SCHOOL CHILDREN - 12 YEARS

1954 1984

	1954	1984
% Zero dmf & DMFT	0.75	27.7%
% Zero DMFT	1.0	37.0%

(Barnard, 1984b)

emphasis on conservation of teeth and prevention through topical fluorides for all patients as well as rinsing and brushing programmes (Barnard, 1984b, p5). Prolonged fluoride application (PFA) technique is now being used by school dental therapists in the school programmes. Stannous fluoride spot application paste is used on newly erupted teeth, susceptible pits and fissures which are either caries-free or have initial lesions and on enamel lesions on approximal surfaces of posterior teeth (Barnard, 1985).

The school dental therapists are actively practising preventive dentistry in the treatment programmes of school children. A typical approach now performed in schools comprises of:

(i) Emergency treatment for relief of pain.

(ii) Fluoride rinsing - depending on individual schools, the procedure is carried out on a class basis by community or school nurse, parents, teachers or school dental staff. This program has priority over all other activities and services except emergency services.

(iii) Diagnostic services - Mobile clinics are allocated and responsible for a set number of schools depending on distance and road conditions from their nominal base. The schools are visited on a cyclic basis in rotation and will normally remain until all treatment at that school is complete. The children in need of urgent treatment are identified.

Bite wing radiographs are usually taken within six months of eruption of permanent molars to identify the 'at risk' teeth.

(iv) Treatment of caries: within the deciduous dentition, amalgam and exodontia are utilised in exceptional circumstances only. Routine treatment generally would comprise of atraumatic procedure and the use of metal fluoride (AgF, SnF_2). Within the permanent dentition, metal fluoride techniques comprise a major proportion of services. School dental staff maintain a register of "at risk" patients who are periodically revisited at their schools.

(v) Recently erupted permanent teeth: regional policy requires that school dental therapists apply metal fluoride (PFA) to permanent teeth as soon after eruption as possible.

(vi) Prophylaxis: normally not provided, except for those children individually assessed as in need.

(Cooper, 1985)

4. DEVELOPMENT PLANNING IN FIJI

Development planning began in Fiji shortly after the end of the second World War, although until 1965 development plans were primarily, public sector capital expenditures. As the economy developed and grew, economic and social problems became more noticeable, and gradually Government became more involved in the economic life of the Nation (DP8, Vol 1 1980 p1).

4.1 FIJI'S DEVELOPMENT PLANS

It was in response to those perceived problems and other related factors that Development Plan Five, 1966-1970 (D.P.5) was formulated; the first comprehensive plan to look at past achievements and future potential. DP6 catered for the period 1971-1975 and likewise DP7 and DP8 for the periods 1976-1980 and 1981-1985, respectively.

While the over-riding objective of DP5 had been one of growth, DP6 recognised growth as necessary but not sufficient condition for development; it was felt important to focus on the type, direction and distribution of growth. During DP7, emphasis was placed on reducing the differences in living standards, facilities and opportunities between urban and rural areas regionally, and nationally to pursue policies consistent with maintaining and increasing national self-reliance (DP8, Vol 1, 1980 pp1-2).

During the DP8 period resources were specifically set aside for dealing with basic needs: deficiencies in

food, shelter, health care, water, sanitation, and to a lesser degree education for the most affected groups; destitutes, the severely handicapped, the elderly, mothers and children with nutrition deficiencies, and unemployed, unskilled youth. The basic needs approach is a short-term of Government intervention to help those in extreme need through both direct grants and programmes of self help. It is not a strategy aimed at long-term income redistribution or employment generation nor the first stage toward the establishment of a welfare state. It is a modest strategy, involving relatively low cost to Government, of immediate and direct help to those most in need (Fiji Today, 1983-84 pp13-14).

Fiji's development plans are not rigid or fixed. They provide an overall framework for guiding public sector resource allocation in a coordinated manner for achievement of desired national objectives.

4.2 HEALTH SECTOR - DEVELOPMENT PLANS

Having ensured a fairly extensive network of medical stations throughout the rural and urban areas in DP6 period, emphasis during DP7 was diverted slightly toward preventive medical services, family planning, maternal and child health care.

Health sector policies in DP8 (which expires this year) were to:

(i) direct health services and monitor basic needs in regions where deficiencies exist, with

special attention given to low income areas;

(ii) generally promote the physical, mental and social well-being of the nation; and

(iii) promote and maintain the quality of health throughout the country.

(DP8, Vol 1 1980, p267)

4.3 DENTAL SECTOR: DEVELOPMENT PLANS

These usually are incorporated as part of the health sector development plans. The first comprehensive Dental Development Plan has been planned for DP9 (1986-1990) period which will be discussed by the author, later on in the thesis. In DP8, the Government efforts in providing dental services in the country were preventive in nature with the extension of services to schools and areas where dental services were scarce. Free treatment for school children only and active health education were provided during the DP8 period.

Dental services face a staffing shortage, largely because of past policy whereby doctors were also trained in the basics of dentistry and were expected to fulfil this additional role. Another noticeable shortcoming noticed in the planning of DP8 policies was that the expansion of dental service was negligible due to limited numbers of dental graduates and the lack of working space for dental personnel in the outlying stations. DP8's policy in this respect was:

(i) to increase the recruitment of auxiliary dental personnel especially dental therapists;

(ii) construction of dental clinics to have dental personnel attached to rural health centres.

(DP8, Vol 1 1980, p270)

4.4 WORLD HEALTH ORGANIZATION

The World Health Organization (W.H.O.) was founded in 1948 as a specialized agency of the United Nations and is an intergovernmental organization supported by its member states of which there are 152. (Barmes, 1981, p77). The headquarters of W.H.O. is in Geneva. For practical purposes W.H.O. divided the World into six regions, each with its own organization, each with a Regional Committee composed of representatives of member states and associate members. Regional Committees meet once a year to review health work in the region and plan its continuation and development. Regional plans are amalgamated into a World Programme for the Organization by the Director General at W.H.O. Headquarters, costs are carried out, and the total programme and budget is scrutinised by the Executive Board before being submitted to the General Assembly for study, modification and approval (Fuller, 1977, pp 91-92).

The six regional offices are located at: Brazzaville for Africas, Washington for the Americas, New Delhi for South East Asia, Copenhagen for Europe, Alexandria for the Eastern Mediterranean, and in Manila for the Western Pacific Region (Fuller, 1970, p93).

The main responsibility for health at an international level rests with W.H.O. The programme of W.H.O. has been built on collaboration with member states to strengthen national health services. That collaboration has developed within the framework of global health policy formulated and resolved by the World Health Assembly which meets annually. This supreme governing body is composed of delegates of member states each of whom has one vote. At its annual three week meeting, health policies are established, the work of the past year is reviewed and the programme and budget for the following year is adopted.

In 1979, the 34th World Health Assembly adopted the Global Strategy for Health for All by Year 2,000 and the Member States of W.H.O. have pledged to work together to attain this goal. The International Conference on Primary Health Care, held in Alma-Ata, USSR, in 1978, declared that primary health care is the key to achieving an acceptable level of health throughout the world in a foreseeable future.

4.5 ORAL HEALTH UNIT OF W.H.O.

In 1954, the W.H.O. Director General convened a meeting of consultants to advise on the W.H.O.'s future dental health programme. Federation Dentaire International (F.D.I.) a non-governmental organization which represents dentistry at an international level through the Dental Associations of the World, had two representatives at that meeting. One of the F.D.I. representatives was

Dr. Leatherman who was the Secretary General of F.D.I. at that stage. The meeting was chaired by D.J.W. Knutson, who became the first dental officer appointed to W.H.O. (Ennis,1967, p149) Eventually in 1956 the Dental Health Unit, now known as the Oral Health Unit was formed.

Since 1965 the unit has been focussing its attention on epidemiological methods and data collection. Standard methods for surveys were included in Oral Health Surveys Manual, the first edition of which was produced in 1971 and the second edition followed in 1977.

A data bank was also established for epidemiological data on dental caries, periodontal disease and other oral disease, selecting those studies which had used the standard methods or were comparable to them. This enabled the W.H.O. to provide a global picture of dental caries and periodontal disease by 1973. One noticeable trend the data from the data bank shows is that:

(i) Industrialized countries which initially had high to very high caries prevalence and moderate prevalence of periodontal disease, now show a decrease in caries prevalence and also a tentative evidence of decreasing periodontal disease. (refer Figure I)

(ii) Developing countries whereas initially had very low to low, or at most moderate, caries prevalence and moderate to high prevalence of periodontal disease, now are showing an increase in caries

prevalence and no measurable change in periodontal disease prevalence. (Renson, 1984, p3) (refer Figure I).

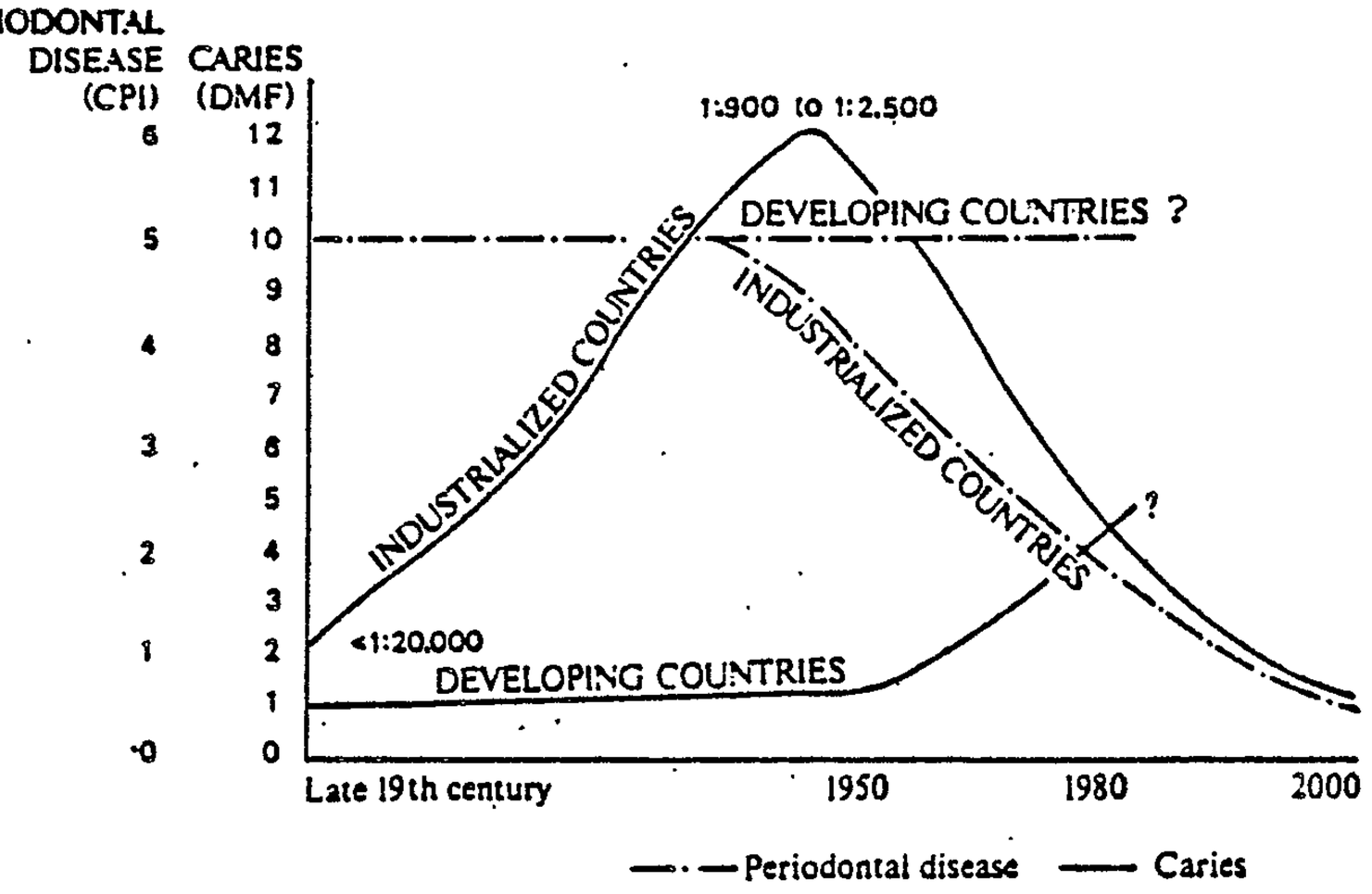

Fig. 1. Oral health trends using data for children aged 12 years. Prepared by WHO in 1983.

The global situation in oral health demands a preventive first approach to halt the increase in caries prevalence as well as to decrease the prevalence of periodontal disease. Thus the central strategy of the W.H.O. approach to global oral health is to promote integrated, coordinated planning of oral health services based on five point programmes:

(i) Preventive programme, including health education.

(ii) Target group services, particularly school dental services.

(iii) Demand services for all non-targeted sector.

(iv) Manpower production in amount and kind.

(v) Monitoring and evaluation.

Material on this is available to all member countries and plans are available for four situations relevant to virtually all developing countries and even to the case of highly industrialized countries (Barmes, 1981, p79).

Coordination of research is another important activity for W.H.O. Caries aetiology and health services research have been major collaborative projects for W.H.O.'s oral health programme and a further collaborative study of total ingestion of fluoride is being developed (Barmes, 1981, p82).

The F.D.I. and the Oral Health Unit of W.H.O. still maintain a very close link. These two organizations have collaborated and worked together on several projects. The first project was when W.H.O. published in 1961, a 'World Directory of Dental Schools' containing such information as conditions of entry, curricula, examinations, tuition fees and licenses to practice in seventy countries. The F.D.I. helped in the collection of this information (Ennis, 1967, pp167-168).

4.6 ORAL GOAL FOR YEAR 2,000

The WHO is working in conjunction with the health departments of the member countries and the FDI is working through the Dental Associations to achieve the oral goals for year 2,000. Thus, there is a two-pronged action on achieving of the goals.

The achievement of self-reliance in applying an organised and relevant approach which will result in improved oral health is, in reality, the overall goal for the year 2,000. The W.H.O. has proposed a specific indicator of 3 DMF teeth at twelve years. By using a specific indicator like this, there is something tangible to aim at and, by surveys from time to time, the progress in achieving the goal may be measured.

The age of twelve years is very important in oral health because:

(i) It is the end of primary school during which the greatest number of targeted programmes of oral health are applied.

(ii) All deciduous teeth have exfoliated at this stage.

(iii) WHO's global data bank has more data on this age group.

(iv) It is an age which can be well sampled in schools.

There are some disadvantages also, e.g., there are a number of recently erupted teeth which have had little or no chance to develop dental caries and also there has been little or no chance for the establishment of serious periodontal conditions. Since the advantages outweigh the disadvantages, the age of twelve years has been chosen.

Dental caries has been selected as the yardstick for the evaluation of dental health since it is for this disease that widespread increase has been measured and that most programmes and demand in the past have grown

because of this disease. The other factor is that programmes preventing dental caries can be easily integrated with prevention of periodontal disease.

The numerical value of 3 DMF has been selected because:

(i) It is the present average for developing countries.

(ii) Experience has proven that caries can be reduced to this level.

(iii) Integrated planning with sub-goals for all aspects of oral health can lead to this figure.

(iv) Evaluation can be performed objectively, simply and annually.

W.H.O. in its data bank has information for 107 countries. Fifty seven of these countries show DMF of three or less and fifty have more than 3 DMF teeth. Only 29 of the latter are developing countries and there are indications that the average twenty years ago for those countries would not have been any more than 1.5 DMF teeth. For developed countries, successful water fluoridation programmes have achieved reductions in whole populations to the range of 2.5 to 3.0 DMF teeth at 12 years. Though some have achieved lower caries levels, if one measures the disease only for those living from birth in fluoridated areas, the range 2.5 to 3.0 DMF allows for in and out migration as well as those groups not covered by the programme. It is a conservative figure aimed at what is realistic (Barmes, 1981, p83).

The indicator suggests preoccupation with dental caries. However the integrated planning methodology, advocated by W.H.O. recognises a whole range of preventive plans from purely oral hygiene programmes, health education activities and regular surveillance, to a comprehensive programme including those features plus use of fluorides, dietary control and whatever other preventive measures that are relevant and practical. The efforts should not restrict even the broadest concept for handling the oral health problem.

Achieving of this goal is important for all countries. Data on manpower show that several countries have now reached the level of one dentist to every 1,000 patients and many more countries fall into the range of 1:1000 to 1:3000 dentist population ratio. Even at those levels there are claims that dental manpower is inadequate, disease levels have remained high and all the repair and rehabilitation has still not achieved total coverage. These trends emphasise the importance of prevention and prevention orientated programmes to attain the goal set by W.H.O. (Barmes, 1981, p84)

Consistent with the direction established by W.H.O. as regards 'Health for All by Year 2,000', and with its own dental health policy statement and other policies and functions, the FDI has also recommended the establishment and achievement of specific goals for oral health for the year 2,000. The proposed global goals by FDI are as listed in the FDI Newsletter are:

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

Goal 2: The global average will be not more than 3 DMF teeth at 12 years of age.

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

Goal 4: A 50 per cent reduction in present levels of edentulousness at age 34-44 will be achieved.

Goal 5: A 25 per cent reduction in the 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.

The FDI is working through the Dental Associations and it is anticipated that Dental Associations:

(i) Participate in monitoring the state of the work-force and provide advice to governments, educational authorities and the profession.

(ii) Publicise the policy statement and stimulate dental personnel to participate in the realis-ation of the national goals.

(iii) Participate in the development of the programmes designed to achieve their goals, and

(iv) Assist wherever possible in the evaluation of programmes. (F.D.I., 1982)

4.7 FIJI GOVERNMENTS- DP9 ORAL OBJECTIVES

In line with Fiji's five year development plans, the dental sector also has its five year plan which is incorporated in the National Development Plan. The main objective for the next five year plan as stated in the 'Briefs on the Plan of Action for the Period 1986-1990' is:

"To ensure that the nation enjoys a high oral health status through planned projects to arrest and control dental caries and periodontal diseases by the following main methods:

(i) maintaining/strengthening of preventive and promotive oral health services so as to reduce the prevalence of dental caries below 3.0 DMF(T) at age 12, and the community periodontal treatment needs to 50 per cent in the 15-29 age group;

(ii) continuing upgrading of the therapeutic dental services by improving clinic working areas, equipment and dental manpower utilization;

(iii) extension of oral health services to the remote and underserved areas of the country with concentrated populations."

The subobjectives are:

(i) Strengthening of the School Oral Health Services by improving staffing, transport, mobile School Dental Clinics and dental equipment.

(ii) Strengthening of the methods for providing basic and post basic training for all levels of dental staff, so that the public will benefit by the improved delivery of dental care.

(iii) Continuing improvement of the accommodation for staff outside Suva so that rural postings will be more readily accepted.

(iv) Maintaining regular monitoring and surveillance on local, regional and national levels of dental disease trends with a view to changing strategies and approaches where necessary to achieve the main objective of the dental health services programme.

(v) Reducing costs of dental filling materials and equipment through local manufacture of intermediate restorative material (IRM) and alternatives to the conventional dental chair and dental operatories.

5. DISCUSSION

The results of previous surveys from 1965 to 1980 demonstrate that the prevalence of dental caries has been increasing in the children of Fiji Islands. Consistent with this, the first priority should be to conduct an oral health survey in the twelve year olds to determine the present prevalence of dental caries in this group. There also should be regular updating of data to facilitate the following:

- continuing evaluation of the state of oral health in this target group;
- projection of trends in dental caries;
- planning for future needs in the education of dental therapists as regards their number and quality in the delivery of dental care to this group.

For the twelve year olds to achieve a low prevalence of dental caries, the major step will be to have them enrolled at two or three years of age on some form of dental care programme. Since the primary school children in Fiji are covered by this scheme, the services should be extended to have all kindergarten children and infants on this scheme.

The present dental care delivery system in Fiji is basically treatment oriented with some emphasis on dental health education to the school teachers and school children. The treatments as such are not preventive oriented. An effort should be made to understand the four

levels of prevention advocated by Leavell and Clark (pp 19-27) and the measures to be instituted for the prevention of dental caries in this group. The four levels of prevention are:

(i) Primary prevention

(ii) Secondary prevention

(iii) Tertiary prevention

(iv) Quaternary prevention.

Primary prevention is the modification of basic patterns of growth and development and cellular activity by genetic, environmental or nutritional measures or alteration of the basic disease and the susceptibility of the tissues. This can be done for dental caries by: systemic fluorides, water fluoridation, dietary supplementation, topical fluoride applications via dentifrices, gels, solutions and pastes, dietary modification by substitutes and additives and by using adhesive tooth sealants.

Both New Zealand and New South Wales (N.S.W.) in Australia have instituted a primary prevention measure in the form of fluoridation of most of the reticulated water supplies. Fiji has had its major water supply fluoridated in 1967 and it is very strongly recommended that all efforts should be directed to have all other reticulated water supplies fluoridated. The institution of this measure will be of major benefit to the children.

A tooth brushing scheme has been instituted in the primary schools in Fiji since 1956. There have been some

'drop outs' due to lack of involvement of the education department. More emphasis should be placed on the extension of this scheme to the non-participating schools. This component should be a part of the curriculum of teacher training courses, so that the teachers are adequately trained to supervise and reinforce this scheme effectively in the schools.

Another primary preventive measure would be to have fluoride mouthrinsing programmes instituted in all the primary schools. This has been going on in some of the schools in Fiji. The introduction of fluoride mouth-rinsing programmes in all the primary schools will be of benefit to the school children from nonfluoridated areas and the children from fluoridated areas will also derive additional benefits too.

Special attention should be placed on the newly erupted permanent teeth by subjecting these teeth to prolonged fluoride applications (P.F.A.). These teeth are very susceptible to dental caries and by P.F.A. the resistance, as such, of the enamel will be greater to acid attacks. This procedure is performed in N.S.W. schools by school dental therapists.

A majority of the population, especially the younger generation have been brought up where using tooth-pastes is a norm. In this respect, it is advocated that the sales of toothpastes be controlled through legislation allowing only the sales of fluoridated toothpastes. This measure will be of benefit to approximately seventy per cent of the population.

Secondary prevention is the interference in the aetiology of dental disease or abnormality, the prevention of further involvement of the tissue in the disease process and the control of the disease. This can be done for dental caries by: early detection and diagnosis, plaque control, treatment of early lesions and regular recall where early detection can be instituted.

The modified school dental programme in N.Z. has this secondary prevention component. Initially caries was diagnosed as being present when the explorer point caught on the occlusal pits and fissures or on unfilled inter-proximal surfaces. The procedure for detection of caries has changed since the use of fluorides and now there is active discouragement within the N.Z. school dental service of early operative intervention in an early carious lesion. Questionable lesions receive topical fluoride treatments and are left without fillings for 3-6 months and then checked again for progression. Fiji can also replace its 'when in doubt, fill' philosophy by 'when in doubt, watch and fluoridate.'

To facilitate early detection and diagnosis of dental caries, it is mandatory that bitewing radiographs be taken after the eruption of permanent molars at regular intervals (e.g. at 6 and 12 years) and the appropriate treatment, either chemical or mechanical be instituted. The individuals with high susceptibility to dental caries can be identified by the therapists and these individuals should be placed on regular recalls (including some with

radiographs) to ensure early detection and diagnosis and subsequent adequate treatment.

Tertiary prevention is the institution of treatment programmes based on biological principles and the elimination of the dental disease practising 'non-iatrogenic' dentistry in the process. This can be done by provision of rehabilitation and disability limitation, provision of comprehensive dental care, education programmes for dental manpower to produce clinical care styles which minimises sequelae and future disease and institution of personalised patient oriented treatment programmes based on individual needs.

As dental therapists are permitted to perform conservative treatments, they should be taught to produce clinical care styles which would minimise sequelae and future disease. For example, margins of restorations to be well adopted to the tooth surface, contact points to be built up properly and restorations to be occlusally adjusted.

Quaternary prevention is the change in attitudes and health behaviour on the part of both the recipient and the donor in the dental health relationship so that the effectiveness and completeness of the health care operation will be maximised.

This is done by dental health education at present in Fiji by senior dental therapists who are appointed as divisional oral health educators. These personnel are very much motivated and are actively involved in the

pursuit of their duties. Some restrictions are placed on these personnel by their small numbers especially as regards extensive coverage and follow up of this programme. The trainee dental therapists in Fiji are trained in this aspect and, upon qualification, these personnel should be motivated by the dental officers at divisional and subdivisional levels in pursuing this very important component of their duty.

Coverage of schools by dental teams in Fiji is presently done in a very haphazard manner as it depends on the availability of manpower and transporting systems, especially at the subdivisional levels. This situation should be duly rectified and each subdivisional clinic should be allocated a transporting system, if not a dental mobile, solely for the dental care of the school children. Dental therapists should be specifically utilized in the schools for the rendering of dental health care to school children. A target of one dental therapist to 1,500 children should be aimed at initially and with enough therapists being trained and available, the proportion could be decreased to one therapist to 1,000 children, who could be maintained at an optimal dental health by the institution of preventive programmes as recommended earlier in this section.

Dental officers with their higher qualification will be highly underutilized if their work is confined to oral health care of the school children. These personnel can act as resource persons and direct the school dental

services as appropriate at the subdivisional and divisional levels and cases beyond the scope of dental therapists should be referred to these dentists for appropriate treatment. With the deployment of dental therapists to schools, the dental officers could devote their time to the treatment of patients at the static clinics, organization and management of general clinic and administrative duties and assessing the ongoing programmes by conducting surveys and evaluating the results.

6. CONCLUSION

The recommended measures for achieving a level of 3 DMF teeth in twelve year olds in Fiji are:

1. Greater utilization of dental therapists in the provision of services to school children.

2. Provision of adequate facilities for gaining access to school children. Dental mobiles or suitable transporting systems should be provided to all the static dental clinics.

3. Extension of the school dental care delivery system to include the infants and kindergarten children on the scheme.

4. Institution of the following preventive measures in the school dental delivery system.
   (a) Fluoride mouthrinsing programmes for all children.
   (b) Prolonged Fluoride Application (P.F.A.) to permanent molars at 6 and 12 years of age respectively.
   (c) Early operative intervention to be discouraged for early carious lesions.
   (d) Early carious lesion to be chemically treated with fluorides.
   (e) Bitewing radiographs to be taken after the eruption of permanent molars to ensure early detection and diagnosis.

(f) Performance of non-iatrogenic dentistry.

5. Intensification of ongoing preventive programmes in schools:

(a) Tooth brushing scheme

(b) Dental health education

6. Institution of general measures:

(a) Fluoridation of all reticulated water supplies.

(b) Incorporation of the toothbrushing scheme and its importance to the dental health of the children into the curriculum of trainee teachers.

(c) Legalisation allowing for sales of fluoridated toothpastes only.

7. An oral health survey will need to be conducted in the twelve year olds to estimate the baseline prevalence of dental caries in the twelve year olds. There should also be regular updating of the data to facilitate the continuing evaluation of the state of oral health in this target group.

The institution of these measures will be of relatively low cost to the government (compared to the institution of treatment measures) and resources will be directed to those most in need as regards vulnerability to dental caries.

Generally, governments tend to be more receptive to the provision of resources to treatment services than preventive services because the output is more tangible. This policy, however is short sighted, because the

magnitude of oral disease problems in children can only be reduced by the institution of preventive measures as well as treating the consequences of the disease until such time as complete prevention becomes a reality.

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