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A Community Dental Health Plan based on a School Dental Service

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Contents

1. Introduction

The purpose of this thesis is first to define the goals in Community Dentistry, and then to propose a community dental health plan which could operate in conjunction with a school dental service to achieve these goals. The intention is to concentrate on behavioural aspects of dental health rather than provision of clinical services.

The environment is a developed country and the target community contains a broad range of social and economic classes. Dental services are available through local private practice.

The community dental health plan will be built on a School Dental Service such as the Australian service, established at the local school and provided by a central Health Department.

Two school dental therapists, trained in dental health education, preventive services and a limited range of treatment services for school children will be stationed at the community school. They are to be supervised by a

School Dental Officer, who is responsible for the activities of a group of 10 - 15 such therapists at a group of 6 - 8 schools.

2. Definition of Goals in Community Dental Health

One of the features of Public Health management is accountability to the public which provides the resources and participates in the activity (Greenburg 1955). The activity must be measured for effectiveness, and this process, known as evaluation, consists of comparing the results achieved with the stated goals (Warren 1969). Definition of goals is therefore a primary consideration.

In 1973, the aims of the Australian School Dental Service were stated as follows: (Australian School Dental Services). "The basic objective was to develop withing each State and Territory of Australia, a comprehensive school dental service offering free dental care to all school children under 15 years of age. The main principles were:

(i) The services would be staffed basically by school dental therapists working under the general direction and control of dentists.

(ii) The programme would be implemented gradually, commencing with the target of covering all primary school children by 1980, and then expanding to cover children of pre-school age and secondary school children under 15 years of age.

(iii) The services would offer free dental care and treatment to each child at least once a year.

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

(v) Treatment would be provided at school dental clinics of either fixed or mobile design, which would be situated in close physical association with the schools."

This statement gives a general description of the type of

service envisaged for Australia, but what are the goals?

Two points are clear:

(1) The main emphasis is on "free dental care and treatment".

(2) Dental health education is to be provided specifically to school children. The inference is that this would take place in the clinic and/or classroom and the education of the community outside the school is not seen as a priority.

Use of the term "dental care" indicates that preventive services are included, but it is not clear from the statement of aims whether the primary goal is treatment or prevention.

It was pointed out by Burt in 1974 that public dental health programmes have traditionally meant treatment services to repair the consequences of dental disease, and that even today they tend to be oriented toward this goal. Barenthin (1974) stated "the dental profession's

goal in community dentistry is usually good individual dentistry for all members of the community". Dentistry for children in developed countries has consisted mainly of restorative procedures, and dentists have been educated to think chiefly in terms of therapy, repair and restoration (Young 1971) so it is not surprising that goals are often related to provision of treatment. If treatment is the primary goal for school dental service, its performance could be evaluated in terms of the quantitly of treatment delivered and the number of children treated.

However, are dental public health authorities justified in expecting the continued support of the community in order to provide treatment as a main measure, rather than as support for a mainly educational and preventive service? Placing such a burden on a nation's health care system has been described as extremely expensive, grossly inefficient and highly undesirable (W.H.O. 1975). This W.H.O. report points out that the expense of oral rehabilitation exceeds the economic resources a nation can reasonably allocate for dental care, even in countries with highly developed health care systems.

The conclusion is that "provision of treatment" is unacceptable as a primary goal in a dental health programme. This being so, what acceptable goal can be stated? What result is required?

A W.H.O. expert committee (W.H.O. 1965) defined dental health as "a state of complete normality and functional efficiency of the teeth and supporting structures and also of the surrounding parts of the oral cavity and of the various structures related to mastication and the maxillo-facial complex". Another W.H.O. group in 1972 (A) suggested "conservation of natural dentition throughout life" as a dental health goal. These levels of dental health for everybody in developed communities are unattainable at present.

Health care must be related to the community and to the period of time in question. The immediate need is an initial achievable goal.

In 1920 Winslow defined public health in terms of "preventing disease and promoting health through organised community effort". This provides a basis for statement of a primary goal that can be measured and is meaningful in that it can

be achieved in the life-time of present health workers. Prevention of disease can be measured as reduction in the occurrence of disease. Therefore the primary goal in community dentistry can be stated as "progressive reduction in oral disease". Supervision of the development of the occlusion for maximum function is a more distant goal.

With the primary goal in mind, the understanding that, by definition it is to be obtained through organised community effort, we can proceed to consideration of the target community.

3. Present oral health status and attitudes in the target community

A survey of the community will provide information about present oral health status, habits and attitudes. This is necessary so that action can be planned and results can be evaluated. Studies of dental health patterns and attitudes in several developed countries will now be

reviewed, and the characteristics expected to be found in this model community will be outlined.

Some insight into the use made of dental services in two towns in England can be gained from a study of a report by Bulman et al in 1968: 2 in every 5 adults surveyed had not been to a dentist in 5 years and one in 4 not for 10 years. Only 20-30% had attended within the previous year. Financial barriers to attendance had been removed under the provisions of the National Health Service. People had an over optimistic view of their own oral health and little idea of the meaning of periodontal disease.

A comprehensive study of adult dental health in England and Wales by Gray et al in 1970 showed that 37% of people over age 15 had lost all their natural dentition (p.25) 23% of a random sample of people from metropolitan Sydney were edentulous in 1973 (Barnard and Minns 1974). Roder reported 30% edentulous over age 15 in South Australia in 1975. In Busselton, Western Australia 35% of adults over age 21 were edentulous in 1969 (Medcalf). Similar levels of tooth loss could be expected in our model community. Differences between regions and social classes will be expected. Among unskilled and semi-skilled workers in

Bulman's two-town study, the prevalence of total tooth loss was 61%. In professional and managerial workers it was 33%.

Gradients related to regions and social classes were evident even in young people who had lived most of their lives under The British National Health Service. Young people from professional backgrounds in Salisbury had lost 2 teeth per person compared with 7 teeth per person with unskilled or semi-skilled backgrounds. In Darlington the difference was 3½ teeth to 5 teeth respectively. A similar pattern was demonstrated by Roder (1974) in the south-east of South Australia: The proportion of full denture wearers was higher in lower socio-economic groups.

The proportion of people totally edentulous in England and Wales (Gray et al 1970) also reflects the social class difference in dental behaviour. 46% of semi-skilled and unskilled were edentulous compared with only 27% of professional, managerial and skilled (p.29). Further evidence comes from Stadt et al (1967) who reported that children from low socio-economic groups in California had higher caries rates and less preventive practices (fluoride toothpastes, toothbrushing, dental visits and fluoride

supplement), than children from high socio-economic strata. The same situation was reported by Roder in 1971 (B), after examining a group of South Australian country children. Mean pre-fluoridation caries experience in Australia was 7 - 9 DMF teeth per child at age 12 years. Barnard (1956) Carr (1966) Medcalf (1970) Roder (1971A) (1971B) Gray et al (1970) reported that in England and Wales, for people who were aged 0 - 14 years when the National Health Service began in 1948, the social and regional variations in total tooth loss were still apparent (p.31). All this research indicates that the major factors in determining dental health habits and total tooth loss are social norms, an important consideration for those who are planning to change behaviour through education. If behavioural norms determine an individual's ultimate dental health, then our efforts to reduce disease must be based on socio-cultural considerations.

Gray (1970) reported little concern over loss of teeth, particularly in rural areas. Most people would rather have a front tooth filled, but they were equally divided over whether they would have it filled or extracted if it was a back tooth. Concern with appearance was a factor influencing tooth loss. In ages under 34 years a much

higher proportion preferred filling in all circumstances, (p.127) indicating that concern over tooth loss decreases with age and peaks at an age below 34 years. In 1975, Gochman reported that appearance motivation increased relative to health motivation as children progressed from age 8 to age 14+. Apparently appearance motivation peaks between ages 14 and 34. Attitudes to denture wearing were also investigated by Gray (1970): 40% of people aged 16 or more found the thought of wearing dentures not at all upsetting, 30% a little upsetting and 30% very upsetting (p.135). That is, 60% were not entirely happy at the prospect of becoming edentulous. Promotion of natural dentition as a social asset would appear to be sound educational policy, particularly with young people.

Further comments on the patient's point of view were made in an investigation by Martin et al in Australia in 1965. Interviewed people stated that the burden of dental treatment costs was excessive and loss of teeth was inevitable, so it was pointless to attend a dentist regularly: one might just as well wait and have them all out when the time came (p.9). The dentist was regarded as the first aid man, to be sought only when in pain. Moreover, many people reported intense

anxiety when faced with the prospect of submitting to dental procedures.

Conclusion: The following oral health characteristics could be expected in the model community:

Caries experience in children will vary according to region and social class and high caries rates can be expected in non-fluoridated areas. Gingivitis may be the rule rather than the exception in school children.

In adults, one could expect a high prevalence of periodontal disease and a general pattern of progressive tooth loss, particularly in lower socio-economic groups, accompanied by feelings of the inevitability of the process and therefore lack of enchantment with traditional dentistry. Against this background, an educational plan will be developed, the objective being reduction in oral disease.

4. Preventive measures that have been proved effective

Before discussing organization for prevention, it is necessary to make a clear statement about the preventive measures which may be applied. Only those which have been proved effective and practical should be considered for use. These measures are identified below, with a brief outline of the reason for including each one.

4.1 Fluoridation

A statement by the W.H.O. in 1975 sums up the present position regarding fluoridation. "Fluoride provided at optimum levels throughout the whole life-span of the individual is the most effective known means of preventing caries. Because of its clear advantages, fluoridation of communal water supplies, where feasible, should be the corner-stone of any national programme of dental caries prevention. It is an ideal public health measure since its benefits are conferred to everyone regardless of socio-economic level or availability of dental services. In addition, it is effective without the need for active participation by the

individual. Unless there are overriding technical reasons, no nation can afford the luxury of not fluoridating every central water supply system containing less than the optimum concentrations of fluoride." As the most effective known means of preventing caries, fluoridation is identified as first priority (priority number 1) in the community dental health plan.

4.2 School water fluoridation

When fluoridation is not feasible, school water fluoridation is recommended. 32-40% reductions in caries incidence have been reported by this method. (Horowitz et al 1964, 1965, 1968, 1972) and Barrow and Lewis (1968). School fluoridation is effective as a community measure because it benefits all the children at the school.

4.3 Fluoride tablets

When school water fluoridation is used, fluoride can be incorporated into those teeth which develop in the pre-school period by providing the child with a dietary supplement beginning soon after birth (Aasenden et al 1974) (Hennon et al 1967 and 1970).

In this thesis, the term "pre-school" refers to the age group from birth to commencement of formal education at age 5-6 years. Reductions ranging from 20-40% have been reported by this method (Davies 1973). Additional benefits are obtained when fluoride tablets are taken prenatally, as shown by Kailis et al in 1968 and Prichard in 1969. Continued injestion of fluoride tablets during the entire pre-school and school period is recommended when school water fluoridation is not feasible.

Davies (1973)

4.4 Oral Hygiene

People who brush their teeth at least once daily have less periodontal disease than people who brush their teeth less than once daily (Sheiham 1970). Toothbrushing, as an isolated function, has little or no effect on the incidence of dental caries unless a fluoride toothpaste is used. Bibby (1966), Sutcliffe (1973), (W.H.O. 1972B)

4.5 Dietary Control

The incidence of dental caries is positively related to the frequency of between-meal snacking

(Gustafsson et al 1954). The most destructive foods appear to be those containing sugar and mixtures of flour and sugar (Bibby 1975).

4.6 Regular dental care

People who go to the dentist regularly have less oral disease than people who go infrequently, provided calculus is removed and oral hygiene procedures are checked and reinforced each time. (Sutton et al 1974)

These proven facts relating to dental health will form the content of the community dental health programme.

Having stated the preventive measures on which the programme is based and having identified fluoridation as the first priority, the next chapter will deal with the implementation of fluoridation.

5. Implementing Fluoridation

5.1 Water fluoridation

Assuming that the community has a sub-optimal fluoride level, how is fluoridation best achieved?

Roemer recommended in 1965 that fluoridation be introduced through legislators and administrative action. She pointed out that legislators are responsible for public health, and it is their duty to make decisions on complex matters like fluoridation, on the information and recommendations of their scientific advisors. Fluoridation is a political issue (Burt et al 1972). The Royal Commissioner in Tasmania (Crisp 1968) stated "adjustment of the fluoride level is a legitimate and proper function of a local health authority in pursuance of its duty to protect public health".

Motz (1971) warned that broad popular participation such as panel discussions, debates or referenda should be avoided because they give anti-fluoridationists the stamp of legitimacy and also introduce

confusing emotional issues.

One of the functions of the central dental health authority is to provide the legislators with facts in the areas where objections are likely to be raised. These areas are:

(1) Effectiveness

(2) The cost/benefit ratio

(3) Safety

These issues are expanded briefly below, to show the type of information that should be provided:

(1) Effectiveness

Table I shows the substantial reduction in caries that has occurred in several fluoridated communities (Davies 1974).

TABLE I

Reduction in decayed missing and filled permanent teeth for children with life-long exposure to fluoridated water

Country	Ages (years)	Average number of D.M.F. teeth		% reduction
		Without F.	With F.	
Canada (Ontario)	16—17	10.4	4.7	55
England (Hartelpool)	15	8.9	5.0	45
New Zealand (Hastings)	11	7.1	3.6	50
United States (Illinois)	13—17	9.0	4.1	54

When demonstrating the dental benefit, it should be pointed out that children's general health is therefore improved.

(2) Cost/benefit considerations

The economic benefit of fluoridation has been demonstrated by several investigators:

In New Britain, Connecticut, it was shown that

while children's dental costs increase with age, the cost and rate of increase are lower after fluoridation (Fluoridation Reporter 1975). Estimated dental costs for children aged 6 - 16 years increased by $6.68 per year before fluoridation and $4.46 per year after fluoridation.

In 1966 Denby and Hollis showed that a New Zealand School Dental Nurse could provide routine treatment for 690 children in a fluoridated area but only 475 children in a non-fluoridated area. For adolescents the mean cost per person was £3.14.0 in the first area and £5.14.0 in the second.

Kunzel (1974) reported that in Karl-Marx-Stadt prior to fluoridation 15.8 dentists were required for 19,000 children. After 8 years of fluoridation only 9.5 dentists were necessary. Ast et al (1968) showed in Newburgh, New York that the cost of dental care for children who drank fluoridated water from infancy was less than half that for those who did not.

When public funds are being made available for

dental care, dental administrators have a responsibility to inform the Government that tax payers' money will be wasted unless the programme is based on prevention. Clear cost-benefit analysis of preventive measures should be made available. The method which achieves the goals with least cost to the community is the method of choice.

(3) Safety

The whole subject of fluoride physiology has been reviewed by the World Health Organization in its monograph 'Fluorides and Human Health' (W.H.O. 1970). This publication treats all aspects of the subject in exhaustive detail and shows conclusively that injestion of fluoride at recommended levels is safe.

As has been stated, the fluoridation decision should be made at top Government level, with application to the whole Nation, so our local dental team is not directly involved in political activity. However, if fluoridation

is a new idea in this community, the health professionals and other community leaders should be given positive factual information about it at this time. The reason is that a new idea tends to diffuse into a community in a recognised pattern, which will be described in chapter 8 (Rogers 1962). In brief, certain people, known as opinion leaders, play key communication roles. (Katz and Lazarsfeld 1955) The opinion leaders in health matters in this community will be some of the health professionals such as the medical practitioner, nurses, dentist, pharmacist and other people who can be identified by studying the community. The local role of the dental specialists is to give information about fluoridation to their peers in an unobtrusive friendly manner, with the objective of providing correct information for the community's opinion leaders.

The alternatives to water fluoridation are:

(1) A system of fluoride dietary supplement for pre-school children followed by

school water fluoridation.

(2) Dietary supplementation through pre-school and school years.

5.2 School Water Fluoridation

As with community water fluoridation, the objective should be top Government legislation, giving the Minister for Health power to instruct a local authority to fluoridate a school supply. The principle, as before, is to avoid local arguments, which confuse the issue. The essential feature is firm recommendations from health authorities to the Government. This should come not only from the Dental Public Health Authority, but also from the Dental Association, Medical Association, and other advisory bodies such as the National Health and Medical Research Council. Responsibility for a planned approach rests with the Dental Public Health Authority. In the long term, projects such as this should be seen as a collective responsibility of an integrated health service.

5.3 Fluoride tablet supplementation

The daily supplement is calculated according to the existing fluoride level in the local water supply.

Responsibility for administration of tablets can be assumed by parents, but there is evidence that even when tablets are provided free, supplementation is not maintained. A survey in a fluoride deficient area of Western Australia (Fluoride 1970) showed that only 8.5% of children had taken fluoride tablets regularly. About 50% reported having taken fluoride tablets intermittently. Tablets were available free of charge from Child Health Centres in the area. In 1967 Hennon reported loss of 80% of his original group after 5½ years and Prichard's (1969) "regular users" were 16-25% of the 6 to 8 year old population.

What plan can be implemented in this community to ensure maximum use of dietary supplement?

5.3.1 School distribution

The studies of Marthala (1969) and De Paola and Lax (1968) provide substantial evidence

of the benefit and practicability of this procedure. Fluoride tablets are currently being distributed by Public Health Nurses and teachers at some Western Australian Schools. Some teachers are more enthusiastic than others, but the system should operate well when school dental personnel are stationed at the school.

5.3.2 Pre-school distribution

Pre-school children are not grouped so conveniently. To develop a plan for tablet distribution, a study of the pre-school community should be made, and a system applicable to the particular community implemented. The usual structure of Australian pre-school communities is examined in Chapter 7, Section 4.

In chapter 4, fluoridation was identified as the first priority in the community dental health plan. School water fluoridation and dietary supplementation are alternative methods of ensuring adequate systemic

fluoride when water fluoridation is not feasible. Implementation of these measures have been discussed in this chapter.

An understanding of the structure of the pre-school community is necessary for planning tablet distribution to pre-school children.

6. Definition of priorities

When the first priority (fluoridation) has been achieved, what is the next priority for application of resources? There are two broad areas to consider:

1. Dental care, which can be subdivided into fluoro-therapy, emergency treatment and individual clinical services.

Fluorotherapy, in a community where systemic

fluoridation has been implemented, means multiple topical treatment for children with high caries incidence, either individually or in groups.

Emergency treatment for relief of pain, infection and disfigurement has a continuing priority but is not effective in reducing disease incidence. Individual clinical services in a school dental scheme consist largely of restoration of carious lesions and supervision of occlusal development.

2. Community behaviour modification

In terms of the goal (progressive reduction in oral disease) is the next priority fluorotherapy, individual clinical services or behaviour modification?

Fluorotherapy and behaviour modification have priority over individual clinical dentistry, because it has been well documented that restorative treatment does not reduce disease incidence. (Sutton et al

1974, Beck 1968, Holst 1975, W.H.O. 1975, Dillon 1976).

There is abundant evidence that fluorotherapy is an effective means of reducing caries (Horowitz 1973). Therefore it is identified as next priority after fluoridation - priority number 2. Fluorotherapy will not be discussed in detail in this thesis.

Consideration of behaviour modification in the chapters to follow will show that traditional methods of dental health education have been less successful than fluorotherapy in reducing oral disease in children. However it was pointed out in chapter 4 that people who adopt behaviour patterns such as brushing with fluoride toothpaste, preventive dental visits and restriction of sugary snacks have less oral disease than people without these behaviours. It is therefore reasonable to devote resources to effective means of behaviour modification as the third priority (Priority number 3).

7. Goal achievement through behaviour modification

Behaviour modification through a school dental service is usually thought of in terms of teaching dental health in classroom and/or clinic, as discussed in Chapter 2. The desirable behaviours were stated in Chapter 4.

7.1 What is the role of school dental health education in child dental health behaviour?

This topic has been studied by many investigators. Table II is a frequency distribution of published studies in the period 1953 to 1970 (Rayner and Cohen 1971.)

TABLE 2

Frequency distribution of published studies relevant to school dental health education

Year Published	*TYPE OF STUDY* *Survey*	*Essay*	*Experimental*	*Totals*
1953–54			1	1
1955–56			3	3
1957				
1958			1	1
1959		1	1	2
1960	3		2	5
1961	1	3		4
1962	1	1	3	5
1953–1962 mean no.	0.5	0.5	1.1	2.1
1963	1	5	2	8
1964	1	2	1	4
1963–1964 mean no.	1.0	3.5	1.5	6.0
1965	5	1	2	8
1966	1	3	5	9
1967	1	4	11	16
1968	6	2	13	21
1969	5	1	3	9
1970*		3	7	10
1965–1970 mean no.	3.0	2.3	6.8	12.2
Totals	25	26	55	106

* This article was prepared during 1970, and the figures for this year are therefore not complete.

In general this literature, and research since 1970, shows that remarkably little success has been achieved by attempts to change behaviour by traditional classroom methods.

20 years ago, in studies at St. Albans, Davis et al (1956) reported that following dental health lessons

to primary and secondary school children the girls' oral hygiene improved initially but fell off toward the end of the year. The boys' oral hygiene did not change much at all. Their conclusion was that fundamental oral hygiene habits were little affected by the dental health programme. Subsequent research supports this conclusion.

In 1960 Dudding and Muhler reported an investigation into factors that do motivate children. In a group with "good" oral hygiene, 61% said they learnt it from the dentist and in a group with poor oral hygiene only 33% said they learnt it from a dentist. In the first group, 19% said they learnt from their parents, and investigation showed that 80% of these parents learnt from the dentist. In the "poor" group, 4% said their parents taught them but only 15% of parents reported learning from the dentist. The authors' conclusion was that the dentist had a pronounced influence on people's oral hygiene practices and they attributed this to "high source credibility". However, in the "poor" groups, most children had not been taught by anyone, so their lack of knowledge could be attributed to lack of any

any information at all, rather than lack of "high source" information.

To investigate this further, Myers and Downs, (1968) and Williford et al (1967) compared school dental health education programmes carried out by teachers with those carried out by dental personnel. Both groups of investigators concluded that the dental specialists were more effective in motivation behaviour change, being regarded as an authority. This supports the high source credibility idea of Dudding and Muhler. However, there is no evidence that lasting behaviour change can be achieved through classroom dental health teaching, no matter who does the teaching. It has long been recognised by teachers that high source credibility visitors have a role in stimulating interest and reinforcing normal classroom teaching. (Grout 1963) (Dental Health Supp. 1974) The ideal approach would seem to be use of the educational skills and experience of the teacher, with the dental specialist as a resource and visitor-stimulator.

A variation of this was used in "The toothkeeper"

programme (Smith et al 1975), where there was a two step flow of information from dentist to teacher to child, but the dentist did not appear in the classroom. Again, no significant change in behaviour was apparent after the programme.

Some doubt was cast upon the effectiveness of the dentist as an educator in 1968, when Bay reported that instruction given when the child was seated in a dentist's chair had little effect, and concluded that the dental chair was not a good educational environment. In Roder's 1969 study nearly half the children who had visited the dentist during the year could not recall toothbrushing instruction. Either the dentist had not given any instructions, or the environment had been an effective barrier to communication.

Many studies of dental health education in schools have shown that habits and practice of oral helth do not necessarily coincide with knowledge of oral helth. (Love 1968)(Pavlid 1968). It appears that classroom teaching is suited to the learning of facts, rather than development of behaviour patterns.

In a community study involving adults as well as school children in Dundee, Finlayson and Wilson (1961) (1962) found that after the campaign possession of a toothbrush had increased from 91% to 96%, and the proportion of people brushing twice a day had increased from 36% to 77%. There was a definite improvement in oral hygiene, but 6 months later this improvement had largely disappeared. There was no evidence of any effect on caries. Bay (1968) recommended 2 - 6 monthly repetitions of oral hygiene instruction in school programmes, because her group's plaque index and GI scores returned to worst in about 28 weeks.

In another dental health education programme designed to improve dental behaviour through school education, Jordan and Pugnier reported in 1967 that the children's increased knowledge had a small effect on their patterns of living but that the dental health knowledge was applied only when it did not effect the student's daily habits seriously.

Robinson et al (1967) reported a study carried out in 13 Negro High Schools in Tennessee. The experimental

group scored well in knowledge tests, but showed no significant change in debris or calculus ratings. The authors concluded that dental care habits should be formed in early childhood since habits cannot be easily changed through education after they have become ingrained.

Investigating the role of teaching aids, Gravelle et al (1967) compared different types of dental health education programmes at schools. They showed that a high intensity programme using special visual aids and several methods and materials was little more effective than a low intensity programme. Both were effective in improving debris, oral hygiene and periodontal index scores in the short term.

In 1963 Knowles concluded that teachers have not proved effective in dental health education. Davis (1974) supports this view. He said that there were few instances where the traditional type of dental health education had been shown to influence significantly attitudes or behaviour. Marjorie Young's conclusion (1970/71) was: "a review of published studies related to school dental health education does not provide

firm data on which to base future programme planning ... programmes will be based largely on expediency, individual or group preferences, and on personal opinion and personal experiences."

If school dental health education is ineffective, is there any other tactic that can be used to change dental health behaviour through a School Dental Service? To examine this question, we can begin by studying Davis's statement in 1974. He said on page 275 "Education for dental health has as its first function to transmit information, information which will lead to a better understanding of the problems of dental diseases, of the possibilities of early preventive action and of the advances that are being made in dental research and clinical practice. An informed public can then be instrumental in furthering public health measures such as fluoridation and dietary modifications whether by manufacturers or outlets such as school tuck-shops".

This philosophy may be applicable to administrative decision making, but the evidence shows that trans-mission of information to children at school does not

lead to a permanent change in personal dental health behaviour patterns.

Two statements above suggest another method of approach. Jordan et al (1967) said that dental health knowledge was applied only when it did not effect the students' daily habits seriously. Robinson et al (1967) said "dental health habits should be formed in early childhood, since habits cannot be easily changed after they have become ingrained".

There has been increasing interest by investigators in the early development of dental health habits. Metz and Richards (1967) stressed the value of impressing parents about the value of preventive dentistry for children. In a study of 6-17 year old children they found a close positive correlation between social status, family income, parent education and the preventive dental visits of children. But the effect of the parent's own practices on the dental practices of their children operated independently of these three factors. They concluded that we should motivate the parents themselves to take preventive action. Rayner (1969) came to the same

conclusion in stating that mothers' dental practices determine the nature of their children's dental practices.

Child learning theorists have all recognised the crucial effect of early childhood experiences on the development of the child (Baldwin 1967). For example, Bruner in 1960 said that any subject can be taught to any child at the right stage in his development. He emphasised the relationship of training to learning. The training takes place first, and is a function of the childs environment. For example if he has been toothbrushing at home, he may be ready to learn why he does it in a school class, but in the absence of training at the right time at home, intellectual learning at school leads only to acquisition of facts, not habits.

All the theories accept in some form an idea of multi-level functioning: one primary and primitive mechanism of behaviour occurs early in the child's life and another, described variously as secondary, conceptual, symbolic, or cognitive develops as the child grows (Baldwin 1967) (p.598). This second level of function gradually assumes control over the first, although the first

continues to function in an important subsidiary role.

Schiamberg (1970) explained Piaget's theory in a similar way. A child may be ready for basic understanding of an activity in the form of sensory - motor manipulation before he is ready to learn the concept at intellectual level. The child learns by doing, seeing, touching etc, and cognitive knowledge may not come until later.

Forsman (1969) concluded that mothers should be instructed in preventive dentistry before the child was 6 months old. Forsman examined the effects of instructing mothers in child health centres in Sweden, and found the best dental health in children who were 6 months old when their mothers were instructed. He said it was too late if the mother was taught preventive dentistry after the child was 4 years old.

We can conclude that a child's basic dental health attitudes and behaviour have been formed through the home environment before he comes to school. The Manual of Health Education, N.S.W. (1969) points out on p.21 that behaviour is organised in terms of a set of

beliefs, attitudes and values which the individual has acquired in the course of his life. In the pre-school child, behaviour is a function of home environment. Human behaviour is a result of emotions as well as reasons. This Manual warns that the educator who seeks only to inform, to change behaviour solely through an appeal to reason, will be largely ineffectual. The commercial "persuaders" have long been aware of this (Packard 1971). Classroom teaching has been essentially factual, rather than emotional. One might conclude that classroom dental health education should be regarded as reinforcement of desirable dental health behaviour, stimulating interest, presenting dental health as being socially desirable and refining techniques of oral care.

7.2 Establishing Desirable Dental Health Behaviour in pre-school children

What implications does this research hold for dental health educators? What action can be recommended in the school-based community dental health programme?

It appears that time can be spent profitably in education

of mothers. As Rayner said in 1970, if children's dental health practices depend on observing their mothers practices, it seems reasonable to expend some effort in the health education of the mothers. The objective is to develop positive dental health values and habits in the child, as early as possible.

When asking the mother to participate, the educator (a school dental therapist) should help mother to understand her role as a model for the child in these early years.

Three behaviour patterns are to be developed, as discussed in chapter 4.

(1) Brushing with fluoride toothpaste

(2) Avoiding sugary snacks between meals

(3) Attending for preventive services.

Mother and child should attend the school centre (or private practitioner) together in the pre-school years. They should learn plaque control together, plaque should be disclosed on both mother and child, and at home mother should use the same toothpaste and brush at the same time as the child.

Because of the effect of mother's dental behaviour on the child's dental behaviour, it seems reasonable that mothers of pre-school children should receive prophylactic and preventive services at the school dental centre, when the child is present. The child's dietary behaviour can be developed through education of mother in the same way. Mother should be impressed with the value her child will gain from avoidance of sugary snacks. She should understand that the family pattern will set the child's behaviour. If the rest of the family consumes sugary snacks but forbids the child, the child's behaviour pattern will be influenced by the family norm and the negative instructions will be seen only as a temporary activity, "out of step" with the norm.

It follows that if positive dental health values could be established in every family, dental caries could be almost non-existent in a fluoridated community with an established preventive programme organised through a school dental service.

It can be concluded that establishment of desirable dental health habits in the pre-school child should be regarded

the first priority in behaviour modification in a school dental service.

7.3 High school girls as future mothers

The importance of mothers in establishment of the pre-school child's behaviour patterns suggests that high school girls should be a primary target group for dental health education. As the mothers of the immediate future they should receive information about preventive care, with the content pertinent to themselves and to their future children. This basis can then be built on in the ante-natal and post-natal child-care phases, the objective being establishment of desirable dental health behaviour patterns in their children.

High school girls are moving more out of the influence of parents and into the influence of peers and community opinion leaders (Dunphy 1969) (Katz and Lazarsfeld 1955). They are therefore more likely than primary school children to challenge family beliefs and decide to initiate new behaviour patterns in their own children. The education process should promote the idea that the new generation of children can be expected to enjoy

better dental health than their parents did - because of new knowledge and new methods of community organization for prevention.

School dental therapists could be invited to visit the high school to discuss preventive dentistry and their own role as community health personnel with the senior girls. The students could then visit the School Dental Centre to receive personal oral hygiene instruction and advice about obtaining dental care. When the School Dental Service has been established for several years, some senior high school girls will have been through the school dental system themselves, so this high school follow-up will serve to reinforce previously learned behaviours.

As was noted in Chapter 3 appearance motivation is high at this age, so a "personal grooming" approach to dental health education by school dental therapists could be effective. This is also an opportunity to promote careers in dentistry.

It should be noted that information about dental health for high school students need not be limited to "health

education" lessons. Dental specialists (therapists and dentists) should participate in teaching activities in the Home Science, Human Biology and General Science areas. A booklet, "Dental Projects for High School Science Students" (1959) describes some useful exercises. This cross-subject approach is recommended for health teaching in schools (Kilander 1968) and has been described in relation to dental health by Davis in 1974. (p.279)

The proposed educational activity in primary and high schools pre-supposes a joint committment on the part of both Health and Education authorities for co-operative action to reduce dental disease. A joint committee to co-ordinate activities such as dental health workshops for teachers and teaching workshops for dental personnel could be useful. In countries where fluoridation is established and funds have been allocated to School Dental Services, Governments should be informed by their Health advisers that education of the community in dental health behaviour is now necessary. Two priorities are:

(1) Diet and nutrition as subjects at primary and high school and therefore as a compulsory element in teacher education.

(2) School canteens should reinforce the health teaching of the classroom. Sound eating patterns should be established at the same time as the factual information is given in the classroom. On page 25 of the Manual of Health Education (1969) it is pointed out that learning does not just "happen" - it is something that requires the participation of the learner, in an appropriate learning environment. The canteen can be used as aprt of the learning process, to assist the students' perception of a new concept. (Martin and Clements (1964)). Recognition of the educational role of canteens could result in a more responsible approach to menu planning.

This point was also elaborated by Brown Jr. in 1963. He said that motivation without opportunity for fulfillment is not effective health education. Teaching should be related to direct experience - every health activity is a direct experience and part of the child's health education. (Nyswander 1947)

However, school canteens are not the only example

of extension of classroom teaching into practical areas. In South Australia, students from a suburban high school visit field clinics and training institutions of the School Dental Service to act as chairside assistants and oral hygiene instructors, for primary school children. It is part of the schools' Community Interaction Programme, modelled on the THETA programme developed at the Dental Health Centre in San Francisco (Weiss et al 1974). Preliminary evaluation in South Australia showed that the students' debris and periodontal scores decreased, use of recommended toothbrushes and pastes increased, but demand for professional care was greater in the controls. (Roder et al 1975) Communication between young school dental therapists and senior high school students should be excellent.

Conclusion

School Dental Therapists should be directly involved in high school health education, aimed particularly at the future mothers. The content should include child dental health, preventive dental care for personal appearance and nutrition education. The school canteen is seen as

an activity associated with nutrition education. Other interesting methods of providing direct dental health experiences for high school students can be developed.

7.4 The usual structure of a pre-school community in Australia

With acceptance of the principle that a large part of the educational effort of the dental team should be directed towards pre-school children, a description of the usual structure of the pre-school community in Australia will now be given.

- Child Health Centres

The number of children under 12 months of age attending child health centres (or Well Baby Clinics etc.) approximates the number of live births for that year. In the second year, just over half are still attending. For 2 year old children, the proportion attending is about $\frac{1}{3}$ of the two year old population (Queensland 1974/5) (Tasmania 1973) (Victoria 1974) (Western Australia 1975). These centres are staffed by nurses who have a general nursing background and post-graduate education in child care.

Day Care Centres

At these centres children in the age group 0 - 5 are left in the care of trained child care personnel for most of the day.

Family care centres

In the age group 0 - 5, groups of 4 or 5 children are cared for by a 'family care mother' in her own home. The mothers receive some training in child care, weekly in-service sessions being held in some states. These centres are controlled by a State Department such as a Community Welfare Service.

Playgroups

Most states have playgroups, catering for children in the 0 - 3 age group. They meet weekly in groups of about 25, and are administered by parents rather than by Government.

Kindergartens

Catering for the age group 3 - 5 years (the immediate pre-school year), these centres are known also as pre-school education centres or pre-primary centres. They are staffed by qualified teachers or other specialists in

child care. About one child in 4 attends this type of centre in Australia.

In addition there are usually community health services, whose special responsibility is the health and welfare of disadvantaged people. In the pre-school area, contact is made with mothers who do not attend child health centres. Most of the initial contact is made in the midwifery wards of public hospitals.

All the pre-school child groups mentioned above are examined by School Medical Services.

It can be seen that most pre-school children can be reached through various agencies, some independent, some Government controlled, but all registrable with a Government department. The personnel operating these child care systems should be made aware of their own role in community dental health, and fluoride tablet distribution to pre-school children can be implemented through them as discussed in Chapter 5. The role of these agencies in preventive dentistry will be discussed in more detail in Chapter 10.

Local medical practitioners:

The role of the community medical practitioner in dental health of pre-school children should not be overlooked. The pediatrician is seen by Ripa (1974) and Leske et al (1974) as an effective agent in prevention of caries in children. On the evidence of Kailis (1968) and Prichard (1969) prescription of pre-natal fluoride supplement should be routine in low fluoride areas, and in countries with a National Health Scheme, fluoride tablets should be included as a Pharmaceutical Benefit. (Davies 1973)

8. The diffusion model in health education

Rogers postulated in 1962 that there are five stages in the process of adoption of an idea that is new to the social system.

(1) Awareness - hearing about it, reading about it, seeing it.

(2) Interest - seeking further information.

(3) Evaluation - deciding whether or not it is of value in terms of personal interests, beliefs and values.

(4) Trial.

(5) Adoption as a habit.

Acceptance or rejection can take place at any stage. An individual (or group) may remain at a certain stage for any period of time. The total time element from Step 1 to Step 5 is extremely variable.

Lazarsfeld et al (1948) in a study of election behaviour, introduced the idea of opinion leaders, people who influence the actions of non-opinion leaders. This hypothesis was substantiated in 4 areas of behaviour - marketing, fashion, politics and movie-going by Katz and Lazarsfeld (1955).

The major conclusions generated from these studies were:

(1) Within each social system there are persons (opinion leaders) who influence non-leaders' opinions, attitudes and actions. Mass communication operates at the awareness stage, but interpersonal communication is more effective

in stages 2 and 3.

(2) Opinion leadership varies according to the sphere of activities.

(3) Opinion leaders are exposed and responsible to external communications and thus create a two-stem flow of information from the source to the non-leaders.

(4) Those who initiate change are known as change agents (Rogers and Shoemaker 1971).

The relationship between the opinion leader and those he influences is necessarily one of respect, trust and acceptance, therefore cross cultural differences between opinion leaders and non-leaders should be minimal.

In 1969 Kar explained how he identified local opinion leaders in India by asking formal community leaders to write down the names of people who were respected, and who they thought could influence others in a particular project. He then communicated with these people and used them successfully to persuade a community to participate in a smallpox vaccination programme.

In a discussion of the role of diffusion research in relation to health promotion, Kar (1974) said that the health educators major role was to accelerate the diffusion rate, and therefore an understanding of the process of diffusion was required.

This diffusion model is useful in pointing out that certain individuals play key roles in community decision making. Lazarsfeld's opinion leaders may include some of Dudding and Muhler's (1960) "high credibility sources", and Wild's (1974) "issue influentials". Benne's (1948) "evaluator-critics", Fisher's (1974) "catalysts" and Patersons (1969) "exemplars" are similar influential members of smaller groups. There are many similarities between the diffusion theory and Berlo's (1960) S.M.C.R.E. model of communication.

Change agents are those who consciously set out to bring about change. They may be planners or administrators remote from the scene, or they may be field workers in close contact with the people. Some of the latter may also function as opinion leaders, but many of Lazarsfeld's opinion leaders are not official community figures. They are harder to find but can be identified and utilised by the change agents.

9. Change agents and opinion leaders in dental health education

Four groups which contain the change agents and opinion leaders most important to the community dental health programme will now be identified: Their activities will be described in chapter 10.

9.1 The Child Health Nurse (C.H.N.)

The priority is young mothers and pre-school children, so one of the key personnel is the child health nurse. She usually operates from a fixed centre and sees most babies in the first year of life (chapter 7.4). The tendency in Australia is for increased contact between the child health nurse and the mother/child unit in the first three years of the child's life. Mothers are accustomed to receiving and acting upon this specialist's advice. She occupies a position of respect and trust and is a traditional "high credibility source". It is therefore necessary to ensure that she has adequate knowledge of current preventive dental practices appropriate for children in that community. She should give instructions to mothers on fluoride supplementation,

brushing teeth with fluoride toothpaste, and avoidance of sugary foods. Dummys dipped in honey, jam, and various vitamin syrups are conducive to rampant caries in infants - (Goose and Gittus 1968) (Committee on Medical Aspects of Food Policy 1969). Such habits are extremely difficult to change. The child acquires a liking for the 'dipped' dummy and it is preferable that the habit should not begin. The dental specialist (therapist or dentist) at the school should ensure that she and the child health nurse are giving exactly the same advice to mothers, to avoid any confusion. A district committee can be formed, or simply informal field co-operation can be established, following an agreement by the central health authority that dental health is a priority and that the child health nurse has a major role to play in the new plan to reduce dental disease in children.

The child health nurse should be a familiar visitor at the school and be seen to be part of the community dental health effort. Dental specialists should participate as educators in training and in-service courses for child health nurses. Child health nurses should spend part of their training and in-service courses at dental

therapy schools to become familiar with the dental care of the pre-school child. The growth and development of the child's dentition, dental and oral diseases, diet and child feeding in relation to dental caries could be taught by dental specialists at the Dental Therapy Training Schools. In this way the child health nurse will become familiar with the work of the school dental therapist and the aims of the health authority in relation to dental health of the community.

9.2 Child care specialists

As discussed in chapter 7.4, several other child care specialists are involved in the care of pre-school children in this community. They will be regarded by parents as having varying degrees of credibility in matters concerning child care. Some will fill the role of opinion-leaders, others may be more positively involved as agents of change. They will be involved in dental health in non-fluoridated communities by distribution of fluoride tablets (chapters 5 and 10).

Child care specialists should have correct information about child dental health. The dental health content

of their courses should be similar to that of the child health nurse, tailored to their specific needs. Courses could be held at Dental Therapy Training Schools where they can become familiar with the dental care of pre-school children. The School Dental Therapist should be presented as a new member of the child health care system, with a specific objective of improving child health through improved dental health.

Child care specialists are important in dental health because as substitute mothers for part of the day they can influence the child's dental health behaviour patterns in the formative stages.

9.3 Medical practitioners

The role of medical practitioners in prescription of fluoride tablets has been discussed in chapter 7.4. They play another role in dental health as high credibility agents, and the local dental officer should ensure that the local medical practitioner has correct information about the scheme. The preliminary study of the community should include an assessment of the role

of local medical practitioners in the community's health and social systems. The attitude and knowledge of medical practitioners, particularly in country towns, could have an important influence on the attitude and participation of the community.

9.4 School teachers

Both change agents and opinion leaders will be found in the school teacher population. Information about child dental health and child nutrition should be given during courses of teacher education. Much initial information about the School Dental Service will be given to the community by teachers, formally and informally, so correct information about the objectives of the scheme is vital. They cannot function effectively in the scheme if they do not understand the goals. The activities of teachers as change agents will be discussed in the next section.

10. Activities of change agents

The school dental team should not work in isolation, but rather as specialists in a team comprising other child specialists, health educators and welfare workers who have reduction of dental disease as a common goal. A summary of the activities of the four groups identified in the previous chapter is now given:

Child Health Nurse

Distribution of free fluoride tablets for children where indicated.

Toothbrushing, including plaque disclosing as education for children and mothers, with development of dental health values and attitudes. Use of fluoride toothpasts.

Diet and child feeding advice for parents.

Referral to preventive dental services at age 2.

Immediate referral if oral disease is suspected.

Liaison with dental team in ante-natal and post natal education discussions for parents.

Child Care Specialists

Toothbrushing programmes at child care centres, using

a fluoride toothpaste.

Development of positive dental health values and attitudes.

Referral to preventive dental care at age 2.

Information for parents about preventive dentistry.

Food available at child care centres should help to establish desirable eating patterns in children.

School dental therapist should visit centres regularly, to assist with dental health programmes, and present herself as a person to the children.

Group visits to the school dental centre for familiarization by the children.

Involvement of school dental therapists or dentist in parent educational activities.

Distribution of fluoride supplement when indicated.

Medical practitioners

Referral to preventive dental care at age 2.

Encourage tooth brushing with a fluoride tootpaste.

Discourage cariogenic snacks.

Fluoride dietary supplement were idicated.

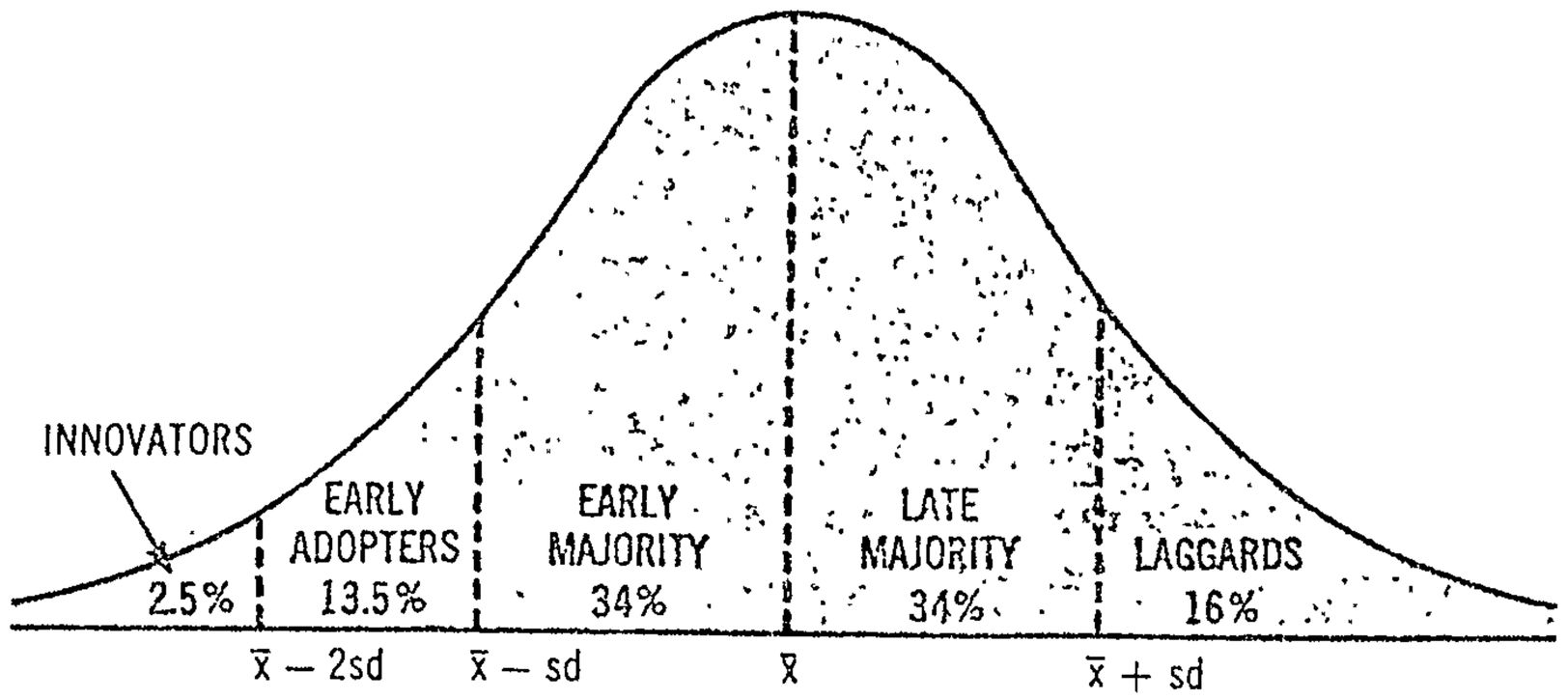
Emphasise the role of oral health in total health of the child. Stadt et al reported in 1963 that at age 3, 98% of children had attended the pediatrician but only

38% had attended the dentist. The pediatrician has a major responsibility to refer the child for preventive dental care. The principle must be promotion of dental health by <u>all</u> health personnel.

School teachers

It was concluded in chapter 7 that little change in established habits occurs in children as a result of school dental helth lessons. However, the important role of the teacher in reinforcement of values and stimulation of activity should not be overlooked. The recommended method is through activity (Davis 1974). It should also be remembered that school children are moving out of the influence of parents into the influence of peers. Therefore some change can be expected in those whose behaviour does not conform to group norms. Rogers' et al (1971) description of the distribution of innovators related to the majority offers a clue for the therapist who is interested in promoting dental health activities through teachers.

Figure 1
Adopter categorization
on the basis of innovativeness.



The innovativeness dimension, as measured by the time at which an individual adopts an innovation or innovations, is continuous. However, this variable may be partitioned into five adopter categories by laying off standard deviations from the average time of adoption.

Rogers reported that adopter distributions follow a bell shaped curve over time and approach normality, as shown in Figure I. This was related to adoption of agricultural innovations in the United States. Opinion leaders enter the adoption process around the - 2sd stage.

If a similar pattern applies to adoption of new ideas by school teachers, it would be good policy to identify the innovators and given them maximum assistance in developing activities to involve children in dental health. The early adopters and others would then follow if they saw the technique as having pertinence and salience for them.

Three studies evaluating "The Toothkeeper" programme (using a special kit for high intensity teaching) in schools were reported in 1975 (Smith) (Stamm) (Graves). In general, no significant difference in behaviour was observed between active and control groups after the programme had been applied. An interesting feature was an improvement in dental health behaviour in the controls. Some of the interest had "rubbed off" onto the controls and these teachers were doing "ad hoc" dental health activities in their own classes. This supports the findings of Gravelle et al in 1967, and suggests that teaching does not need to be highly structured, with films, slides, etc. - just an innovative and interested teacher.

Educators have always aimed at total involvement of the senses in teaching. When a topic is introduced children are encouraged to touch it, see it, smell it, hear it, discuss it. Pavlid commented on the effectiveness of curiosity arousing methods of health education in 1967 and Maddick and Downton described a "finding out" approach to dental health education in 1970.

One activity which can be developed through the school is toothbrushing, but this should be related to home, rather than school, behavioural patterns. Lindhe et al in 1967 reported that supervised school toothbrushing of 13-14 year old children

had a marked effect on gingival health during the 2 year experimental period: 12 months afterwards however, the experimental group had no better gingival health than the controls. The authors' reason was that they had been trained to brush at school: no emphasis had been placed on home care. They suggested there should have been a transition phase during which home care was monitored in an attempt to establish a home behaviour pattern before the experiment was discontinued. This emphasises the necessity to involve parents. Parents should not only be encouraged to call at the dental centre to discuss the child's dental health, but should be personally involved in the programme whenever possible.

It would be good policy to employ a mother as receptionist in the school dental centre. This would help to bridge the gap between the dental centre and other parents. Parents could also assist in supervision of brush-in programmes and in other ways. Employment of community people in community dental programmes was recommended by Gluck et al in 1976.

The best teaching is by example. Teachers and dental therapists should brush their teeth sometimes where children can see them.

Teachers could participate in dental health "workshops" at the Dental Therapy Training Schools or at the School Dental Centres. Progress reports from the dental team should be given at school staff meetings and through the Headmaster, to parents. It was reported that Canadian teachers and school authorities became "quite interested" in promoting child dental health in their schools after being supplied with data about the children's dental health (Canadian Dental Association 1962). It was also stated in this report that intensive dental health education should precede treatment services.

Before concluding this section dealing with the role of the school teacher it should be re-emphasised that dental health behaviour taught at school should not be related solely to school life. School toothbrushing programmes should be related to home behaviour patterns, and children in their last year of School Dental Service should have developed an established home brushing routine with fluoride toothpaste.

The same principle applies to school canteens. Conditioning children to non-cariogenic between meal snacks at school, should be seen as an activity in educating them to choose suitable snacks in the out-of-school environment. Failure to relate these behaviours to the out-of school situation possibly accounts for some of the disappointing results of school dental health education.

The problem occurs again in children who have become accustomed to receiving dental care at school. School dental attendance behaviour must be transferred to a post-school dental care system.

This could be facilitated by organised visits of children to private practices, free first visits after leaving the school scheme, or other schemes depending on local conditions. This area requires early action by organised dentistry, because the problem occurs when the first children leave the school dental service system, one year after its initiation.

Service Organisations

In concluding this section, the role of the community service organizations such as Apex, Rotary and Progress Groups should be mentioned. These groups can play a facilitating role, e.g. practical assistance with a group self application programme, thereby encouraging organised community effort. Their activities vary from community to community. Where they are active, they can be most useful means of organising the community to participate in preventive measures.

11. Planning a school dental health service

In 1974 Baerum pointed out that organised dentistry has an obligation to inform the Government of the best solutions to the dental problems of the community. Winslow's definition of Public Health (1920) emphasises "through organised community effort". This principle is often forgotten when planning community health services. For example a community dental health programme should not be left entirely to dental personnel.

When a School Dental Service is planned, it should be seen by the planners as a broadly based project, in which the many skills of various health and educational specialists will be utilized in a co-ordinated system to achieve the stated goal. All involved health and educational personnel (teachers, child specialists, social workers, medical practitioners etc) should be made aware of the objectives of the scheme, and their role should be explained to them by the leaders of their own organizations. This means that the various top departmental administrators must be involved, as directed by the Government which is introducing the Scheme. When the public health authority agrees to accept a committment to reduce dental disease in the community, the same committment should be accepted by the

Water Supply Authority, Education Authority, Child Welfare Authority and so on, according to the Government's decision to spend public money on this project. The directive should come from the Executive arm of the Government, as a result of a collective decision to act.

A central co-ordinating committee could be established, so that cross-departmental matters such as school distribution of fluoride tablets and school "tuck shops" can all be seen as issues involved in achieving a common goal.

12. The role of the local dental practitioner

This issue is discussed separately because it is seen as being the vital key to the success of the scheme.

Waterman (1956), Friere (1964), McKendrick (1970), and Lindhe et al (1975) have described control of oral disease through prevention and therapy while the child is at school. The behaviour of child and dentist after that will determine

the future dental health of the individual. It was concluded in chapter 4 that annual dental care was required to control periodontal disease. There is much evidence that regular care is not maintained after the child leaves the School Dental Service. In New Zealand, (Beck, 1968) 49% of males and 72% of females in the 19-21 age group were reported to be receiving regular dental care. However, in the same year Burgess and Beck found that 12% of age group 20-29 and 30% of age group 30-39 were edentulous - 46 years after the New Zealand School Dental Service began. In Finland, Ainamo et al (1973) examined a group of young adults 7 years after they had left the School Dental Service where they had received dental care for the 7 years of primary school. He reported that 60% of the teeth filled in the school scheme were either decayed, retreated and redecayed, or missing. Of the teeth that had been root-filled at school, 27% had been extracted. Whatever the standard of school care might have been, it is obvious that caries activity was still high in these young adults, reflecting a low level of preventive care in the post school dental service system.

In South Australia, Roder in 1973 reported that students in second year high school who had been treated by the school dental service for one year 2 years previously, had

similar oral hygiene and dietary practices to the control group, which had no School Dental Service experience. Only about half of them had visited a dentist since leaving the school scheme - less thatn the controls, many of whom had attended for crisis care. In a later study, Roder (1976) reported that only 40% of high school children had visited a dentist since leaving the School Dental Service, compared with 60% of the group with no School Dental Service experience. The comments of Holst (1975) are worthy of note. She examined two groups of grade 7 children, half of whom had received dental care through the Danish School Dental Scheme and half had not. The proportion of children with untreated caries was 4% in the first group and 13% in the second. Caries experience was lower in upper socio-economic classes in both groups, but high in both groups.

She reasoned that the problem was not so much whether they got treatment or not, but to develop a service with special organisational facilities for preventive measures, and so reduce disease. The dentist population ratio in Denmark is 1 - 1,200.

The School Dental Service under discussion could be regarded first as a means of organising to reduce disease in school children and second as a means of organizing community dental health behaviour so that the reduction is maintained. This

implies organised community effort, which includes goal-oriented participation by the local dental practitioner.

It follows that the dental practitioner should be seen by parents, children, school staff etc., as part of the total programme, because the long term objective will not be achieved if children do not continue to obtain dental care and advice on a regular basis when they leave the school scheme. He should be involved in planning from the beginning and should have a formal role in the programme - screening children, participating in clinical procedures, working with teachers, canteen personnel, child care centres, town council on fluoridation ... He therefore requires education in dental public health so that he can co-operate effectively with the rest of the health team. Dentists in unfluoridated developed countries have been conditioned to regard children's dentistry as a series of restorative procedures in caries susceptible teeth-orientation to new concepts is required. The dentist will be a source of information for people about the new scheme and his comments will carry considerable weight. As an opinion leader, his role is to assist the diffusion of innovation, to assist adoption of new school canteen menus, fluoride projects, etc. He is also a formal leader in the community's dental health programme.

The success of the school dental service could be evaluated in terms of the proportion of children who seek preventive care when they leave the school scheme. This behaviour is a measure of the effectiveness of health education, remembering that health education can be defined as the sum total of an individual's health experiences. (Nyswander 1947)

Facilitating utilization of the post-school dental care system

Roder (1973) and Tash et al (1969) commented on the need to remove economic barriers to post school dental service care, and Brown Jr. in 1963 stated that motivation without opportunity for fulfilment is not effective. 20 years after removal of cost barriers in England and Wales regular attendance ranged from 30% to 50% in different regions. (Gray 1970 p.115) Further action to promote regular attendance is required. One method worthy of assessment is examination of high school children, with reports to parents emphasising the need for continuing care. Opportunity to obtain care is then required.

If regular attendance on a voluntary basis cannot be achieved, the community may decide to continue schemes for organised care through high school and on to tertiary educational institutions, and places of employment, as a means of maintaining oral health

and reducing absenteeism through oral ill health.

There is a clear need to remove economic barriers to continuing care. The contract between Australian Dental Plans and the Australian Union of Students Friendly Society in March 1976 appears to be a step in the right direction. Dillon (1976) describes two systems which are being tested in Europe. In Denmark, adolescents who attend for regular incremental care every 9 - 16 months after leaving the School Dental Service pay only 25% of treatment costs.

In Holland, certain children are entitled to free dental care in the first year after leaving the School Dental Service. Eligibility is restricted to those children who can maintain a low caries increment. Straight-out fee for service treatment schemes are expensive and ineffective (Gray et al 1970). It is interesting to note the attempts in Holland and Denmark to build in an incentive system to encourage adolescents to control their own oral disease.

It is the responsibility of organised dentistry to develop schemes to maintain oral health in children after they leave the School Dental Service. One of the problems will be to re-educate a dental profession which has become accustomed to crisis dentistry in techniques of maintaining a high level of oral health in people who have minimal oral disease.

In 1974 Gochman reported that preventive dental encounters in children decreased the levels of health motivation and perceived vulnerability, both of which are psychological correlates useful in predicting preventive behaviour. This points to the need to maintain a psychological state necessary for preventive behaviour in children who have received repeated preventive encounters in a School Dental Service. It also highlights the need for continuing education in applied psychology on the part of the dental health team in both school and post-school systems.

13. The role of the mass media

The mass media have not been widely used in public health education. Their main use has been to give information about facilities such as visits by mobile immunization units. In the educational field, Griffith and Knutson in 1965 pointed out the problem of selective perception. Mass media advertising is directed toward canalizing pre-existing behaviour patterns - persuading a smoker to change his brand, rather than persuading a non-smoker to smoke. A small section of the public can be

influenced - those who are "tuned" to receive the message. Therefore dental health communications should be aimed at mothers of pre-school children and at the children themselves. For example television could be used by having the School Dental Therapist appear on a childrens' show with favourite childrens' characters, to present her as a friendly person in the child's environment. No specific message need be attempted, but regular personalities could refer to dental health occasionally without making a large issue of it. When the compere bids children goodnight, toothbrushing could be mentioned briefly.

Television transmits feelings, rather than facts. For example, presenting a natural dentition as a social asset.

Griffith and Knutson (1960) discussing source credibility, said that characterization of the mass communicator as trustworthy or otherwise had a marked influence on the degree to which recommendations were accepted but little influence on the learning of facts. Dudding and Muhler (1960) reported similarly. Cartwright in 1949 showed that personal solicitation was more effective than mass communication in obtaining a specific response. This ties in with Katz and Lazarsfeld's (1955) idea that opinion leaders received much of their

information of current events through the mass media. Then the two-step flow of information takes place: from source to opinion leaders to other individuals. So the mass media can be useful in getting information to opinion leaders.

Lynton Porter (1962) points out that radio is an excellent medium for transmitting facts. It could be used to inform parents about the school dental facilities (breakfast or evening sessions when both parents are home), or to inform mothers during the day sessions of simple facts, such as "six year old teeth are permanent teeth". Techniques of using local personalities can be effective if the personality holds a position of trust, respect and credibility.

The mass media should be used as part of the health education programme, and experts should be consulted regarding method of presentation and choice of medium.

14. Summary and Conclusions

The immediate goal in community dental health has been defined as

progressive reduction in oral disease. A plan for a community dental health programme, based on a School Dental Service has been outlined.

The priorities are seen in the following order:

(1) Fluoridation, with school fluoridation and/or dietary supplement as alternatives if fluoridation is not feasible.

(2) Intensive fluorotherapy for high caries children - discussion of which was not included in this t esis.

(3) Behaviour modification related to oral hygiene, diet and dental attendance.

(4) Individual clinical treatment and guidance of occlusal development. Emergency treatment for relief of pain, infection, and disfiguring malocclusion should be available at all times.

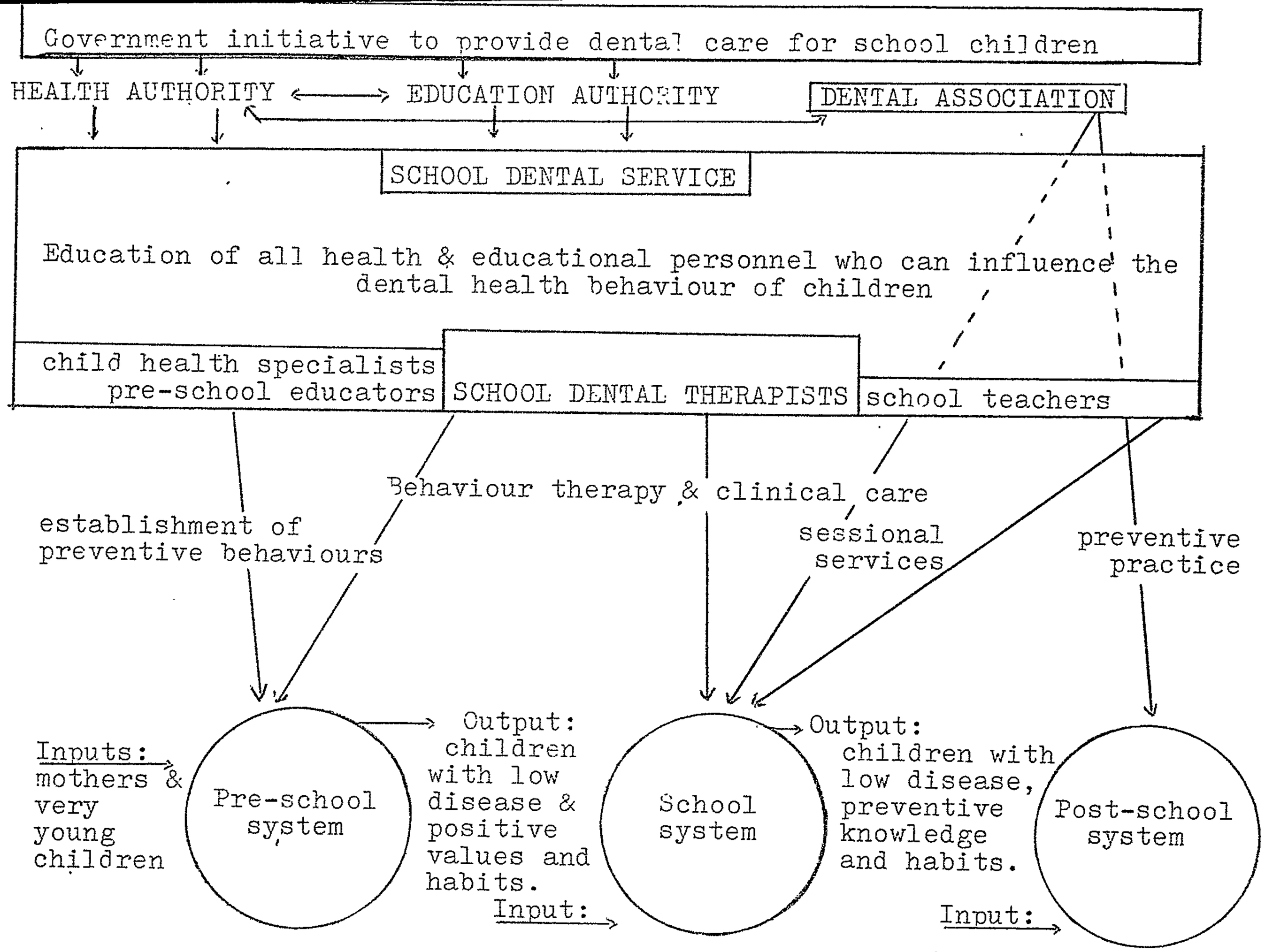
The priority target for behaviour modification is the infant and mother. The need is seen for a planned approach by all health and child care personnel who are in a position to

influence the behaviour of mother and/or child. This should be coordinated by the central health authority. The dental team should study the structure of the pre-school community to develop a plan for reaching each pre-school child and mother. The function of school dental health education is to reinforce and refine positive dental health behaviour. The method is stimulation of interest through involvement of the child in a variety of activities with a dental health theme. High school girls are seen as a primary target because of their future influence on their children. Integration of health services towards a common dental health objective is emphasised. When a community decides, through its Government, to implement a programme to reduce dental disease, all the health, education and welfare authorities should be formally committed (not simply the traditional dental personnel). Interdepartmental participation should be co-ordinated at top political and administrative level so that issues such as school canteens and teacher participation in school fluoride programmes can receive appropriate attention in relation to the overall goals. Knowledge of the community and identification of opinion leaders is necessary for planning.

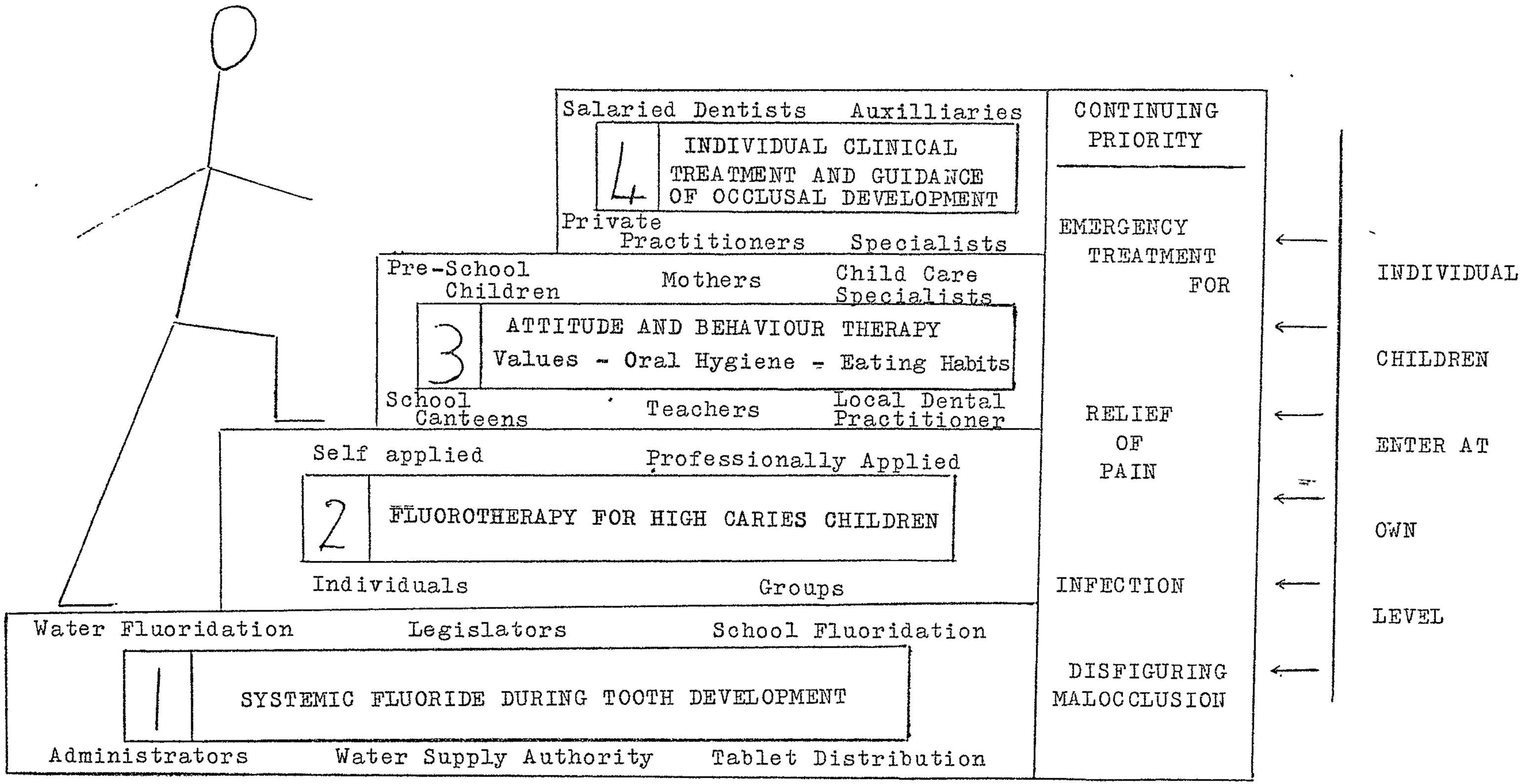
Following the reduction of oral disease in school children the next consideration is maintenance of the low disease rate

throughout life. To achieve this there must be easy passage of adolescents from the school system to another dental care system. To facilitate this there should be planned overlap. For example practitioners who operate in the post-school system should be involved in the school system.

The School Dental Service is seen primarily as a means of organising reduction of oral disease in school children. Investigation is required into means of maintaining regular dental supervision of individuals after they leave the school dental care system.



Intergration of Health and Education agencies in a Dental Health Plan for school children.



PRIORITY STEPS IN A DENTAL HEALTH PLAN FOR SCHOOL CHILDREN

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