THE ROLE OF ORAL HEALTH PROMOTION IN ORAL HEALTH POLICY

A Comparative Analysis of Two European Countries

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Thesis presented for the Degree of Doctor of Philosophy
University of Edinburgh
1992
To Wendy, Laura and Robin

- who had to 'put up with' such a busy mum for so long
## CONTENTS

### CHAPTER 1 INTRODUCTION, AIMS AND OBJECTIVES

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

### CHAPTER 2 REVIEW OF RELEVANT LITERATURE

#### 2.1 DENTAL LITERATURE

| 2.1.1 The Relation between Oral Hygiene and Oral Health | 7 |
| 2.1.2 The Relation between Sugar and Oral Health | 16 |
| 2.1.3 The Relation between Fluoride and Oral Health | 29 |
| 2.1.4 The Role of Visits to the Dentist | 46 |
| 2.1.5 Dental Health Services in Denmark | 63 |
| 2.1.6 Dental Health Services in the UK | 68 |
| 2.1.7 Dental Manpower in Denmark | 79 |
| 2.1.8 Dental Manpower in the UK | 85 |
| 2.1.9 Dental Health, United Kingdom, Scotland and Denmark | 91 |
| 2.1.10 Structure and Organisation of Dental Health Education in Denmark | 111 |
| 2.1.11 Structure and Organisation of Dental Health Education in the United Kingdom | 137 |
| 2.1.12 Comparison of Dental Health Education in the Two Countries in Relation to Sugar, Oral Hygiene, Fluoride and Visits to the Dentist | 151 |

#### 2.2 POLICY LITERATURE: POLICY ANALYSIS AND HEALTH POLICY

| 2.2.1 Defining and Accounting for Policies | 160 |
| 2.2.2 Policy-makers | 173 |
| 2.2.3 Theories of Policy-making | 187 |
| 2.2.4 Political Theories | 194 |
| 2.2.5 Evaluation | 200 |

### CHAPTER 3 MATERIAL AND METHODS

| 207 |

### CHAPTER 4 RESULTS

#### 4.1 ORAL HYGIENE POLICY

| 4.1.1 Oral Hygiene Policy in Denmark | 224 |
| 4.1.2 Oral Hygiene Policy in the UK | 240 |
| 4.1.3 Oral Hygiene Comparison | 256 |

#### 4.2 SUGAR POLICY

| 4.2.1 Sugar Policy in Denmark | 270 |
| 4.2.2 Sugar Policy in the UK | 289 |
| 4.2.3 Sugar Policy Comparison | 307 |
4.3  **FLUORIDE POLICY**  
4.3.1 Fluoride Policy in Denmark  
4.3.2 Fluoride Policy in the UK  
4.3.3 Fluoride Policy Comparison  

4.4  **DENTAL VISIT’S POLICY**  
4.4.1 Dental Visit’s Policy in Denmark  
4.4.2 Dental Visit’s Policy in the UK  
4.4.3 Dental Visit’s Comparison  

CHAPTER 5  **FINAL DISCUSSION AND CONCLUSION**  

APPENDIX I  Children’s Oral Health Care Act  
APPENDIX II  Key Developments in Evaluation 1980-89  
APPENDIX III  Questionnaire Guide for Semi-structured Interviews  

REFERENCES
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Some Sweet-tasting Compounds</td>
<td>24</td>
</tr>
<tr>
<td>2.2</td>
<td>Sugar Substitutes used in most Scandinavian Countries</td>
<td>25</td>
</tr>
<tr>
<td>2.3</td>
<td>Acidogenicity and Cariogenicity of some Sweetening Agents</td>
<td>27</td>
</tr>
<tr>
<td>2.4</td>
<td>Children's Dental Health in Relation to Dental Attendance</td>
<td>51</td>
</tr>
<tr>
<td>2.5</td>
<td>Mean Number of Decayed, Missing and Filled Teeth and DMFT According to 10-11 year old Children's Attendance Pattern</td>
<td>52</td>
</tr>
<tr>
<td>2.6</td>
<td>Distribution of the Numbers of Sound and Untreated Teeth among Dentate Adults in the UK by Dental Attendance Pattern</td>
<td>58</td>
</tr>
<tr>
<td>2.7</td>
<td>The Proportion of Dentate Adults with 18 or more Sound and Untreated Teeth by Dental Attendance Pattern and Age in UK</td>
<td>58</td>
</tr>
<tr>
<td>2.8</td>
<td>Average Number of Missing, Filled and Sound and Untreated Teeth by Change in Dental Attendance Pattern and Age in the UK</td>
<td>59</td>
</tr>
<tr>
<td>2.9</td>
<td>Average Number of Filled Teeth Plus Sound and Untreated Teeth by Change in Dental Attendance Pattern and Age in the UK</td>
<td>60</td>
</tr>
<tr>
<td>2.10</td>
<td>Annual Student Intake at the Royal Dental Colleges in Denmark from 1981 to 1990</td>
<td>81</td>
</tr>
<tr>
<td>2.11</td>
<td>Unemployment among Danish Dentists and the Numbers Working Abroad in 1983, 1986 and 1991</td>
<td>84</td>
</tr>
<tr>
<td>2.12</td>
<td>Declining Caries Experience in 5-year-old Children from the UK During the Period 1973-1989/90</td>
<td>94</td>
</tr>
<tr>
<td>2.13</td>
<td>Declining Caries Experience among 12-year-old Children from Scotland, England and the UK</td>
<td>95</td>
</tr>
<tr>
<td>2.14</td>
<td>Caries Development in the Primary Dentition (def's) in Danish Schoolchildren from Class 1 to Class 6 during the Period from 1972 to 1986</td>
<td>98</td>
</tr>
</tbody>
</table>
2.15 Caries Development in the Permanent Dentition (DMFS) in Danish Schoolchildren from Class 1 to Class 6 during the Period from 1972 to 1986

2.16 Caries Experience (dmft) from 1968 to 1990 in 5-year-old Children, UK, Scotland and Denmark and Care Index Values for Scotland and Denmark

2.17 Caries Experience (DMFT) in 12 year-olds in UK, Scotland and Denmark

2.18 Adults with 21 (UK) or 20 (Denmark) or more Natural Teeth in 1978, and in 1988 in UK and 1981 in Denmark

2.19 Percentage of the Adult Population with Total Tooth Loss in UK and Denmark

2.20 Percentage of Total Tooth Loss in Different Age Groups in Scotland in 1972, 1978 and 1988 and in Denmark in 1981

2.21 A Scheme for Analysing Public Policy

4.1 Nineteen British Experts' Opinions about which Agencies Promote Oral Hygiene Messages to the Public

4.2 Nineteen British Experts' and 38 Danish Experts' Recommendations about which Oral Hygiene Messages the Public Should Receive

4.3 Dental Expenditures as a Percentage of Health Expenditures and Gross Domestic Product and Dentist Population Ratios, 1974-83

4.4 Responses from 19 UK Experts and 38 Danish Experts Regarding Information to the Public on Sugar and Dental Health

4.5 19 UK and 38 Danish Interviewees' Recommendations for the Use of Fluoride

4.6 'Dental Visits' Recommendations from 19 UK Experts and 38 Danish Experts
### LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>The Distribution of Tooth Conditions around the Mouth for Dentate Adults age 16-34 by Dental Attendance Pattern 1988, United Kingdom</td>
</tr>
<tr>
<td>2.2</td>
<td>Caries Experience (defs &amp; DMFS) in Danish First-year Schoolchildren (about 7 years old) from 1972-1986</td>
</tr>
<tr>
<td>2.3</td>
<td>Distribution of Caries Experience in 12-year old Danish Children in the Period from 1978 to 1988 According to 'Zones' of Caries Severity</td>
</tr>
<tr>
<td>2.4</td>
<td>Caries Experience in the Permanent Dentition in 8-year old, 12-year old and 15-year old Danish Children in 1978 and 1988 According to 'Zones' of Caries Severity</td>
</tr>
<tr>
<td>2.5</td>
<td>The Overall Condition of the Teeth of Dentate Adults. Means of Decayed, Filled, Missing and Healthy Teeth in the Respective Age Groups in UK in 1988 and in Denmark in 1981</td>
</tr>
<tr>
<td>2.6</td>
<td>Development and Placement of the First Health Education Body within Danish Central Governmental Administration</td>
</tr>
<tr>
<td>2.7</td>
<td>Policy Analysis, by Type of Activity</td>
</tr>
<tr>
<td>2.8</td>
<td>Power in Policy-making</td>
</tr>
<tr>
<td>2.9</td>
<td>Categorisation of Pressure Groups: The Goal/Strategy Mix</td>
</tr>
<tr>
<td>2.10</td>
<td>Concepts in Evaluation</td>
</tr>
</tbody>
</table>
DECLARATION

This thesis is the sole work of the author, with the exception of the help and guidance from the individuals acknowledged in the text.

Lone Schou
ABSTRACT

The aim of this study was to examine the role of oral health promotion in oral health policy. Oral health promotion was defined as: 'Any action to protect or enhance oral health, including legal, fiscal, educational and social measures'. The study examined such actions within the four policy areas of sugar consumption, oral hygiene, fluoride exposure and visits to a dentist. In order to increase understanding of the application of policy work in dentistry a comparative perspective was taken. Two northern European countries, the United Kingdom and Denmark, were chosen for the analysis as countries with similar patterns of dental disease.

Due to the novelty and complexity of the research area, a rather comprehensive and thorough analysis of existing documents and scientific literature was conducted and presented as part of the thesis. This includes a review of policy literature as well as a comparative analysis of dental health, dental health services, dental manpower and structure and organisation of dental health education in the two countries.

The study population comprised 39 Danish and 19 British experts. The interviews were tape-recorded and comprehensive notes were taken during all interviews. The comparative analysis using Leichter's health policy framework was based on tapes and notes from all 58 interviews and also on information gained from the document and literature analysis.

The results showed differences both between the two countries and between the four policy areas in terms of what the policies were and the way in which they had developed. Despite sugar's
aetiological relation to dental caries, a sugar policy was non-existent in both countries, strongly influenced by the sugar industry and against dental professional advice in the UK, but not particularly against dental professional advice in Denmark. The Danish profession considered sugar consumption of little importance whereas oral hygiene was considered extremely important and supported by various laws and regulations. In the UK oral hygiene was not considered a government policy issue and no strategy for implementation or evaluation had been developed. In both countries the oral hygiene industry was seen not to have influenced formal policies and a mutual benefitting co-operation existed between the industry and the profession.

Water fluoridation had been a policy issue in both countries but with opposite outcomes. In Denmark it has been rejected whereas it has received continuous support from the British government. Despite this only 10% of the UK population are drinking fluoridated water.

Regular dental attendance for children had developed in Denmark according to a well defined policy. During the mid-eighties the recommendations began to change from 'regular attendance' to 'attendance according to need'. In the UK regular attendance had been recommended since the beginning of the dental services in various policy documents but no laws or regulations ensured implementation. Today a much larger proportion of the Danish than the British population are regular dental attenders. In this respect it is relevant to observe that the dentist/population ratio is much higher in Denmark.
In conclusion scientific knowledge and dental professional attitudes had limited influence on policies in both countries although slightly more influence in the Danish community. The forces shaping oral health policies were mainly of a political/economic nature. In Leichter's terminology particularly situational and structural factors appeared to have had an impact on the development of oral health policies.
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I am most grateful for the guidance, the helpful advice and sustained interest of my two supervisors, Professor Philip Sutcliffe, Department of Preventive Dentistry and Dr Alex Robertson, Department of Social Policy and Social Work, University of Edinburgh.

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CHAPTER 1 INTRODUCTION, AIMS AND OBJECTIVES

During the last decade we have witnessed an increased interest in health and health promotion (HP) at several levels (Tones 1986, Whitehead 1989, Nutbeam et al 1990).

At national level, politicians and decision makers have observed a dramatic increase in expenditures for health services without a corresponding decrease in disease prevalences. Health promotion has been suggested as a possible way to reduce health expenditure.

At the same time the general public has shown an increased interest in their own health which again has been reflected in certain changes in the kind of goods now being manufactured. Gradually the production of 'healthy' goods such as foods and drinks with low or no sugar, salt, additives, preservatives etc. have increased. Recent reports and papers have emphasised the importance of lifestyle and behaviour, but also pointed at national health policy as having a facilitatory role or as an obstacle for health promotion (Milio 1981, Ziglio 1985A, Kickbush 1985 and Aaro et al 1986).

Dental health is also strongly influenced by lifestyle, behaviour and health policy. Although prevalences of the two major dental diseases, dental caries and periodontal disease, are still high in most industrialised countries it is generally agreed that both diseases are preventable.

There are four major factors that can influence the development or prevention of, dental caries and periodontal disease, namely sugar intake, oral hygiene, fluoride exposure and visits to the dentist. All of these are dependent on individual behaviour as well as being influenced by health policy.
Numerous studies have examined the individual relationships between oral hygiene, sugar, fluoride and dental visits and oral health. A review of these relationship is presented in 2.1.1, 2.1.2, 2.1.3 and 2.1.4. It is clear that activities aimed at promoting oral health must concentrate on these four areas. Since all four areas are dependent on individual behaviours and lifestyles, dental health education seems an obvious tool and thus has often been suggested as a means to achieve oral health. However, some confusion exists regarding this concept. The term 'health education' can be limited to include only interventions, based on the provision of learning opportunities directed towards achieving change in health risk behaviours or the maintenance of health enhancing behaviours. As the influences on health are many and varied, it should be emphasised as Whitehead (1989) states:

'health education encompasses a broad spectrum of activities not only concerned with personal lifestyle but also with the social and environmental factors which affect health. As such, it is not only focused on the general public, but also on the professions in contact with the public or the local and national policy-makers who can influence the state of the environment and the opportunities for improving health available to the public'.

Health education even as widely defined as here is still just one component of the overall process of health promotion which encompasses actions to protect or enhance health, including legal, fiscal, educational and social measures. Health education is, however, a crucial component because education for health of the individual, the politicians or the professionals themselves is often needed to lay the foundations before the other components can come into play. In the present thesis, oral health promotion is therefore examined, with special attention to the component of oral health education. When the term oral health promotion is used it
is understood as:

'Any action to protect or enhance oral health, including legal, fiscal, educational and social measures'.

The term dental health education will be used when the focus is specifically on educational aspects.

In a recent thorough review of health education in Britain, Whitehead (1989) concludes:

1. There is evidence of growing interest in education for health
2. Despite this increase in activity, the total amount of effort and resources put into education for health is still insignificant. The issue has been and still is of low status and low priority with consequent under-funding and under-resourcing and haphazard implementation
3. There are large variations in the quality of educational efforts, but significant advances have been made in recent years
4. Despite new knowledge on methods, ineffective or even counter-productive strategies are still being used
5. The lack of knowledge and understanding of previous successes and failures of educational efforts has led to unrealistic expectations of what each method can achieve
6. The balance of activity on different health issues has been very uneven - the majority of policies and initiatives have been concerned
with individual lifestyles aimed at reducing conventional risk factors by changing the behaviour of members of the general public. There has been (a) a neglect of education concerned with social and environmental influences on health and (b) a relative neglect of education directed at local and national policy-makers.

7. There is a lack of co-ordination and advisory systems to support the coherent development of health education throughout the country and a lack of recognition that educational policy is only one facet of health promotion policy which should encompass additional legal, fiscal and social measures.

In her final recommendations, Whitehead concludes:

'Above all, there is a need for a coherent and comprehensive national policy for health promotion - health education would form an integral part of this broader policy'.

Whitehead is clearly referring to general health not oral health. No such scrutiny has been carried out in the field of oral health. In fact most literature in the dental field relating to oral health education and promotion has concentrated on isolated intervention studies, frequently not building on any theories or models of behavioural change. Moreover few studies have described organisation or structure of oral health education (Schou 1981) and no studies known to the author have linked oral health promotion to oral health policy.

This thesis, exploratory in nature, examines the role of oral health promotion in oral health policy. Due to the novelty and
complexity of this issue a comprehensive and thorough analysis of existing documents and scientific literature was necessary. Chapter 2 thus describes the results of this analysis. Obviously a number of 'dental' issues were of relevance to the formation of policies such as organisation of dental health services, dental manpower, dental health and structure and organisation of dental health education. Perhaps less obvious but equally necessary was the inclusion of an overall review of policy literature. Chapter 2.2 thus describes definitions of policies and policy-makers as well as some of the most commonly used theories of policy making and theories of explaining policies. In order to increase the understanding of the application of policy work in the area of dentistry a comparative perspective was taken. Two northern European countries, the United Kingdom and Denmark were chosen as countries with similar patterns of dental diseases, and as examples of countries with a drastically declining pattern of dental decay over the last decade.

The overall aim of the thesis was to examine the role of oral health promotion in oral health policy.

The research objectives were:

1. To describe developments and organisation of Dental Health Education in each country
2. To compare and contrast Dental Health Education in the two countries in relation to sugar, oral hygiene, fluoride and dental attendance policies
3. To compare and contrast the two countries in terms of the scope of oral health promotion in oral health policy
4. To analyse and explain, by specifically examining the structures and processes of dental health related decision making, why differences in the role of oral health promotion in oral health policy exists between the two countries.
CHAPTER 2 REVIEW OF RELEVANT LITERATURE

2.1 DENTAL LITERATURE

2.1.1 The Relation between Oral Hygiene and Oral Health

It is well-known that oral hygiene has been an essential part of most efforts to maintain oral health and prevent dental disease. It is recognised that oral hygiene practices are directed at the elimination of pathogenic products of dental bacterial plaque, and that the major plaque-associated oral diseases are periodontal disease and dental caries. In reviewing the literature on the role of oral hygiene in the development of caries and periodontal disease, one difference becomes immediately evident. Largely, agreement exists regarding the role of oral hygiene in periodontal disease, whereas disagreements exist regarding oral hygiene and caries. Consequently the scientific basis for the recommendations related to each of these two diseases is presented separately.

Oral Hygiene and Periodontal Disease

The evidence linking oral hygiene and periodontal disease stems from many sources, all of which show a direct relationship namely that effective plaque removal prevents gingivitis and periodontal disease. The relationship is of an aetiological nature. The role of bacteria in the aetiology of gingivitis and periodontitis is well established on the basis of findings in epidemiological studies (Löe 1963). The direct cause and effect relationship between bacteria and gingivitis was demonstrated by Löe et al in 1965. They showed that the withdrawal of oral hygiene measures resulted in plaque accumulation and the development of gingivitis within a three week period in young adults. They further showed that the gingival tissue healed within a few days when an effective oral hygiene was resumed. These results have
later been reproduced in other study populations and in older individuals (Friedman and Clinkhammer 1971, Holm-Pedersen et al 1975).

The beneficial effects of a high standard of oral cleanliness has also been demonstrated in schoolchildren (Hamp and Johansson 1982), in young men (Lightner et al 1971), in adult employees (Lovdal et al 1961, Soderholm 1979 and Suomi et al 1971), in regular dental patients (Axelsson and Lindhe 1981A) and in patients treated for moderate or advanced periodontitis (Badersten et al 1981, Philstrom et al 1983, Ramfjord et al 1973 and Westfelt et al 1983). The beneficial effects of a high standard of oral cleanliness are thus beyond question. What is debated is the means and methods to achieve such high standards on a population basis. The role of mechanical oral hygiene practices in the control of periodontal disease has been addressed in many previous workshops, e.g. at Ann Arbor in 1966 (Greene 1966), Malmo (Bergenholtz 1972), Chicago (Sheiham 1977B) and Santa Monica (Schmid 1981). More recently Frandsen (1986) has reviewed the state-of-the-science of oral hygiene practices taking into account conclusions from all of these workshops, as well as results from previous reviews. The following summarises his main findings and includes data which have appeared subsequently. It is appropriate to consider oral hygiene practices by the individual, separate from professionally administered oral hygiene procedures.

Mechanical oral hygiene practices by the individual

Toothbrushing is by far the most widely used form of oral hygiene, performed daily by around 80-90% of the population in most industrialised countries. The effectiveness of toothbrushing is dependent upon a number of factors, including the design of
toothbrushes, the type of dentifrice used, and probably most important, the method and frequency with which the person uses the brush.

According to Frandsen (1986) no scientific evidence yet exists which indicates that one specific toothbrush type and design is superior in removing plaque. As pointed out at several of the previously mentioned workshops and repeated by Frandsen (1986) and Glavind and Nyvad (1986), the toothbrushes that are available are satisfactory aids to personal oral hygiene practices, provided that the persons using them are properly motivated and instructed. Frandsen (1986) states:

'If performance fails, it is more likely that improvements will occur by altering the conditions which determine the use of toothbrush rather than changing the toothbrush itself'.

Similar conclusions have been found regarding the brushing method. No method has been found to be clearly superior to any other and low research priority has been given to this area in recent years. The reason for this is that researchers have realised that improvement in oral hygiene is not as dependent upon the development of better brushing methods as upon improved performance by the persons using any of the accepted methods (Frandsen 1986, Glavind and Nyvad 1986).

A number of studies have examined the relation between frequency of brushing and oral hygiene and gingival health. Although these studies show a trend towards better oral hygiene and better gingival health amongst frequent brushers (Berenie et al 1973, Ainamo and Parviainen 1979, Anagnov-Varelizides et al 1982, Addy et al 1990), the optimal frequency cannot be substantiated by scientific research (Sheiham 1977, Greene 1966, Frandsen 1986).
Clearly the effectiveness in terms of plaque removal is more important than the frequency.

Generally, toothbrushing is most effective on the buccal and lingual surfaces (Conroy 1965, Bergenholtz et al 1969, Hansen and Gjermo 1971). Therefore it has been recommended that toothbrushing is supplemented with aids designed for interproximal cleaning. The most common available aids are dental floss, toothpicks, the interspace brush and the interdental brush. Conflicting evidence exists regarding the effectiveness of these aids (for a detailed review see Glavind and Nyvad 1986 and Frandsen 1986) and no scientifically based recommendations of one practice being superior to another can be made. It is clear though that the effectiveness of these different aids is influenced by local conditions such as the wideness of the interdental space, the shape of gingival papillae and the morphology of the teeth as well as of individual preferences and habits. Some concern has been expressed regarding the use of floss by children. Frandsen (1986) and Sheiham (1986) directly states:

'Daily use of floss by children with healthy gingiva can be damaging'.

Professionally administered mechanical oral hygiene procedures

In principle professionally administered mechanical oral hygiene procedures have two different purposes. One is to perform these procedures for the patients. The other is to enable people to do it themselves. Often these purposes are combined so that when a professional administers oral hygiene procedures for a patient she at the same time makes it easier for patients to perform effective oral hygiene procedures themselves. However, there exists considerable doubt regarding the effect of some of these professionally administered procedures on the gingival and
periodontal health. Frandsen (1986) states:

- 'scaling and oral hygiene instruction did not markedly affect the gain or loss of attachment'
- 'there was some doubt about the usefulness of removing calculus'
- 'the importance of root roughness in relation to plaque accumulation was questioned'
- 'no evidence that removal of plaque at intervals longer than four weeks was of significant therapeutic benefit'
- 'polishing is of questionable value'
- 'little experimental evidence that total calculus removal is essential to periodontal health'
- 'no studies have been found to demonstrate the additional benefits of root planing as compared to removal of calculus and overhangs'
- 'the role of root planing in preventing reinfection of the subgingival area is not well documented'
- 'the value of routine professional polishing, performed two to four times a year, is questionable as a plaque control measure'.

In addition to the problems relating to the effect of these procedures, practical problems exist. Scaling and root planing is a tedious procedure and can be extremely time-consuming. Furthermore, in many studies of the effect of non-surgical periodontal therapy, it is implicit that appropriate instruments and optimal operator dexterity are available. It may be questioned to what extent similar conditions are available 'outside' in dental practices where dental care is carried out under conditions where 'time is money'.

Despite all these doubts, very frequent and thorough professional toothcleaning has been shown to produce a dramatic reduction in dental disease among children and adults (Axelsson et al 1976, Paulsen et al 1976, Axelsson and Lindhe 1977, Hamp et al
1978, Axelsson and Lindhe 1981B). Although various intervals have been tested, there still exists disagreement as to what the optimal frequency should be. There is no scientific background for recommending professional cleaning of teeth at six month intervals. It is further questionable whether these intensive programmes can or should be implemented on a population basis.

The crucial question is whether the populations at large are as susceptible to periodontal disease as the study groups in the above investigations. The prevalence of destructive periodontal diseases is lower than previously estimated and is declining. There is a consensus that severe periodontal disease occurs in a few teeth, in a relatively small proportion of people in any given age cohort. Furthermore, although gingivitis is common it does not necessarily progress to periodontitis. If progression and destruction occur it may be characterised by acute episodes of bursts and remissions interspersed with periods of repair. The average rate of progression is very slow (Page 1986, Hunt 1988, Johnson et al 1988, Burt 1988A, Burt 1988B, Griffiths et al 1988, Sheiham 1988, Oliver et al 1989, Papapanou et al 1989 and Pilot 1989). In conclusion it appears that professional oral hygiene procedures are indicated to a much lesser extent than previously thought. The role of professionals is primarily to identify high risk individuals and enable these patients to restore and maintain periodontal health. It should be noted in this relation that effective methods to identify high risk periodontal patients are not yet available.

Oral Hygiene and Dental Caries

Numerous studies have examined the relationship between oral hygiene and dental caries. Several well-known and experienced
researchers have previously reviewed all these studies. Rather than attempting to produce yet another review of the state of the art it has been chosen to summarise the main conclusions of some of the more recent reviews.

In his review Sutcliffe (1989) divides studies of this relationship into four different approaches: point prevalence surveys of total caries experience and oral cleanliness; longitudinal retrospective studies of oral cleanliness and increments in caries experience; reported toothbrushing frequency and total caries experience; and finally prospective studies of improved oral cleanliness and increments in caries experience. The rather thorough analysis of the results from these studies including emphasis on explaining weaknesses and strengths of the different types of study leads the author to conclude:

'there is no unequivocal evidence that good oral cleanliness reduces caries experience, nor is there sufficient evidence to condemn the value of good oral cleanliness as a caries preventive'.

In contrast to this Axelsson (1981) concluded:

'proper plaque control measures are highly effective in the prevention of caries as well as periodontitis. It is important, however, to realise that toothbrushing is not synonymous with proper toothcleaning. A proper plaque control program includes measures which remove plaque on all tooth surfaces'.

In line with Axelsson, but also to some extent based on the 'Karlstad' studies developed by Axelsson, Koch, Arneberg and Thylstrup (1986) state:

'regular professional plaque control is able to reduce caries progression by almost 100% in populations. In contrast, self-performed plaque control on a group basis gives rise to reductions in caries progression varying from 0 to 50%'.


It is characteristic that the two latter quotes stem from Scandinavian authors whereas the first quote was from a British author. Although Sutcliffe's review was confined to fluoride-free toothpastes and Axelsson and Koch et al did not make such distinction, this factor alone does not explain the different conclusions. There appears to be a difference in the beliefs of the role of oral hygiene in dental caries. British authors tend to believe that there is no evidence that oral hygiene in itself prevents caries whereas Scandinavian authors strongly believe there is. Koch et al's conclusion clearly shows this difference:

'Most important is that even though numerous studies have demonstrated that dental caries cannot develop without the presence of microbial accumulations, several more recent reviewers still regard toothbrushing and plaque removal as measures to control periodontal diseases only. This common, yet incorrect belief is, however, understandable in the light of the fast recovery of the inflammatory gingival tissue to plaque removal in contrast to the much slower reaction of diseased enamel tissue'.

It could be argued that this discussion is of more academic than public health interest; even though the British experts appear not to believe in toothbrushing in itself, they still recommend toothbrushing because of the effect of fluoride toothpaste which is nearly always used. The different beliefs however may have some implications for policies chosen in relation to oral hygiene, dental health services, the role of dental professionals and dental attendance. This will be revealed in Chapters 4 and 5.

In conclusion, the relation between oral hygiene and oral health can be summarised as follows:

1. Effective plaque removal prevents gingivitis and periodontal disease
2. In contrast to the British, Scandinavians (in general) find scientific evidence that good oral cleanliness prevents dental caries.

3. Agreement exists on the caries preventive effect of toothbrushing with a fluoride-containing toothpaste.

4. There is no scientific evidence that one specific toothbrush design or one brushing method is superior to others.

5. There is no scientific evidence for any optimal frequency of oral hygiene procedures performed by the individual or administered by professionals, although it has been demonstrated that very frequent and thorough plaque removal will prevent caries and periodontal disease.

6. The time and resources needed for professionally administered therapeutic and supportive programmes make it highly questionable whether such programmes can be implemented on a population basis.

7. Existing and available oral hygiene brushes and aids are sufficient to enable well-motivated and instructed people to maintain a functional, natural dentition to a high age. Only a minority of the population, the high risk group, will need additional professional help. Effective methods to identify high risk groups are not yet available.
2.1.2 The Relation between Sugar and Oral Health

Diet and Dental Caries

Numerous studies have demonstrated a clear relation between diet, or more specifically sugar and dental decay. The evidence derives from different sources - history, epidemiology, human clinical studies, animal experiments, plaque pH studies and laboratory experiments.

The following only briefly summarises the main evidence including the most important factors related to diet and dental decay such as frequency of intake, total amount of sugar, protective factors, oral clearance time and sugar substitutes.

Basically there are two ways in which the diet effects the development of dental decay. It can either be systemic (while the teeth are forming and before their eruption) also called pre-eruptive, or it can be locally (in the mouth after the teeth have erupted) also called post-eruptive. Although the local effect is considered by far the most important, both effects - local and systemic, will be described for a fuller understanding of the relationship between diet and dental caries.

Systemic/pre-eruptive Effect

The relationship between nutritional deficiencies and caries susceptibility has been extensively studied in animal experiments (Navio, 1970). Also studies involving human beings have been reported although most of these are 20 to 60 years old. A more comprehensive description of some of these studies are given by Rugg-Gunn (1983).

The major conclusions of pre-eruptive effect from these studies are:
although some animal experiments show an increase in caries from deficient diets, there is a lack of adequate confirmation that deficient diets (i.e. protein malnutrition) influences caries in humans

- the influence of Ca, P, Ca/P ratio, of vitamins and sugar is uncertain, even after many years research, but their effect is unlikely to be great and furthermore teeth, and specifically enamel, seems to react far less than the other calcified tissues in the body.

Local/post-eruptive effect

Historical

The history of caries can be fairly accurately determined because carious lesions may be recognised in teeth from skulls which have been buried for thousands of years (Corbett and Moore 1976, Hardwick 1960). Pedersen (1971) described caries-free skulls from eskimos dating from before contact with white people. This Arctic population lived almost exclusively on protein and fat acquired by hunting and fishing. Studies of skulls of early man found in many parts of the world and dating back even to hominoids living in South Africa 500,000 years ago, have shown very low caries prevalence which is distributed differently on the tooth surfaces than in modern man. In material from the earliest agricultural societies only 2-4% of the teeth preserved were carious (Theilade et al 1986).

Until the 17th and 18th centuries caries prevalence was extremely low and the diet was rich in meat and fish. Honey was the only sweetening agent, as sugar was unknown. In the 17th and
18th centuries marked increase in the total caries experience (i.e. DMFT) occurred, coincident with the first consumption of cane sugar and refined flour. These new products were expensive at first and used mainly by the upper classes. At this time Queen Elizabeth of England and Queen Mary of Scotland, were well known for their black teeth and frequent toothaches. As sugar consumption gradually increased through the next centuries so did caries prevalence. Particularly in the 19th century where new laws reduced the sugar price dramatically a similar increase in caries prevalence was seen.

In conclusion historical evidence has shown caries thousands of years back but at an extremely low prevalence. It has further shown a dramatic increase in caries prevalences which closely followed the introduction and increased consumption of sugar.

Epidemiological studies

Although epidemiological studies merely shows relationships between different factors and not causal relationships it is striking how strongly and clearly sugar has been related to dental decay in numerous epidemiological studies throughout the world.

In populations with relatively primitive ways of living and a diet mainly based on local products and low on sugar, caries prevalences are also low. The more 'civilised' the diet with high sugar content and many 'ready to eat' sweet snacks the more caries prevalence increases. For a detailed review of these studies the reader is referred to Rugg-Gunn 1983. Only examples of the most important and well known studies will be mentioned here. Marthaler (1978) compared annual sugar consumption per capita with DMFT for 11-12 year olds in 19 countries in 1959. A close relation between sugar consumption and caries was found. Numerous studies have
shown that Eskimos living on their natural diet have low caries experience (Bang and Kristoffersen 1972). Several studies from Sudan and Ethiopia (Emalie 1966, Olsson 1978/79) shows increased caries with increased sugar consumption, but also significantly higher caries experience in persons using sugar in tea and coffee. Also studies from Ghana and Nigeria (MacGregor 1963, Sheiham 1967) shows increased caries levels with increased sugar consumption.

Also Hopewood House (famous in dentistry) has to be mentioned. It was a home in rural New South Wales, Australia, where children of low socio-economic background entered the home soon after birth and remained under close supervision until about 12 years of age. The diet could be classed as lacto-vegetarian and sugar and white-flour were virtually absent from the diet. On the other hand their fluoride intake was estimated to be low and oral hygiene measures were virtually absent. Until the age of 12 years, caries prevalence was much lower than in children from Australian State Schools but increased in the Hopewood House children after 12 years of age to become the same as observed in children from state schools (Harris 1963, Marthaler 1967). This indicates that the diet received up to 12 years did not offer any protection from caries development in subsequent years. Also in Australia a statistically significant lower caries increment has been shown in schools not selling sweets (Fanning et al 1969, Roder 1973).

During the Second World War a number of countries changed their diet in a characteristic way. Sugar and sweet snacks were reduced dramatically, whereas the consumption of vegetables, potatoes, rice and bread was increased. Reductions of up to 80% in caries prevalence were observed in Scandinavia (Toverud 1957), in several European countries (Sognnaes 1948) and in Japan (Takeuchi

Groups of people with particularly low or high sugar consumption

Several retrospective studies have been carried out on people who for various reasons are on a restricted diet. Thus persons suffering from diabetes have been reported having less caries than comparable healthy people (Matsson and Koch 1975). Hereditary fructose intolerance patients are unable to eat fructose and suchrose but can eat starch. Several studies (Mathaler 1967, Newbrun et al 1980) have shown that more than half of such patients are caries-free and the rest as having a very low prevalence of caries in pits and fissures only.

Studies on groups of people who consume sugar more or more frequently have also demonstrated the clear relation between sugar and caries. For example Anaise (1978 and 1980) and Katayama et al (1979) found a higher caries experience in confectionery workers compared with workers in other industries. Children with long-term frequent intake of suchrose sweetened medicine have also been reported to have much higher caries experience than control children (Roberts and Roberts 1979).

Cross-sectional epidemiological studies which relate caries prevalence to the consumption of sugar and confectionery as revealed by dietary interviews on questionnaire methods are numerous (Rugg-Gunn, review 1983). The results seem somehow conflicting but this could be explained by the fact that nearly all the studies tried to relate caries experience at one point in time to sugar or confectionery consumption at the same point in time or, at the most, over the previous three to seven days. Obviously the caries experience is then an accumulated measure from the individual tooth eruption time representing a time period where the
sugar consumption might have varied considerably.

Experimental human studies

The most famous single study ever carried out on the subject of sugar and dental caries was the Swedish 'Vipeholm study' (Gustaffson et al 1954). Over the period from 1946 to 1951 a total of 436 mentally handicapped adults' sugar consumption was controlled and recorded. The purpose of the study was to examine how caries activity is influenced by: (a) the ingestion at meals of refined sugar with only a slight tendency to be retained in the mouth (non-sticky form); (b) by ingestion at meals of sugar with a strong tendency to be retained in the mouth (sticky form); and (c) by the ingestion between meals of sugar with a strong tendency to be retained in the mouth (sticky form).

The study population was divided into different groups, one group for instance being 'fed' 24 toffees a day. Obviously for many reasons the main one being ethical, no such study design has ever been repeated since. Despite some design and methodological problems and criticisms particularly from The Cocoa, Chocolate and Confectionary Alliance (1974, 1979, 1986A) the main conclusions remain:

1. Consumption of sugar is associated with only a small increase in caries increment if the sugar is taken up to four times a day at meals and none between meals.
2. Consumption of sugar between meals is associated with a marked increase in caries increment.

Individual variations were large which may in part be due to the fact that the patients were adults. On the other hand the very
poor oral hygiene could be expected to increase the cariogenic effect of the diet. When the sugar regiments were withdrawn the caries increase dropped to the low pre-experimental level.

In order to study the effect of substitution of sucrose in a normal diet with fructose or xylitol a study of 115 adults were carried out in Turku in the period from 1972 to 1974 (Scheinin and Makinen 1975). Analysis of the results showed xylitol to be non-cariogenic and both fructose and sucrose to be cariogenic.

Instead of enamel demineralisation several caries related parameters may be studied in short-term human studies. Consumption of tests products may be examined in terms of ingestion time, oral clearance time and the effect on salivary flow rate (Edgar et al 1975). Any conclusions from such indirect methods should, however, be drawn with great care.

Animal experiments

Animal experiments concerning sugar (and starch) have mainly been carried out using rats but hamsters, mice and monkeys have also been used. Although such experiments can be very useful for the understanding of sugar and dental caries in humans one has to be careful not to draw too strong conclusions. Several differences are important in this respect. Firstly the oral microflora in animals is different from that in humans. Secondly tooth anatomy, enamel composition as well as the properties of saliva are different. Finally, the animals have been superinfected with streptococcus mutans in many experiments. However, animal experiments have shown the importance of the local effect of sugar in the mouth (Kite et al 1950), the importance of frequency of feeding (Konig et al 1968, 1969) and the importance of concentration of sugar (Huxley 1971, 1977, Hefti and Schmid 1979).
Plaque pH studies

Formation of acid from various food items by glycolytic activity of oral plaque bacteria results in a pH fall at the tooth surface. The basic principle for plaque pH experiments is that a low pH value will cause demineralisation of the tooth surface and that the risk of caries increases with decreasing plaque pH and with the duration of low pH. It has to be emphasised that it is acidogenicity and not cariogenicity which is being measured. It is also important to realise that besides the properties of the test product, individual factors also influence plaque pH, such as quantity and composition of plaque, secretion rate and buffering capacity of the saliva and oral clearance time. Thus products causing an extensive fall in plaque pH below the critical value of approximately 5.7 are acidogenic and have a caries-inducing potential, which does not mean that these products necessarily will produce caries.

On the other hand non-acidogenic products are unlikely to be cariogenic. Already in 1969 the Swiss Office of Health introduced the food label "safe for teeth" for non-acidogenic products. The method used in Switzerland is known as intra-oral plaque pH telemetry (Muhlemann 1969, Graf 1970, Imfeld 1977). A number of snack foods have been ranked by plaque pH experiments. Edgar et al (1975) ranked 54 American snacked foods and found boiled sweets to reach the lowest pH. Rugg-Gunn et al (1978) ranked 22 British snacks and again found that boiled sweets gave the lowest pH value.

Relative cariogenicity and regulations of sweetening agents

Table 2.1 lists the most commonly used of the many sweet-tasting compounds. Sweetness relative to sucrose varies widely and some of the compounds are not thermostable and are destroyed in
food manufacture. The list of those permitted for use in foods varies from country to country.

**TABLE 2.1 Some Sweet-tasting Compounds**

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Approx. sweetness relative to sucrose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sugars</strong></td>
<td></td>
</tr>
<tr>
<td>Glucose</td>
<td>0.7</td>
</tr>
<tr>
<td>Fructose</td>
<td>1.2</td>
</tr>
<tr>
<td>Sorbose</td>
<td>0.9</td>
</tr>
<tr>
<td>Sucrose</td>
<td>1.0</td>
</tr>
<tr>
<td>Lactose</td>
<td>0.3</td>
</tr>
<tr>
<td>Maltose</td>
<td>0.4</td>
</tr>
<tr>
<td>Glucosylsucrose*</td>
<td>-</td>
</tr>
<tr>
<td>Maltosylsucrose*</td>
<td>-</td>
</tr>
<tr>
<td>Trichlorosucrose*</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Sugar alcohols</strong></td>
<td></td>
</tr>
<tr>
<td>Xylitol</td>
<td>1.0</td>
</tr>
<tr>
<td>Sorbitol</td>
<td>0.5</td>
</tr>
<tr>
<td>Mannitol</td>
<td>0.7</td>
</tr>
<tr>
<td>Maltitol</td>
<td>0.75</td>
</tr>
<tr>
<td><strong>Complex</strong></td>
<td></td>
</tr>
<tr>
<td>'Lycasin'*</td>
<td>-</td>
</tr>
<tr>
<td>'Palatinit'*</td>
<td>-</td>
</tr>
<tr>
<td>Hydrogenated glucose syrup*</td>
<td>0.75</td>
</tr>
<tr>
<td>Isomalt*</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Dipeptide</strong></td>
<td></td>
</tr>
<tr>
<td>Aspartame*</td>
<td>180</td>
</tr>
<tr>
<td><strong>Polypeptides</strong></td>
<td></td>
</tr>
<tr>
<td>Monellin</td>
<td>3000</td>
</tr>
<tr>
<td>Thaumatin</td>
<td>4000</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
</tr>
<tr>
<td>Saccharin*</td>
<td>500</td>
</tr>
<tr>
<td>Cyclamate*</td>
<td>50</td>
</tr>
<tr>
<td>Acesulfame potassium*</td>
<td>130</td>
</tr>
<tr>
<td>Glycyrrhizin</td>
<td>50</td>
</tr>
</tbody>
</table>

* not naturally occurring

Source: Drucker 1979
TABLE 2.2  Sugar Substitutes used in most Scandinavian Countries

NON-CALORIC SWEETNERS

Aspartame  
Cyclamate  
Saccharin

CALORIC SWEETENERS

Sugars  
Fructose  
Glucose  
Lactose  
Invert sugar  
Glucose syrup (corn syrup)  
(High fructose corn syrup)(1)

Sugar alcohols  
Lycasin  
(Mannitol)(2)  
Sorbitol  
Xylitol

(1) Used mainly in United States  
(2) Only used in a few products

Source: Theilade et al 1986

In the UK permitted natural sugars are glucose, fructose, sucrose, lactase and maltose. Permitted as 'bulk sweeteners' are sorbitol, mannitol, hydrogenated glucose syrup, isomalt, and xylitol and lactital. The revised list of permitted sweeteners (Ministry of Agriculture, Fisheries and Food 1982) also recommended that three 'intense sweeteners' be permitted: acesulfame potassium, aspartame and saccharin where previously only saccharin was allowed. Although the Committee on Toxicity of chemicals in food, Consumer Products and the Environment (COT) recommended that cyclamates be restored to the permitted list, this recommendation was not accepted by the Food Additives and Contaminants Committee, and cyclamates are thus not permitted for use in foods and drinks in the United Kingdom.

Table 2.2 shows the sugar substitutes used in most Scandinavian countries. Among the non-caloric sweeteners cyclamate
and saccharin are most common, aspartame (Nutra sweet) is only recently being permitted for use in beverages in Sweden and Denmark. None of these non-caloric sweeteners can be metabolised to acids by the oral micro-organisms - so from a dental caries point of view they are not harmful. However, their widespread use is limited by disadvantages such as instability and lack of volume. Some countries (UK) also have limitations for their use for toxicological reasons. Among the sugar alcohols sorbitol is the most commonly used in Scandinavia. It is far less cariogenic than sucrose and is considered "safe for teeth" in Switzerland.

For a summary of acidogenicity and cariogenicity see Table 2.3.

The possibilities of removing sugar from certain dietary items so as to reduce the threat to dental health has recently been discussed by international experts at a symposium held in Newcastle. The publication from the proceedings (Rugg-Gunn 1991) provides an excellent source of reference on issues such as physicochemical properties and applications of Sugarless Sweeteners, Metabolism and Tolerance of Sugarless Sweeteners and EC Regulations on Sugars and Sweeteners.
## TABLE 2.3 Acidogenicity and Cariogenicity of some Sweetening Agents

<table>
<thead>
<tr>
<th></th>
<th>Acidogenicity</th>
<th>Cariogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>glucose, fructose,</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>sucrose, lactose,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>maltose, invert sugar,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>glucose syrup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar alcohols</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(adaptation possible)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xylitol, sorbitol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mannitol, malitol</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>lycasin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-caloric sweeteners</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Aspartame, cyclamate</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>saccharin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Summary

As mentioned in the beginning of this chapter the evidence of the role of sugar in human dental decay comes from numerous sources. In a thorough review of existing evidence Rugg-Gunn (1983) summarises as follows;

"...

1. In the development of dental caries, the influence of diet is much more important after a tooth has erupted into the mouth than any dietary influence on the forming tooth before its eruption. Sugar would appear to be the most important dietary item in caries aetiology and its presence around plaque-covered tooth surfaces essential for more than very limited caries development. Starch-containing foods, especially if cooked, can cause some caries

2. Some sugars would appear to be more cariogenic than others. Sucrose is likely to be the most cariogenic sugar, although a diet containing both glucose and fructose may be of comparable cariogenicity. Fructose alone is likely to be less cariogenic and lactose and the remaining
common mono- and disaccharides even less so. The sugar alcohols (sorbitol, mannitol, maltitol, and xylitol) or other sugar compounds (e.g. chlorosucrose, glucosylsucrose, sorbose) are non-cariogenic or virtually so.

3. The frequency of sugar intake would appear to be a much more important dietary variable than the total quantity of sugar eaten. However, frequency of eating sugar and total quantity of sugar consumed are probably closely correlated in many epidemiological surveys, so that as sugar becomes available to a population both total quantity of sugar eaten increases as well as the frequency with which it is eaten. Hence in many countries there is a correlation between total amount of sugar consumed and caries experience.

4. The acidogenicity of a sugar-containing food can be modified by other items in that food, and the acidogenicity of a sugar-containing meal can be modified by other foods in that meal. The evidence for these conclusions is limited to plaque pH studies (e.g. studying acidogenicity) but since it may be more practical to modify a food so that it is less cariogenic rather than remove the sugar altogether, it is an approach worthy of further investigation. It could possibly explain why sugar at meals is much less cariogenic than sugar both at meals and between meals. There is almost certainly a strong correlation between acidogenicity and cariogenicity, the difference between the two being due to the possible presence of 'protective factors' in foods or the theoretical presence of chelators which might cause caries at neutral pH.

5. Dietary factors which protect tooth enamel from caries development during acid attack have been isolated. Phytate appears to be the most effective 'in vitro' although inorganic and other organic phosphates also have an effect. Organic phosphates act primarily by forming a tightly bound protective layer on the enamel surface, whereas inorganic phosphates act mainly by a common ion effect. However, clinical studies have shown these compounds less effective at caries prevention than might have been expected from animal and laboratory experiments.

6. Although a large number of dietary compounds have been thought to influence a developing tooth's future caries susceptibility, only fluoride has been established to have any appreciable influence. Other trace elements
may have a smaller effect, and the influence of calcium, phosphates and vitamins A and D remains uncertain.

7. If our eating habits (with a high number of snack meals) are accepted, in order to modify our 'high-sugar' diet so that it becomes less cariogenic there seem to be three alternatives: (i) to remove sugar from foods (or selected foods) altogether. In many foods this leads to little change in taste (Okholm 1980); (ii) to substitute non-cariogenic sweeteners for sucrose/glucose in foods. It may be necessary for only a limited type of food (e.g. common snack foods) to be altered to have significant effect on a community's caries experience (Scheinin et al 1975); (iii) to modify sugar-containing foods so that they are less cariogenic. Co-operation between nutritionists, physicians, dentists, economists, and food manufacturers is required to achieve these aims."

2.1.3 The Relation between Fluoride and Oral Health

Fluorides and Dental Caries

For the last fifty years fluoride has been a cornerstone in caries prevention. The number of studies of the effect of fluorides are numerous and has enlarged our understanding and knowledge of dental epidemiology, -biochemistry, -plaque, -physiology, -immunology and -pathology tremendously. Fluorides in their various forms are one of the most important factors responsible for the dramatic decrease in dental caries in the western industrialised world over the last decade.

Even so the study of fluoride is still one of the most topical research areas within dentistry with thousands of new publications every year. Prior to explaining some of the most 'burning' research questions in the late eighties the nature as well as the different methods of using fluoride as a caries preventive agent will briefly be described.
Fluoride Chemistry and Occurrence in Nature

Fluoride is the most electronegative of the halogens. Through this high reactivity it forms fluoride salts of almost all metals. The most common solid fluoride compounds are calcium fluoride (CaF₂), fluorapatite (C₁₀(PO₄)₆F₂) and sodium aluminium fluoride.

The small size of the F atom and ion and the strong bonding to metals and non-metals, give rise to easy and strong reactivity of fluoride with most other elements.

In acid solutions the F ion forms a hydrofluoride molecule (HF). This is of biological significance as fluoride is mainly passing through the membranes of both multi- and uni-cellular organisms in its non-ionic form as HF, e.g. through the stomach wall, kidney tubules and bacterial cell membrane (Luoma et al 1986).

In nature the element fluoride (ForF₂) is not found except momentarily during volcanic eruptions. Although the fluoride contents of rocks is about 300-700 ppm and in unfertilised soils is above 300 ppm it is largely bound in its poorly soluble forms.

"Some fluoride is, however, leached into the natural ground- and surface waters. Depending on the quantity of the fluoride source, e.g. the softness and solubility of the rocks, the fluoride content in well and surface waters may vary from undetectable quantities up to 20 ppm or more. In some rare wells and lakes in volcanic areas, such as East Africa, it is 10- to 100-fold higher. A further source of soil fluoride are the phosphate fertilisers that sometimes have appreciable fluoride "impurities" which may amount to 8-20kg added F/hectare per year. In sea-waters, fluoride concentration ranges from 0.8 up to 1.4 ppm" (Luoma et al 1986).

Some fluoride is transferred from soil and water to plants and animals. Through consumption of food and water it reaches humans.

The total intake of fluoride may thus vary considerably not
only related to 'added' fluoride for dental health reasons such as tablets and drops but also according to the fluoride content of household water and the fluoride content of different food items. The best known items for high fluoride content are plants like tea and tobacco and certain fish (Okamura and Matsuhsa 1965, Koivistoitenen 1980). It has to be remembered that the fluoride content of most food items reflects the fluoride content of the waters of the growth area. Due to the vast scale and centralisation of the manufacture and processing of food and even more important distribution of these products the individual differences in fluoride uptake tend to diminish compared to the time when most people lived off a locally produced diet.

Methods of the Use of Fluoride as Caries Preventive Agent

The many different ways of using fluoride as a caries preventive agent can be categorised according to rather different criteria. Some authors would categorise them according to the effect they have in humans whether it is mainly a systemic or a topical effect, others according to whether they are used as community public health measurement (such as water fluoridation) or as individual dental preventive agents (topical application on teeth). The following section describes the most common fluoride caries preventive methods as well as the mechanisms of action of fluorides.

Water Fluoridation

Numerous studies from natural fluoridated as well as artificially fluoridated areas have indicated that about 1 ppm in the drinking water is able to provide a reduction in caries incidence on approximately 50% in the permanent as well as the deciduous dentition (Dean et al 1942, 1950, Moulton 1942, Arnold et

After these early favourable reports appeared, many communities decided to fluoridate their public water supplies so that by 1978 approximately 155 million people worldwide were consuming fluoridated water, in addition to the 40 million receiving naturally fluoride-rich water supplies. Dental health has been monitored in many of these communities and for a comprehensive review of these reports the reader is referred to Naylor and Murray 1989 (In: The Prevention of Dental Disease, ed. J J Murray 1989).

Water fluoridation has from its very early days been a controversial issue. Due to the potential danger of too high intake of fluoride certain groups of people in most societies have been strongly opposed to its implementation.

One of the longest and most well known trials about water fluoridation took place in Scotland. After an agreement in September 1978 between Strathclyde Regional Council and the local Health Boards of fluoridating water supplies for which they were responsible, an elderly citizen, Mrs McColl of Glasgow, applied for an interdict to restrain the Council from implementing its decision. This was allowed and legal aid was granted to Mrs McColl, who’s submission in brief was that water fluoridation is unsafe, ineffective and illegal.

The hearings held in the Court of Session, Edinburgh, took nearly two years. The court sat on 201 days making it the longest and most costly case in Scottish legal history. The judge took nearly a year to consider the massive evidence and gave a verdict
on 29 June 1983. The judge completely vindicated the safety and efficiency of fluoridation but sustained the petitioner’s plea in law that fluoridation for the purpose of reducing the incidence of dental caries was *ultra vires* the respondent (that is beyond the power of the water authority), and granted the interdict on this point and on this point alone.

Since then Parliament has clarified the law and after the Water (Fluoridation) Bill was read in 1986, it is now legal in UK to fluoridate the public water supplies, but it is up to the local water authorities to make this decision.

In Denmark water fluoridation has been termed politically undesirable since 1977. This was decided by the Minister of Environmental Protection in response to a wish from several municipalities to introduce water fluoridation programmes in municipal water works (Schwarz 1981). Recent data from Danish communities with low and optimal concentrations of natural water-borne fluoride indicate that the Child Dental Health Service in the former communities has been able to reduce dental caries to a level near to that of the natural fluoride area (Thylstrup, Bille and Bruun 1982). The Child Dental Services were established in all three areas in 1956-57 and, since 1966, school-based fluoride-raising programmes have been operating in the low-fluoride areas. In addition, fluoridated dentifrice was introduced in Denmark in the mid-sixties and since 1970 more than 80% of all dentifices consumed in Denmark contain fluoride. Similarly recent data from Finland reveal that there is no longer any difference in caries incidence between an artificially fluoridated town and non-fluoridated cities. On the basis of that evidence the Scandinavian fluoride researchers (Luoma, Fejerskov, Thylstrup 1986) conclude
that topical administration of fluoride to groups or individuals, together with oral health education, reduces caries progression to a level which is equal to that achieved by water-borne fluoride.

Recent studies from the UK which compare dental caries experience in 5 year olds (Duxbury et al 1987) and in 14 year old children (Mitropoulos et al 1988) in fluoridated and non-fluoridated areas, show less caries amongst children living in fluoridated areas. Both studies conclude that although dental health has improved, fluoridation of water supplies remains an important and relevant public health objective in the concerned region.

Despite the overwhelming evidence of the efficacy on dental caries of water fluoridation, and the highly respected, numerous authorities' recommendations that water fluoridation, where applicable, should be the cornerstone of any national policy of caries prevention, the progress of water fluoridation in the UK has been slow.

Realising this Murray and Rugg-Gunn (1982) argue that if further progress has to be made, it is essential that other aspects of water fluoridation be considered. In a major review of 164 articles they answer the following three questions:

"(1) What evidence exists on psycho-social attitudes to water fluoridation in countries where progress has been slow? (2) Have persons responsible for dental public health informed the public sufficiently of the benefits of community water fluoridation schemes? (3) Have questions concerning fluoride and general health been investigated sufficiently?"

The psycho-social attitudes vary considerably in the studies reviewed by Murray and Rugg-Gunn and it is noteworthy that very few studies on attitudes towards water fluoridation has been carried
out. Perhaps Kraft (1985) is right in his conclusion that

"attitudes are complex, and consist of both emotional, cognitive and behavioural components. Single attitude questions are not sufficient to clarify this complexity ... and finally, and perhaps most important, it is conceivable that a campaign propagandising water fluoridation may have the opposite effect of the intended, and may well turn out to make use of fluorides a matter of controversy. In this context a fluoridation campaign may be fatal."

To the question on whether persons responsible for dental public health have informed the public sufficiently Murray and Rugg-Gunn state that neither the dental professions nor the health authorities in Scandinavia (Burt and Petterson 1972, Schwartz and Hansen 1976) attempted to give the population an organised view of the benefits of water fluoridation. They further claim that fluoridation schemes have been much more successful in communities where there has been a high level of co-operation between a department of public health and dental associations. The answer to the third question asked by Murray and Rugg-Gunn on fluoride and general health is that the level of fluoride in the water supply on 1 ppm recommended by the dental profession has not in any study been shown to aggrevate or cause any of the many different disorders claimed by the anti-fluoridationists.

**Fluoride tablets and drops**

When water fluoridation for various reasons could not be established in many parts of the world, fluoride tablets or drops have been the alternative chosen measurement in many instances to secure adequate fluoride protection in infants.

The relative effect of tablets or drops compared to the effect of water fluoridation have been an issue of controversy. A number of reviews (Driscoll et al 1977, Wei 1982, Naylor and Murray 1983 and Bruun et al 1982) of studies on the percentage caries reduction
give between 20 and 80% reduction but ranging even from 0 to 93%. However the majority of studies range between 30 to 40% caries reduction. The reason for the apparently lower caries reductions in all these studies as compared to water fluoridation lies, according to several authors (Luoma et al. 1986), in the fact that the controlled trials have been conducted over shorter period, and that the children in the study groups presented with the majority of their permanent teeth partly or fully erupted in the oral cavity. Had the clinical trial therefore been initiated from the very beginning of tooth eruption, then the reductions would have been larger, approaching that observed in fluoridated areas.

Another factor which influences the effect obtained in these studies is the compliance of the children (= parents). If the supplements are distributed through schools this usually minimised the number of children who either stop taking the tablets or only take them infrequently. If the daily supplements are to be taken at home this requires a very high parental motivation. Smyth and Withnell (1974) reported that only 22% of 3,500 pre-school children in Gloucestershire entered a fluoride tablet scheme and only 2% of those originally invited were still taking tablets at the end of nine months, despite widespread publicity and subsidy of the cost of the tablets. Silver (1974, 1982) found that only 6-10% of three year olds in Hertfordshire were consuming fluoride tablets despite their widespread recommendation and availability. The school based tablet programmes seem to have higher compliance (Driscoll et al. 1977, Poulsen et al. 1981) and furthermore do require parental approval and thus overcome a major objection by anti-fluoridationists because of the availability of individual choice. Newbrun (1978) concluded that the distribution or prescription of
fluoride supplements is definitely not an effective public health programme for large populations for whom no programme of patient education motivation has been carefully devised.

"On the other hand, motivated families should be able to realise significant caries preventing benefits if F tablets are taken regularly for long duration and their use is further encouraged by paediatricians and dentists to ensure that they are an integral part of the total preventive dentistry programme" (Wei 1982).

Also the recommended age in which to begin to take fluoride supplements and the doses has been and to some extent, still is, an issue of disagreement.

Thus Naylor and Murray in their book on prevention of dental disease from 1989 state:

"The effectiveness would seem to be greater the earlier the child began to take fluoride supplement ..."

and they continue

"It has to be admitted that daily administration of tablets at home from birth - or pre-natally - (my emphasis) requires a very high level of parental motivation ...." 

Wei (1982) states in paediatric dentistry from 1982 that:

"there is no doubt that fluoride passes through the placenta ..." and "however, the placenta may have a regulatory function in preventing excessive fluoride in the maternal blood from reaching the foetal circulation ..." and "although calcification of the primary teeth (except the incisors) begins in utero, most of the caries-susceptible surfaces of the teeth calcify after birth. Therefore as long as fluoride ingestion is initiated shortly after birth (my emphasis) it is probably sufficient."

However more recent research, seems to indicate that fluoride supplements should not be initiated until the time of tooth eruption (when the child is about six months old). These recommendations are based on theories of de- and re-mineralisation
and derives from chemical-based research on the effect and interaction of fluoride and enamel.

In accordance with these theories the latest UK recommendations from the British Association for the study of Community Dentistry (BASCD), on 'The Home Use of Fluorides for Pre-School Children' (1986) state:

"Since current interpretation of evidence indicates that fluoride acts predominantly post-eruptively and possibly during maturation of enamel, fluoride supplements need not be started until six months of age."

**Fluoridised salt, milk and fruit juices**

Salt, milk or fruit juice fluoridation is another way of introducing fluoride. In Switzerland fluoridated salt has been on sale since 1955. Despite the widespread use of fluoridated salt it is difficult to estimate its effectiveness, since in many Swiss communities other preventive programmes have been introduced in addition to fluoridated salt. Also Hungary has been used to fluoridated salt for some years. Thus Toth (1979) reported a substantial caries reduction in young children 10 years after the introduction of fluoridated salt. Salt appears to be a safe vehicle for fluoride administration (Muhlemann 1967, Ruzicka et al 1976), and uses only 3 per cent of the quantity of fluoride required for water fluoridation (Toth 1978). However, due to the undesirable effect of salt on general health, it is unlikely to be suggested in the UK.

Milk and fruit juices are also possible vehicles for fluoride, but clinical data is rather limited. Milk has in particular been tried in Switzerland whereas fruit juice has been tried in Israel.

The intake of both milk and fruit juices varies widely and none of these have proven popular in either UK or Scandinavia.
Professionally applied topical fluorides

Professionally applied topical fluorides are usually of high concentrations and applied by the dentist or dental hygienist at regular but infrequent intervals, perhaps twice a year.

As with fluoride supplements the percentage caries reduction varies widely due to differences in experimental design, (i.e. length of study), methods of administration of the agent, examiner-variability, base-line prevalences, caries incidences in control and experimental groups, fluoride concentration of the local water supply, and dietary and oral hygiene habits. For a comprehensive review of the literature of clinical trials and their percentage reduction together with differences between the use of sodium fluoride, stannous fluoride, acidulated phosphate fluoride, stannous fluoride gels, APF gels is referred to Clarkson and Wei (1982) or Naylor and Murray (1989).

Most authors agree that the effective caries inhibition brought about by topical fluoride applications is somewhat dependent on the frequency of the applications. Clarkson and Wei (1982) conclude:

"If the professional prophylaxis is not an essential requirement prior to topical fluoride application, especially for people with good oral hygiene (toothbrushing and flossing being adequate), then self-applied fluorides must be the method of choice for the future. It eliminates the problems of shortage and high cost of professional personnel and leaves only patient motivation as the key to its success".

The mechanisms behind the caries reduction from high concentrations semi-annually or annually or infrequent applications are not yet understood. Evidence from more recent studies indicates that deposition of CaF2 in porous enamel can explain the caries reductions observed after these treatments. Luoma et al
It is believed that by gradual but extremely slow dissolution of CaF₂ this salt acts as a reservoir of fluoride ions. The slow release of fluoride ions into the local micro-environment from the porous enamel may thus provide elevated and beneficial fluoride levels over prolonged periods. In principle, these elevations of fluoride may act on caries progression or demineralisation in the same manner as frequent (daily) administration of low levels of fluoride, e.g. from fluoridated dentifrice or from fluoridated drinking water (Bruun et al 1982, Bruun and Thylstrup 1984).

Fluoride mouth rinses

Fluoride mouth rinses can be carried out either home-based or school-based. The home-based is mainly recommended for adult use. The main thrust in the development of these rinses came from Scandinavia during the 1960s. Mouth rinses have since then been more widely used in Scandinavia than anywhere else probably due to the practicalities of school-based distribution. The dental school service in Scandinavia (described 2.1.5) covers all children and most schools have dental surgeries.

Again the percentage caries reduction varies greatly due to the same reasons as for topical professionally applied fluoride studies.

In a review of the literature on fluoride rinses Miller and Brunelle (1982) state:

"By the middle of the 1970's rinsing with NaF solutions was being actively promoted in the dental literature.

The weekly 0.2% NaF rinse and the daily 0.05% NaF rinse were considered to be ideal public health measures for the following reasons:

1. The NaF rinses inhibit new decay by 20% to 50%
2. The procedure is easy for small children to learn
3. Few materials and supplies are required
4. It is inexpensive
5. Non-dental personnel with minimum training can easily supervise the programme.
6. It can be carried out with minimal interruption of the school academic routines.
7. The fluoride rinse is safe with no known toxic effects even if accidentally swallowed.

Official recognition of the efficacy and simplicity of the school-based NaF rinse programme was not sufficient to foster widespread usage of this preventive regime in the USA. Therefore in 1975 the National Caries Programme, National Institute of Dental Research (NIDR) initiated one of the largest standardised community trials ever conducted to demonstrate the community acceptance and cost benefit of this school-based rinse procedure.

Miller and Brunelle (1982) conclude from this programme that

"school-based fluoride mouthrinising has become one of the most popular prevention programmes available" and further "although school-based fluoride mouthrinse programmes have been stressed primarily for non-fluoridated communities (Horowitz 1973), several clinical trials currently in progress suggest that mouthrinising combined with other preventive regimes provides added benefits."

However studies carried out more recently seem to somehow contradict their earlier results.

In a double-blind, clinical trial Bruun et al. (1985) studied caries increments and progression patterns by comparing two groups of children who rinsed fortnightly with a 0.2% NaF solution or received biannual topical applications with a fluoride varnish (Fluor-Protector). The authors conclude that:

"... the two fluoride treatments are equally effective for the inhibition of dental caries."

This finding is consistent with the general impression from numerous short-term clinical trials testing various topical fluoride treatments that caries reductions obtained by non-specific application of fluorides in preventive programmes are very similar

Fluoride Dentifrices

Parallel to the decline of caries experience in Northern Europe and Northern America there has been an increase in the production and use of fluoride toothpaste.

In the UK the proportion of fluoridated toothpaste sales increased from 2% to 96% from 1970 to 1981. Most researchers as well as dental practitioners explain that the decline in caries experience as primarily due to the increased use of fluoride toothpaste.

Luoma et al (1986) state:

"In areas or countries with low water fluoride concentrations, it is important to choose topical fluoride measures which are easy to handle by the individual and which result in continued, slightly elevated fluoride concentrations in the oral fluids. Thus fluoridated dentifrices are mandatory at any age."

Also Naylor and Murray (1989) conclude:

"Fluoride dentifrices, properly formulated and tested to show chemical stability and clinical efficacy, are clearly an important component of any caries-preventive programme. Such dentifrices not only deliver fluoride in relatively low non-toxic concentrations to the tooth-surfaces but, in addition, when used with a brush they contribute to the removal of microbial plaque. Indeed the decline in dental caries prevalence recently reported from many western countries has been attributed in part at least to the widespread use of fluoride-containing dentifrices".

Mechanisms of action of fluorides

The discussions on the different methods of using fluorides are related to the mechanisms of action of fluorides. Fejerskov (1984) states:
"It is evident that most epidemiologists and manufacturers operate on the basis of the concept that fluoride prevents dental caries by being incorporated into the enamel apatite. This has been a predominant concept - in other words, fluoride prevents caries by increasing the resistance of the tooth. We are all familiar with postulates such as 'fluoride-deficient teeth', 'optimally mineralised teeth' etc. This has been a tempting and pleasantly simple explanation, and the well-known data showing a relationship between a slight increase in water fluoride concentrations and a decrease in caries prevalence originating from the time period where we had no topical fluorides like dentifrices are well established. However, these classical data only tell us that fluoride interferes with the carious processes, but not how." (my emphasis)

Crucial to the efficient and cost-effective planning and administration of fluoride health policy is the understanding of the mechanisms of action of fluoride in relation to caries etiology and pathology.

This understanding is not only crucial as to which particular methods of fluoride should be recommended but also with regard to dosage, age of recipient, choice of target group etc.

"For a long time the primary working mode of fluoride was thought to be its effect on the solubility into the tooth enamel. Recently, however, it was argued that this contribution is probably overestimated" (ten Cate, 1984).

In vivo data has shown that there is no generally accepted relationship between fluoride content in the enamel and caries experience. Teeth from 'high' and from 'low' fluoride areas, although differing in fluoride content seem to behave similarly in artificial caries solutions (Kidd et al 1980).

Fejerskov (1984) has summarised the reasons why basic research during the last decade has raised serious doubt as to the validity of caries prevention being a simple function of enamel fluoride concentrations.
"(1) Although there is an apparent relationship between enamel fluoride concentration and in vitro solubility reduction in laboratory experiments, there is no evidence that this has any clinical significance.

(2) The amount of fluoride incorporated into surface enamel in individuals born and reared in areas with 1.0-1.5 ppm of fluoride in their drinking water as compared to that of individuals from low-fluoride areas is of a magnitude which by no way can explain the difference in caries reduction as a simple result of decreased solubility.

(3) Using in vivo biopsy methods no relationship has been established between enamel fluoride content and caries prevalence and incidence of the individual. One problem here is of course that we can only measure fluoride in vivo on free smooth surfaces.

(4) There is no relationship between the capacity of topical treatments to incorporate fluoride into sound enamel and their caries-reducing effect."

If fluoride cannot be 'stored' then it will need a continuous supply. Newer theories thus claim that fluoride has to be present in the aqueous phase around the tooth, in the saliva, the plaque fluid and the aqueous phase of the pores of the enamel, to effect a caries inhibition. Thus Larsen and Bruun (1986) state:

"It is based on the fact that the amount of enamel dissolved in water is decreased significantly when the aqueous phase contains fluoride of a concentration of 0.1 ppm or more. When the concentration of fluoride is lower the effect becomes ignorable presumably because of a compensation release of fluoride from the solid powder. This theory contains an element of immediate redeposition because of a formation of solid fluorhydroxyapatite. Since the dissolved fluoride in the oral environment is rinsed away, this theory implies a continued supply of the agent, so that caries prevention with topical fluoride can be initiated at any time with reasonable results. A discontinuation of the fluoride supply leaves the enamel open to renewed demineralisation. It follows that fluoride in either form should be given over a lifetime."
There seems to be a general agreement among fluoride researchers that fluoride caries preventive actions occur both in the demineralisation and the remineralisation phase. This has recently been clearly expressed by Featherstone (1984):

"If fluoride is present at the time of acid challenge it will diffuse with the acid and may markedly inhibit the dissolution step at the crystal surface ... If present during a remineralisation phase it enhances crystal growth and hence makes the overall remineralisation process more rapid and more effective. These two aspects of fluoride action are extremely important in its ability to reduce or prevent caries" (Featherstone 1984).

There are several implications for the use of fluoride in caries prevention of these later findings. The importance of a continuous local (in the mouth, i.e. in saliva or plaque) supply of fluoride means, for instance, that swallowing fluoride tablets has only limited effect and if fluoride tablets are recommended they should be chewed rather than swallowed. The recommendations of fluoride in pregnancy or prior to teeth eruption also appear to be of limited value. Water fluoridation is primarily effective as long as fluoridated water is consumed.

In conclusion the oral health benefits of fluoride in terms of caries protection have been shown in numerous studies and are beyond doubt. The effects, however, are dependent on the frequency, the amount and the form of fluoride to which the teeth are exposed. When making decisions as to which methods to use, whether at national or individual level, it seems important to secure a continuous local supply.
2.1.4 The Role of Visits to the Dentist

Dental visits have - since the very early days of dentistry - been the basis of oral health care in both Denmark and the UK. However, the reasons as laid out in various policy documents and given by health authorities as well as the patients' motivations have changed. From the beginning of this century when a dental health service began to take shape in both countries, the populations mainly visited a dentist to relieve oral pain or because they had some sort of dental problem. Despite early calls for preventive approaches (like Sir George Newman's 1921, see 2.1.6) extraction was by far the most common treatment for many years to come. The objectives for the NHS as recommended in the Teviot Report (Ministry of Health 1944B) and accepted by the Minister of Health who initiated the service (Bevan 1946) were to make 'an adequate and satisfactory dental service available to the population'. The establishment of a dental service was based on the so-called 'restorative philosophy'. Dental treatment should be made conveniently and promptly available on demand and should be paid for by the community rather than the patient. Already in 1944 it was clear, however, that at least two barriers stood in the way of achieving these objectives. The dental awareness in the population was low and the number of dentists insufficient. In order to overcome these two problems, a strategy was developed to increase demand for and supply of services as resources became available. Demand was increased by transferring the cost of treatment from the individual to the community and supply was planned to be increased by transferring the cost of dental education from the student to public funds (Lennon 1976). Demands certainly did increase as a result of this strategy. Holloway and
Lennon (1980) report that the dental profession was overwhelmed by the demand for the extraction of grossly infected teeth, which resulted in the end of gross oral sepsis in Great Britain.

In Denmark it was also realised early on, that prevention was important but the disease load and the reparative need was so heavy that very little was done in the area of prevention (see 2.1.5). The restorative philosophy prevailed in Denmark until the sixties, but came to an end at least officially by the Child Dental Health Care Act and its implementation during the seventies. By this law all municipalities were required to set up dental clinics and appoint auxiliary personnel to the extent necessary to ensure that free preventive and therapeutic dental care became available to all children of school age. The implementation, including various amendments to the law, have been described in detail elsewhere (2.1.5). Basically it meant that all school and pre-school children were seen by a dentist regularly. Visits to a dentist for children in the UK has never been enforced by law, but ever since the onset of a dental health service been recommended in various policy documents (2.1.6, 2.1.11). Dental attendance by adults has never been enforced by law in either country, but encouraged through dental health education activities and various payment schemes where public funds have covered parts of the cost to the patients (see 2.1.5, 2.1.6, 2.1.11 and 2.1.12).

In order to explain the role of visits to a dentist in oral health policy and oral health promotion, two issues are of importance. One is the question of why should the public visit a dentist and the other is the question of how often. Although the two questions are separate, the answers are connected. If the reasons for dental attendance are mainly restorative, i.e. to ease
pain and discomfort and 'repair' hard and soft tissue damage, the answer is simple: attendance should be when a problem occurs or when a disease is detectable. The more popular dental term is 'when in trouble'. However, if the purpose of dental visits is also to prevent disease from occurring in the first place, or to promote oral health, the answer is much more complicated. Although numerous issues can be and are debated in relation to longevity of fillings, satisfaction with full dentures, side effects of the use of dental materials, and iatrogenic diseases or damage, there is little doubt that the 'restorative' dental services are successful. Dental pain and discomfort and damages can be eased and 'repaired' by a visit to a dentist. Ironically the process of repairing or 'easing' pain is often perceived as painful in itself and that has been the main reason for many people not to visit a dentist (Finch 1990, Todd and Lader 1991).

However, if the arguments for dental visits are expanded to include preventive reasons, the questions of how often visits should be and whether the service has been successful are far more complex. In this relation the terms used are 'regular care' or 'regular check-ups'. The term regular is imprecise and has been debated in the media, amongst dental professionals and in the scientific literature.

In his famous article in the Lancet, Professor Sheiham (1977) asked the question: 'Is there a scientific basis for dental examinations every six months?' Based on a thorough literature review, he concludes that no such evidence exists. The article raised heated debate amongst dental professionals and, as no conclusive evidence has been produced since then, the question of frequency of dental visits has in the UK remained a controversial
issue.

To investigate the desirable frequency of dental attendance, it is necessary to examine and compare the dental condition and dental satisfaction of patients attending at different frequencies. However, the availability of such data is limited and none of the studies approaches the ideal of a randomised clinical trial. Ideally such studies should examine not only which dental conditions can be achieved with which intervals of attendance, but also which dental condition is 'desirable'. In other words, which goals for dental public health should and could be achieved with which attendance pattern? Oral health goals are usually defined in terms of DMFT (decayed, missed and filled teeth) per person in various age groups. One of the global indicators for dental caries chosen by WHO is DMFT at 12 years of age and this has been used in setting the target for Health for All by the Year 2000 (WHO 1985). In a comparative analysis of financing of dental care in Europe (WHO 1990) it is stated:

'It is striking that there is no obvious association between the amount of resources allocated to the dental care system (whether measured by the number of dentists or expenditure) and lower DMFT scores (better health). If anything, the relationship between resources and DMFT at 12 years appears to be positive. Ireland and Romania, for instance, devote comparatively few resources to dental care, but have relatively low DMFT scores; the FRG has the largest dental expenditure per person and the highest DMFT scores'.

In trying to explain the relationship between the supply of dentists (thus indirectly dental attendance) and DMFT at 12 years, it is pointed out that a clearer understanding of this link can be obtained by separating DMFT into its component parts, DT (decayed teeth), MT (missed teeth) and FT (filled teeth). When doing so positive correlations are found between the supply of dentists and
total DMFT and FT, whereas negative correlations are found between MT and DT. So, whilst greater numbers of dentists were not associated with less disease (as measured by lower DMFT) they were associated with a greater provision of restorative care. This is consistent with the view that organised dental care has been more successful in treating disease, by filling teeth, than it has been in preventing it.

Similar disappointing results can be found between dental attendance rates and DMFT using data from the UK National Dental Health Surveys.

In these surveys, the subjects’ response at interview have been categorised as 'attending for regular check-ups', 'attending for occasional check-ups' or 'attending only when in trouble'. Prior to considering the results from these surveys, it should be noted that these data should be treated with caution. It has been indicated that people overstate dental attendance in these surveys. Eddie (1984) found in a five year follow up of 920 dentate adults who formed the Scottish sample in the 1978 National Survey, that actual dental attendance over the five year period 1978-1983 was less favourable than indicated at the interview in 1978. Keeping this caution in mind, the next section considers the attendance pattern of British children and adults in relation to oral health (DMFT and gingival health) and various background variables.

Attendance Pattern and Oral Health

   Children

   The latest National Child dental Health Survey (Todd and Dodd 1985) contrasts dental health for regular and occasional attenders. Information regarding gingival and orthodontic status was not included and have therefore been obtained from the 1973 survey.
Table 2.4 shows there were no differences in the five year old children nor were there any differences in gingival status in the older children between regular and occasional attenders. The mean D teeth in 12 and 15 year olds were less amongst regular attenders but the differences are small.

**TABLE 2.4**  
Children's Dental Health in Relation to Dental Attendance (from Todd 1975; Todd and Dodd 1985)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Regular check-up</th>
<th>Occasional check-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 years :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean d teeth</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>% with gum trouble*</td>
<td>41%</td>
<td>39%</td>
</tr>
<tr>
<td>12 years :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean D teeth</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>mean M teeth</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>% with gum trouble*</td>
<td>76%</td>
<td>78%</td>
</tr>
<tr>
<td>15 years :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean D teeth</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td>mean M teeth</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>% with gum trouble**</td>
<td>72%</td>
<td>73%</td>
</tr>
<tr>
<td>% with orthodontic need**</td>
<td>25%</td>
<td>30%</td>
</tr>
</tbody>
</table>

* 1973 data  
** 1973 data for 14 year olds

A more recent study by Gratrix, Taylor and Lennon (1990) examined mothers’ and their 10-11 year old children's dental attendance and dental health. Out of 210 randomly selected children, 188 were examined for caries and the mothers of these children completed a questionnaire on their own and their child's dental attendance. Claimed attendance was subsequently checked with the dentist concerned. Table 2.5 shows the number of Decayed, Missing and Filled teeth and DMFT according to the children’s attendance pattern.
TABLE 2.5  Mean Number of Decayed, Missing and Filled Teeth and DMFT According to 10-11 year old Children’s Attendance Pattern

<table>
<thead>
<tr>
<th>Children’s attendance</th>
<th>N</th>
<th>D</th>
<th>M</th>
<th>F</th>
<th>DMFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDS</td>
<td>122</td>
<td>0.82</td>
<td>0.01</td>
<td>0.93</td>
<td>1.75</td>
</tr>
<tr>
<td>CDS</td>
<td>34</td>
<td>0.24</td>
<td>0.09</td>
<td>1.38</td>
<td>1.71</td>
</tr>
<tr>
<td>Not attended</td>
<td>21</td>
<td>1.29</td>
<td>0.10</td>
<td>0.14</td>
<td>1.52</td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>0.76</td>
<td>0.03</td>
<td>0.92</td>
<td>1.72</td>
</tr>
</tbody>
</table>

Decayed teeth  
chi square $x^2 = 8.63$  
P < 0.01

Missing teeth  
chi square $x^2 = 3.78$  
N S

Filled teeth  
chi square $x^2 = 10.57$  
P < 0.01

DMFT teeth  
Anova F = 0.17  
N S

(From: Gratrix et al 1990)

Mothers and children were considered to be attenders if their dentist confirmed that they had attended for dental treatment (excluding emergency treatment) within the previous 12 months prior to the month of the survey. There were no differences between attenders and non-attenders measured by total DMFT and number of missed teeth. Non-attenders and attenders at GDS had more decayed teeth and less filled teeth than attenders at the CDS. The claimed overestimation of attendance in national surveys was confirmed by this study. Overall 88% of the children who claimed to be attenders could be confirmed to have attended either the GDS or the CDS. Unfortunately this study does only examine attenders versus non-attenders, so no information regarding frequency of attendance can be given. In fact no studies, apart from the national surveys which in this respect as already mentioned have to be treated with caution, have examined the effect on oral health of different intervals in children’s dental attendance.

However, several policy documents recommend certain recall intervals for children.

The British Association for the Study of Community Dentistry
(1988) made three general policy statements which are appropriate
for child patients.

1. Recognising the variation between patients, dentists should determine the appropriate recall interval for each, and should not recall patients more frequently than clinically indicated.

2. NHS Regulations concerning the frequency of claims for fees for clinical examinations should allow for this variation, and should not therefore be changed (*).

3. Emphasis should be placed on the desirability of at least an annual check-up visit in dental health education material in children.

The British Paedodontic Society’s (1990) considerations regarding an appropriate recall interval for children are summarised below:

1. Future patterns of disease may be especially difficult to predict in children aged 1-4 years, who may all therefore need a recall interval of less than a year.

2. The opportunity for children to acclimatise slowly to the dental surgery and personnel, without the need for active intervention by the dentist initially, cannot be emphasised too strongly. Attitudes to dental health can be transmitted very early in life.

* (2) is no longer relevant after the introduction of the capitation scheme.
3. Other age groups for whom short recall intervals may be warranted include 6-8 year olds for fissure sealing of molars.

4. Effective prevention of disease may also necessitate recall intervals of less than one year. This is important in 12-14 year olds for the detection of the earliest stages of periodontal disease.

5. The timing of orthodontic treatment can be critical and regular reviews of developing occlusions are needed.

6. Dentists should have the flexibility of determining the most appropriate recall interval.

7. The changing remit of the CDS to screening for dental disease at least three times in a child’s school life places a greater emphasis on the need for frequent recalls in general dental practice.

8. In many regions of Britain, the problems of infrequent attendance outweigh any that might arise from unnecessarily frequent visits.

It is clear from both policy documents that dental attendance for children is recommended at least annually and for certain groups more frequently than that and, in any case, the frequency is to be determined by the dentist based on clinical judgment. Although the arguments put forward are sensible, it is surprising that no studies hitherto have examined the cost-efficiency of different recall intervals.
Adults

Information regarding the relation between oral health and adult dental attendance stems mainly from the Adult Dental Health National Surveys (collected in 1968, 1978 and 1988). The results from these must, for reasons previously mentioned, be treated with caution. Keeping this in mind, the trend has been similar and only data from the most recent survey (Todd and Lader 1991) will be presented. The survey contrasts 'regular' attenders, 'occasional check-up' attenders and those who attend 'only when in trouble'.

Figure 2.1 illustrates the general trend of tooth conditions for the three groups of attenders aged 16-34. The regular attenders do not have less disease as measured by total DMFS than the two other groups. They do, however, have more fillings but the overall pattern of tooth conditions is rather similar in the three types of attenders. More specific information is presented in the following tables.
Figure 2.1: The Distribution of Tooth Conditions around the Mouth for Dental Adults aged 16-34 by Dental Attendance Pattern - 1998, United Kingdom.

From: Todd and Lader (1991)
Table 2.6 shows the distribution of the numbers of sound and untreated teeth among dentate adults by attendance pattern. Overall, people who attend only when in trouble have more sound and untreated teeth than people who attend regularly for check-ups. Table 2.7 shows the proportion of dentate adults with 18 or more sound and untreated teeth by dental attendance pattern and age. In all age groups, a higher proportion of those who attend only occasionally or when in trouble than regular attenders have 18 or more sound and untreated teeth. On the basis of these data, it must rather sadly be concluded that it appears that regular attendance does not lead to more healthy teeth compared to occasional or only in trouble attendance.

Table 2.8 shows average numbers of missing, filled and sound and untreated teeth by changes in dental attendance pattern and age. The number of missing teeth is lowest among regular attenders in all age groups, apart from the 16-24 years old and 55-64 year olds, where those who currently attend regularly, but have not always, have the highest number of fillings. The average number of sound and untreated teeth is highest amongst those who have never been regular attenders in all age groups, apart from the group of people who are more than 75 years old. It is therefore also when changes in dental attendance are taken into account, those who have never been regular attenders who have the highest number of sound and untreated teeth.
### TABLE 2.6 Distribution of the Numbers of Sound and Untreated Teeth among Dentate Adults in the UK by Dental Attendance Pattern

<table>
<thead>
<tr>
<th>No. of sound and untreated teeth</th>
<th>Attending for regular check-ups %</th>
<th>Attending only when in trouble %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>1 - 5</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>6 - 11</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>12 - 17</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>18 - 23</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>24 or more</td>
<td>9</td>
<td>13</td>
</tr>
</tbody>
</table>

(From: Todd and Lader 1990)

### TABLE 2.7 The Proportion of Dentate Adults with 18 or more Sound and Untreated Teeth by Dental Attendance Pattern and Age in UK

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Dental attendance pattern</th>
<th>All dentate adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regular check-up</td>
<td>Occasional check-up</td>
</tr>
<tr>
<td>16 - 24</td>
<td>79%</td>
<td>86%</td>
</tr>
<tr>
<td>25 - 34</td>
<td>30%</td>
<td>53%</td>
</tr>
<tr>
<td>35 - 44</td>
<td>16%</td>
<td>23%</td>
</tr>
<tr>
<td>45 - 54</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>55 - 64</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>65 +</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>All ages</td>
<td>29%</td>
<td>49%</td>
</tr>
</tbody>
</table>

(From: Todd and Lader 1990)
TABLE 2.8 Average Number of Missing, Filled, and Sound and Untreated Teeth by Change in Dental Attendance Pattern and Age in the UK

<table>
<thead>
<tr>
<th>Dental attendance pattern</th>
<th>Age</th>
<th>All dentate adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16-24</td>
<td>25-34</td>
</tr>
<tr>
<td><strong>Average number of missing teeth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always regular</td>
<td>4.7</td>
<td>4.6</td>
</tr>
<tr>
<td>Regular currently, but not always</td>
<td>4.3</td>
<td>4.8</td>
</tr>
<tr>
<td>Has been regular, but not currently</td>
<td>4.2</td>
<td>5.0</td>
</tr>
<tr>
<td>Never been regular</td>
<td>4.2</td>
<td>5.4</td>
</tr>
<tr>
<td><strong>Average number of filled teeth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always regular</td>
<td>5.5</td>
<td>12.9</td>
</tr>
<tr>
<td>Regular currently, but not always</td>
<td>7.5</td>
<td>11.9</td>
</tr>
<tr>
<td>Has been regular, but not currently</td>
<td>5.5</td>
<td>8.9</td>
</tr>
<tr>
<td>Never been regular</td>
<td>3.7</td>
<td>6.8</td>
</tr>
<tr>
<td><strong>Average number of sound and untreated teeth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always regular</td>
<td>21.3</td>
<td>14.8</td>
</tr>
<tr>
<td>Regular currently, but not always</td>
<td>19.7</td>
<td>14.8</td>
</tr>
<tr>
<td>Has been regular, but not currently</td>
<td>21.2</td>
<td>16.5</td>
</tr>
<tr>
<td>Never been regular</td>
<td>22.5</td>
<td>18.2</td>
</tr>
</tbody>
</table>

(From: Todd and Lader 1991, p.216)

It could be argued whether sound and untreated teeth is a reasonable measure when comparing the effect of being regular or irregular attender. If the goal of dental attendance is to achieve as many sound and untreated teeth as possible then surely it is. If, however, the goal was to achieve as many functioning teeth as possible, a more reasonable measure would perhaps be sound and filled (otherwise sound) teeth. This measure can be extracted from Table 2.8 by simple addition. Table 2.9 shows the results of this exercise.
TABLE 2.9  Average Number of Filled Teeth plus Sound and Untreated Teeth by Change in Dental Attendance Pattern and Age in the UK

<table>
<thead>
<tr>
<th>Dental attendance pattern</th>
<th>Age</th>
<th>16-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always regular</td>
<td></td>
<td>26.8</td>
<td>27.7</td>
<td>25.7</td>
<td>22.7</td>
<td>19.4</td>
<td>17.1</td>
</tr>
<tr>
<td>Regular currently, but not always</td>
<td></td>
<td>27.2</td>
<td>26.7</td>
<td>24.8</td>
<td>23.1</td>
<td>20.1</td>
<td>15.5</td>
</tr>
<tr>
<td>Has been regular, but not currently</td>
<td></td>
<td>26.7</td>
<td>25.4</td>
<td>23.0</td>
<td>19.4</td>
<td>15.7</td>
<td>12.9</td>
</tr>
<tr>
<td>Never been regular</td>
<td></td>
<td>26.2</td>
<td>25.0</td>
<td>21.9</td>
<td>18.4</td>
<td>13.3</td>
<td>10.1</td>
</tr>
</tbody>
</table>

(From: Todd and Lader 1990)

Comparing the results of dental attendance in this way it can be seen that subjects who have always been regular have more functioning (sound and untreated plus filled (otherwise sound)) teeth than do subjects who have never been regular although the differences particularly in the younger age groups are small.

Regrettably the only national Danish adult health survey (Kirkegaard et al 1985) does not present data analysing the relation between oral health and dental attendance. What has been presented is the relation between treatment need and dental attendance. Not surprisingly it shows that those who have not seen a dentist within the previous three years have the largest need for fillings and the more visits patients have had the less the need for fillings is.

However, the usefulness of these national surveys in terms of determining the optimal interval between dental visits is limited. Firstly, the validity of patients' claimed attendance has been questioned. Eddie (1984) found in a follow up of 720 dentate adults that actual attendance over the five year period 1978-1983 was less favourable than indicated at the interview in 1978. This
was particularly the case among those who claimed to be regular attenders, of whom only 31% subsequently had a record of attending annually. Secondly, no x-rays are taken which indicates that dental decay may be underestimated in the national surveys. Thirdly, it could be argued that the people who go regularly have more disease than people who go only occasionally or when in trouble. This latter point cannot be answered adequately as no scientific evidence exists. A finally and probably more likely explanation for the fact that regular attenders in national surveys do not appear to have better oral health as measured by DMFT, lies in a combination of factors related to the system itself. Perhaps the payment system, the organisation and structure of the dental health service and the dental education furthers a restorative treatment orientation amongst dentists as well as patients. If dentists mainly hitherto have concentrated on restorative treatment rather than preventive activities, it cannot be expected that regular attenders have less disease than occasional or 'only in trouble attenders'. That leaves hope for the future. The new capitation system has been introduced to encourage prevention and dental professional as well as public attitudes are changing towards more prevention. Hopefully future surveys will be able to show greater benefits of regular attendance.

Despite the missing scientific evidence for optimal recall intervals, recommendations have been put forward by the British Association for the Study of Community Dentistry (1988). They recommend the following relating to adults as well as children:

1. Recognising the variation between patients, dentists should determine the appropriate recall interval for each, and should not recall
patients more frequently than clinically indicated

2. NHS Regulations concerning the frequency of claims for fees for clinical examination should allow for this variation, and should not therefore be changed

3. Emphasis should be placed on the desirability of at least an annual check-up visit in dental health education material for children

4. Continuity of care should be encouraged and frequent changes of dentist discouraged

5. Dentists and patients should question the need for replacement fillings, and research workers should seek better prognostic indicators for the viability of restoration

6. It should be recognised that in many regions in Britain the problem of infrequent dental attendance outweigh that of 'too frequent' dental visits

7. More valid techniques for determining actual rather than claimed attendance pattern should be developed for future epidemiological studies.

The point about changing dentists has been included because patients who change dentists appear to be at particular risk to replacement fillings (Davies 1984).

In conclusion, no scientific evidence exists for the optimal recall interval. The available data contrasting regular, occasional and 'only when in trouble' attenders, shows little oral
health benefits when measured as total caries experience (DMFT) of regular attendance hitherto. Recommendations for desirable frequency of dental attendance are mainly based on clinical judgments.

2.1.5 Dental Health Services in Denmark

The description of the dental health service in Denmark will be reviewed separately for children and adults. This arises from the different legislation for the two groups.

Children

Denmark is a country where legislation on almost every aspect of life has been passed and where modern society is regulated to the smallest detail. It is also a country which has decided that health services in general are a public responsibility which should be freely available to its citizens. However, the dental services, as part of the health services are only free at the point of uptake for children whereas for adults there is only partial public subsidy.

Short History

Schwarz (1987) has previously described the history and legislation related to dental services for children in Denmark. The following are extracts from his account.

The need for dental services for children was recognised early in this century. Already at this stage, dental caries in school children was rampant and idealistic private dental practitioners offered their services to individual municipalities in order to take care of the schoolchildren. However, the disease load and the reparative need was so heavy that very little prevention was done. In 1910 the first municipality established its own dental clinics in order to give care to schoolchildren, and during the
next 2-3 decades more and more municipalities chose this strategy, helped by the slowly increasing number of dentists. In 1933 it was decided that municipalities could receive a state subsidy for school dental care. This encouraged the development, but in 1970, still only 50% of the schoolchildren in the country had access to a municipal dental clinic, while an unknown proportion of children (assessed to be very limited) were taken to the dentist by their parents, mainly as a result of pain.

Legislation

Responding to the above and to an increasing number of reports on the terrible state of the children's teeth, the Ministry of Health, in 1959, established The Child Dental Care Commission. The commission published its report in 1967, in which it was proposed to establish a public, outreaching, preventively oriented child dental care system, ideally comprising children from age 0 to age 20.

The report was shelved for a couple of years, partly due to the economic requirements for such a system, partly due to a lack of dentists which would become obvious in a country-wide new dental organisation and partly due to the political process. During the waiting time a municipal reform was introduced which reduced the number of municipalities in the country from around 1,400 to 275. This was to secure an administrative unit in Denmark which would be sufficiently large to take responsibility for certain social and health tasks for the inhabitants, including the children's dental services (Schwarz 1987).

Law on Children's Dental Care

In 1971, the law on children's dental care was passed unanimously by the Parliament with the starting point in 1972
By this law all municipalities were required to set up dental clinics and appoint dentists and auxiliary personnel to the extent necessary to ensure that free preventive and therapeutic dental care became available to all children of school age. In order to avoid heavy economic demands on the municipalities, provisions were made for an incremental fulfilment of the law. Thus, only first grade children were eligible the first year, 1972-73, first and second grade children in the second year of the law and so on until 1981. By then all compulsory grades 1-9 were covered by the law.

Two important amendments to the law should be mentioned. In 1976, a number of municipalities, which had not yet complied with the law, requested permission to organise children's dental services by means of private dental practitioners in the municipalities. This was granted by the parliament. A set of guidelines was established by the Ministry of Health to ensure that the alternative organisational framework would match the public clinics in quality and price. In 1977, an amendment was passed extending the provisions of the law to the pre-school children aged 0-6 as of 1981. Thus, continuing the incremental principle the total population of children aged 0-16 years would be covered by the law in 1987 (Ministry of Interior, 1979). Municipalities were permitted voluntarily to extend their dental services beyond the limit set by the law. Thus, by 1985, most of the municipalities already had a dental service with a total age coverage corresponding to the final stages of the law.

In 1986 the government introduced a new law on Dental Health Services (Act No.310, 4 June 1986). According to this Act on dental health service, the Community Dental Service is responsible
for all children from birth up to and including 17 years of age. A detailed description of the content of the service in terms of preventive and dental health education activities is presented in 2.1.10.

During the eighties, the dental health care of the so-called 'youth group' (the 16 to 18 year olds) became an increasingly important issue of disagreement between the two sectors; the Community Dental Service (CDS) preferred to 'keep' the children as long as possible, i.e. the 16 to 18 years olds should attend the CDS rather than the General Dental Service (GDS). In contrast, spokesmen for the GDS wanted this group to attend the GDS. With the Act of Dental Health Services in 1986 a 'free choice' was introduced which meant that 16-18 year olds (inclusive) could choose whether they wanted to attend the CDS or the GDS, the service being free at uptake.

Adult Dental Services in Denmark

Short history

Until the beginning of this century, dentistry for adults was carried out by the few qualified (see 2.1.7) dentists and practising denturists on a private basis without public reimbursement of any kind. The first sign of an organised service was when private sick funds were established at the beginning of the century. On the basis of membership fees and state subsidies agreements were made with doctors and dentists for certain forms of treatment for their members. For 40 years, until 1959, these agreements contained provisions for among other things, the most urgent treatment for caries and extractions.

In 1965 the dental association entered into a country-wide agreement with the 'Association of disease funds' over a variety of
caries and caries related treatments that included provisions for a special regular dental care scheme for young adults as an attempt to create an attractive continuation scheme after the child dental health service. This scheme contained increased reimbursement rates for regular dental care users and a recall system (Schwartz 1981).

**National Health Insurance Act**

In 1971 a National Health Insurance Act was passed by the Danish Parliament, and in 1973 the Health Insurance took over all agreements previously held by the sick funds which then ceased to exist. Under the National Health Insurance the Minister of Health after consultation with the National Board of Health, makes regulations as to which forms of dental examination and treatment shall be eligible for part-payment under the insurance scheme (Schwarz 1986).

These regulations are given in a special order on insurance benefits for dental care. This order provides for part reimbursement of the cost of the following caries treatment, examination fees, x-rays, fillings, endodontic treatment, and extractions. During the late seventies and eighties provisions were made for various preventive items. It should be noted here that there had been an increasing interest in preventive measures during the mid-eighties and particularly up to the time of the interviews (1988). Thus in the agreement of the National Health Insurance of December 1987 the Health Minister at that time stated:

"The Health Ministry has by approval of this agreement attached special emphasis on strengthening preventative dental health care".

A detailed description of prevention and dental health education activities within the General Dental Service is presented in
2.1.10.

2.1.6  Dental Health Services in the UK

Short History

In the United Kingdom the Education Act of 1870 introduced compulsory education for all children. The education system eventually provided a practical basis for a dental public health programme. Dental inspections were thus carried out at school for the first time under the provisions of the Education (Administrative Provisions) Act. At this time dentistry had not achieved full professional status and the majority of those practising dentistry had no formal dental qualifications.

Treatments were inevitably determined by existing knowledge and technical resources and in particular neither local nor general anaesthesia had achieved widespread use in dentistry. As late as 1928, a medical officer at the Board of Education was able to remark upon the practice of some school dental officers who extracted permanent molar teeth without any form of anaesthesia (Langdon 1928).

By 1918, 169 Education Authorities had equipped 350 School dental clinics. From the beginning, guidance from the Board of Education stressed the need for a preventive approach. Sir George Newman (1921) wrote in his annual report

"Above all no dental scheme can be considered satisfactory which fails to approach the problem from a preventive standpoint. General health, particularly dental hygiene, and a sound diet stand in the forefront of prevention of dental decay."

Despite statements like Sir George Newman's, extraction was by far the most common treatment for many years to come. At the time that his suggestions were made the financial and political climate was not right for the additional expenditure which would have been
involved. The depression years of the 1930s prevented many social welfare schemes and this was but one of them. Shortly after the Second World War ended The National Health Service Act (1946) was introduced, which had the effect of diverting dentists from the school dental service into the better-paid area of general practice (Renson 1974). Preceding the introduction of the National Health Service a number of Governmental reports were published, the most important of which are mentioned below.

The Interim Report of the Interdepartmental Committee on Dentistry (Teviot Report, Ministry of Health 1944B) was written to advise the Minister of Health on whether a dental service was a necessary part of the developing health service. The report noted the high level of dental disease in the population, the low level of demand for treatment and the low morale in a contracting and ageing dental profession.

It suggested, therefore, that the main aim of the service should be to increase the amount of dental treatment by stimulating demand. This was most easily to be achieved by moving the cost from the individual to the community. The report also expressed concern that the service should be equitably distributed and that shortages should be "shared by all" (Lennon 1981).

The National Health Service including The General Dental Service came into being following the report of the Interdepartmental Committee on the Remuneration of General Dental Practitioners in 1948 (Ministry of Health, 1948, Spens Report).

The concept of a "free" service ended in June 1952, when a maximum patient contribution of £1 was introduced for a course of dental treatment not involving dentures. This charge remained unaffected for sixteen years when, in 1968, it was increased to
The 'priority classes', that is expectant and nursing mothers, and school and pre-school children were exempt from these charges and continued to receive free treatment.

In contrast to Denmark where there was a clear division in the service, adults were treated by General Dental Practice (GDP) and children by the Community Dental Service (CDS), there has been until recently a 'tandem' arrangement in the UK. Children could be treated either in GDP or in CDS. At times the two services have almost been competing with each other. However, this 'tandem' arrangement is currently being terminated and all 'normal' children should now be treated in GDP (see later).

Organisation and Administration

Dental health services have been part of the NHS since it was formed in 1948. There were no major changes until the reorganisation in 1974. The aim of the reorganisation was to unify the services, increase accountability of the NHS to local needs and reduce the inequalities in funding between the regions. This administrative reorganisation produced a structure with three levels of management responsible for hospital and community services; Level 1: Department of Health and Social Security (DHSS); Level 2: Regional Health Authorities and Level 3: Area Health Authorities. The General Dental Services maintained their autonomy under the Family Practitioner Committee (FPC), which was accountable to the DHSS. There was an FPC for each Area Health Authority (AHA). Also a consumer input was created for the first time, the Community Health Councils (CHCs). The two restructurings since 1974 (in 1982 and 1984) maintained the major characteristics of this tripartite system with some modifications. In 1982 the AHAs were abolished and their statutory responsibility divided
between the Regional Health Authority (RHA) and the new District Health Authority (DHA). Hence the DHA became the third level of authority. (In Scotland there is only one tier of administration. All health services including both primary and secondary care are administered by the 15 health boards.)

Changes took place again in 1990 when family health services authorities (FHSAs) replaced the former family practitioner committees.

The role of the the RHA, the DHA, the FPC, the FHSA as well as each of the three branches of dental services, the General Dental Services (GDS), the Community Dental Service (CDS) and the Hospital Dental Service (HDS) will briefly be described.

Regional Health Authorities (RHAs)

Each RHA is accountable to the Secretary of State for its own activities and for all DHAs under its control. The regional task is in part strategic planning, in part co-ordination and supervision, and in part executive. There is a special responsibility for ensuring that satisfactory service facilities are provided to support medical and dental teaching, both undergraduate and postgraduate, and research.

Each RHA reviews plans made by all DHAs within their borders to ensure that (a) necessary improvements in service are planned, (b) plans are consistent with available resources and national and regional policies, and (c) plans are co-ordinated with local authority planning and operational activities. Resources are allocated to each district and the performance monitored against the objectives agreed by members with the DHSS.
District Health Authorities (DHAs)

Each DHA is responsible for planning and developing services to meet the needs of the communities within its health district. It regularly and systematically appraises the quality of existing services and assesses unmet needs. In districts with substantial facilities for undergraduate and postgraduate clinical teaching, the DHA has responsibility for providing clinical teaching facilities to support the university. Each district has a District Dental Officer (DDO) who is responsible for the management of the Community Dental Services (CDS). (In Scotland the equivalent person is the Chief Administrative Dental Officer, the CADO.)

The Family Practitioner Committee (FPC)

The FPCs administered the General Practitioner Service. They had four primary functions: (i) to enter into contracts for services with practitioners and other persons, (ii) to prepare lists of practitioners under NHS regulations, (iii) to pay such practitioners and (iv) to deal with disputes and complaints arising out of the performance of their contracts by practitioners.

In 1990 the FPCs were replaced by the Family Health Services Authorities (FHSAs), see later.

Again the administration in Scotland has been slightly different. The equivalent body, the Scottish Dental Estimates Board (SDEB) later the Dental Practice Board had as its main function to calculate and authorise the payment schedules on the basis of which the health boards pay the fees of the independently contracted general dental practitioners on their lists.

The General Dental Service (GDS)

The dental health services as it reaches the patient, is, as previously mentioned, divided into three sections: the hospital
service, providing specialist or secondary care for both in-patients and out-patients referred from the primary care services, the Community Dental Service providing primary care to selected priority groups and finally the General Dental Service providing dental care to the population at large. The General Dental Services is by far the largest measured by most means. More than 80% of active dentists work within the General Dental Service whereas about 12% are working in the Community Dental Services and only about 7% in the Hospital Dental Service.

The terms and conditions of service are determined by NHS Regulations. A dentist’s relationship with the National Health Service is similar to that between any private practitioner and a third party dental insurance group. The dentist treats as many or as few patients under the service as he wishes and his obligation to any patient used to be for a course of treatment only, but this has recently changed.

The service was based on a fee per item of service and the fee for each item is listed in a regularly updated Statement of Remuneration. Most items can be initiated by the dentist without approval but certain complex items require both prior approval and the negotiation of a discretionary fee. The bulk of the cost is borne by the Department of Health. Patients’ charges vary with each item and are regularly negotiated and updated. For instance, dental examinations were free for the patient until recently. In 1988, a fee for dental examination was introduced much against the dental profession’s wishes. However, certain groups of patients, including children and pregnant and nursing mothers, are exempt from such charges. Dental officers of the Department of Health monitor the quality of GDPs’ performance.
The first major change of dental services since the start of the NHS in 1948 which affected all general dental practitioners was the introduction of a new continuing care and capitation contract from 1 October 1990. The new contract was imposed on the profession and this led to considerable bitterness. Whether or not the changes to the way dentists are paid for the treatment of adults will have a noticeable effect is not clear, as there is no research evidence, as yet, on how practitioners have responded to the new rules; except that some NHS dentists have resigned and are working outside the government-funded system (Blinkhorn 1991). Capitation on the other hand was carefully researched prior to its implementation and found to be a valid way of providing dental care for children (Coventry et al 1989). However, there have been complaints that the system could lead to supervised neglect of dental health (Blinkhorn 1991). The government-funded study (Coventry et al 1989) did not find any evidence of neglect. It was clear that dentists were not filling teeth until there was clear evidence of a cavity.

One of the problems in relation to the capitation system is that caries rates vary considerably throughout Britain (2.1.9). In areas where decay rates are high, dentists are unhappy that money will be lost rendering child patients dentally fit and little time will be available to give preventive advice. Dental caries is also related to social class so dentists in poor areas will have to cope with more disease. Such differences in dental health which may have a direct effect on dentists’ salaries may prompt greater interest in ways of preventing dental caries. For instance, water fluoridation may become of high priority for dental practitioners seeking to earn money from capitation.
Hospital Dental Service

The role of the Hospital Dental Service is mainly:

(a) To provide consultant (specialist) advice and treatment for cases of special difficulty referred to hospitals from the primary care service

(b) Comprehensive dental care for long-stay hospital in-patients

(c) Emergency care for short-stay hospital in-patients

(d) Treatment of certain out-patients with medical complications.

Thus in the hospital dental service the main emphasis is on treatment.

Community Dental Service (CDS)

The Community Dental Service in contrast to the General Dental Service is not a 'fee per item' system and it is free of charge for its clients. Further, all dental officers, hygienists and therapists are employed on a fixed salary.

Treatment is carried out in mobile and fixed clinics whereas preventive and dental health education programmes often take place out of the surgery in schools, nurseries and various other institutions.

According to recent guidelines (Department of Health 1989) dental health education, preventive programmes, epidemiological surveys and dental screening are the main working tasks within the community dental service, whereas it is recommended that patients in need of dental treatment should normally be referred to the general dental service. The philosophy behind the latter is the
notion of a 'family dentist', i.e. children visit the same dentist as their parents and a pattern of dental attendance developed during childhood can continue into adult life. It is thus no longer appropriate for the Community Dental Service to provide treatment for all those who are found to have dental disease. There will, however, be instances where the community dental service needs to provide a safety-net service of treatment because this prospect is not feasible - for example, adults and children with special needs and in isolated rural areas. This will also be true in some localities where there may be no readily available GDP, or in some instances the child may not have been taken for treatment despite a referral.

The role of dental health education within the Community Dental Service is to be increased with the aim of encouraging self-care and regular attendance at the dentist, particularly in those areas where dental attendance is poor. Target groups should be identified among schoolchildren but also other groups, such as expectant and nursing mothers, pre-schoolchildren and the elderly, who are often reluctant to seek care. The co-operation of local teachers and professional health educators is stressed as being essential for the successful outcome of such programmes. The initiation of dental health education programmes is recommended even in the workplace. These are currently very rare (Schou 1989).

National epidemiological surveys are undertaken at regular intervals but also local surveys of child dental health are considered an essential tool in planning dental services. It has been recommended that the Community Dental Service should expand its activities in monitoring levels of dental health, by means of surveys in children and other groups, to enable authorities to
target their services more accurately at those in greatest need.

The epidemiological surveys are intended to provide an accurate profile of levels of dental health, but not intended to screen individuals and identify those in need of referral for dental care.

It is recommended (Department of Health 1989) that screening policy should be clarified to allow for more frequent screening in areas where levels of dental health and attendance are poor as a means of promoting better dental health. Further screening programmes should be evaluated at regular intervals.

From the description of the three parts of the dental services in the UK, the General Dental Service, the Community Dental Service and the Hospital Dental Service, it is clear that most prevention is initiated and run by the Community Dental Service.

Family Health Services Authorities (FHSAs)

In September 1990, FHSAs replaced the former FPCs. The FHSAs were conceived in the White Paper 'Promoting Better Health' (DHSS 1987) which set out the need for improved planning and management of primary health services, including primary dental care. The subsequent White Paper, 'Working for Patients' (Department of Health 1989) actually set the agenda for NHS management changes and included bringing primary health services fully within the NHS family.

These new authorities are accountable to RHAs in the same way as DHAs are. Policies decided by government are to be passed through RHAs to FHSAs with targets for action in respect of primary care services and to DHAs for secondary care services and then monitored to evaluate outcomes. This is a significant break from previous arrangements, where contracts for GDPs were administered
by a separate committee outside the hierarchical system of Department to region to district. In February 1991, the Department of Health issued circular HC(91)5, together with its report, 'The Role of FHSAs in Primary Dental Care' (1991). In there, two underlying principles for future action were identified. Firstly, the GDS should have a higher profile in the NHS. Secondly, there needs to be a focus for the responsibility of primary dental care.

The key messages in the report were:

- FHSAs are the appropriate focal point for the strategic development of primary dental care and this role needs to be developed
- Systematic and positive collaboration between DHAs and FHSAs is vital
- FHSAs, DHAs and RHAs all need a management focus for moving dental matters forward and a source of dental advice, particularly on the epidemiological and research aspects of service planning.

Palmer (1991) describes the role of FHSAs in terms of activities for primary dental care as follows:

"1. To continue to provide operational and administrative support for GDPs. This will include maintaining informative dental lists, certain financial services, such as the authorisation of postgraduate training and other payments, and dealing with regulatory matters, such as complaints procedures and service hearings. These aspects are largely reactive and similar to the old family practitioner committee role
2. To develop services and professional activities. These will often be driven by consumer requirements or Department of Health initiatives and will involve collaboration with other health services. Activities include
the encouragement and support of the production of dental practice patient information leaflets, statutory from October 1991; the establishment of programmes for assessing local emergency dental care arrangements; practice visits in relation to the control of cross infection or other matters; and peer review within the general dental service. Also to be arranged are health promotion activities and consumer surveys about patient satisfaction with dental services. These aspects are proactive and require a new approach".

The latter statements on oral health promotion activities and consumer surveys, if implemented, represent a real break with the previous role of FPCs. The question is whether the FHSAs, although having the responsibility for such activities, also have the power to ensure the execution of these? Much will depend on the willingness and the co-operation of the dental profession. In view of all these changes, the future of dental primary care is uncertain but indeed challenging to all involved parties.

2.1.7 Dental Manpower in Denmark

Educational policy

At present there are four different categories of dental personnel in Denmark; dentists, dental hygienists, dental assistants and dental technicians. Ancillaries such as dental therapists or dental health educators have never existed in Denmark and there are no plans for expanding the number of categories at present.

Dentists

Formal dental education dates back to 1889 where the first school opened in Copenhagen. There were 18 students and the training lasted for two years. In 1909, the old curriculum was extended and changed to a three year study period followed by two years of "apprenticeship" with a practising dentist. Although a ministerial committee in 1905 had already proposed a plan for a
four year curriculum, it was not until 1941 that such a plan was carried out. In 1949, an obligatory one year period was established preceding the admission to the dental college itself. This meant that the curriculum in reality had become quinquennial. In 1959, a new five year curriculum was introduced, incorporating a special pre-dental year. In reality, many students now study for six years before they pass their final exams (Danish Ministry of Education, 1982). The dental course consists of a 1st part and a 2nd part, the officially stipulated time of study being two and three years, respectively. Each year is divided into two terms.

Since 1961 there have been two Dental Colleges, one in Copenhagen and one in Aarhus. The length of the curriculum has been five years since then. Also the content of the curriculum was identical until 1 September 1986 when the curriculum content of the College in Copenhagen was changed completely. One of the most important aims of the new curriculum was to secure a holistic view of the individual patient's problems, 'the potential of educating Dental Public Health minded dentists, who will be able to solve new emerging problems' (Moller 1986). The next decades will show whether this was possible or not.

In the early eighties it was recognised that the annual intake of dental students was too high and would lead to unemployment. At that time the approximate average dentist/population ratio was 1:1000. In the period from 1981 to 1990, the government reduced the intake. Table 2.10 shows the figures from 1981 to 1990 and it can be seen that the annual intake has been more than halved.
TABLE 2.10  Annual Student Intake at the Royal Dental Colleges in Denmark from 1981 to 1990

<table>
<thead>
<tr>
<th></th>
<th>Copenhagen</th>
<th>Aarhus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>155</td>
<td>95</td>
<td>250</td>
</tr>
<tr>
<td>1982</td>
<td>142</td>
<td>95</td>
<td>237</td>
</tr>
<tr>
<td>1983</td>
<td>117</td>
<td>80</td>
<td>197</td>
</tr>
<tr>
<td>1984</td>
<td>88</td>
<td>60</td>
<td>148</td>
</tr>
<tr>
<td>1985</td>
<td>72</td>
<td>56</td>
<td>128</td>
</tr>
<tr>
<td>1986</td>
<td>76</td>
<td>56</td>
<td>132</td>
</tr>
<tr>
<td>1987</td>
<td>79</td>
<td>71</td>
<td>150</td>
</tr>
<tr>
<td>1988</td>
<td>75</td>
<td>53</td>
<td>128</td>
</tr>
<tr>
<td>1989</td>
<td>63</td>
<td>42</td>
<td>105</td>
</tr>
<tr>
<td>1990</td>
<td>65</td>
<td>52</td>
<td>117</td>
</tr>
</tbody>
</table>

Source: Danish Dental Association 1991

Dental Hygienists

The group of dental hygienists will briefly be described because of their strong involvement in dental health education.

In 1971 the Danish Ministry of Interior issued a report recommending the education and training of dental hygienists. The report stated that a particular need existed for dental hygienists not only within the public child dental health service, but also in dental private practice. As a result of this report the first school opened in 1972. The period of study was set at two years. Primarily training and education took place at the school for dental hygienists, interspersed by shorter periods (one or two weeks) during which the students trained in different institutions and hospitals and in the public child dental health service or in private practice. Great importance has been attached to preventive dentistry, with specific attention to dental health education (Schou et al 1986).

The annual total intake of 100 has not changed at the two Schools in Aarhus and Copenhagen. The length of the curriculum has remained at two years.
The aim of the dental hygienist's education is to produce preventive and public health oriented dental personnel. The proportion of behavioural science (psychology, sociology, public health, education theory) is much larger than it is in the dental curriculum.

In a national survey (Schou et al 1986) it was found that the majority of educated dental hygienists were working in the Public Child Dental Health Service (50%), whereas 35% were working in private practice.

Of those who received formal training in Denmark from 1972 to 1982 (inclusive) 59% were still employed as dental hygienists, 30% had changed occupation and only 11% were without employment. Only 4% of those working in private practice and 31% of those working in public child dental health service were mainly working with dental health education (Holst, Tronbjerg and Schou 1986).

**Dental Assistants**

The training of DSAs has in Denmark been highly structured and controlled in contrast to the training in the UK and will therefore briefly be described. The training has undergone major changes during the eighties. Until 1991 there were basically three training paths.

One of these was based at the Royal Dental Colleges (Copenhagen and Aarhus), Division for Auxiliaries. This training consisted of one year's education at the Royal Dental College, plus one year apprenticeship, which could take place either before or after the one year's education at College. For a more detailed description of working conditions see Meyer and Teglers (1984).

A more old fashioned way to become a dental assistant was by mainly practical education with two and a half years' work in a
general dental practice including about two weeks of theoretical courses run by the Danish Dental Association.

The third training pathway for a dental assistant was called EFG - 'uddannelsen'. This was the least common, with about 100 pupils a year. With certain adjustments and after five years of 'piloting' this training takes three years; one basic year (general education, Danish, mathematics etc.) plus two years' practical work in a general dental practice interrupted by a 10 weeks theoretical period at one of the two dental colleges.

No matter which of the different training pathways a dental assistant had been through, she (99% are females) was defined as 'a person who assists the dentist (or the dental hygienist) with clinical work but does not carry out any independent procedures in the mouth' (WHO 1968).

From 1991, all three training pathways were replaced by a completely new way of training dental assistants. This new education is called the 'erhversuddannelsen'. It takes three years and comprises periods of training at various schools interspaced with periods of working in general dental practice. It is expected that the first two periods at 'schools' are going to take place mainly at technical colleges, whereas the last two 'schooling' periods will be based at the Royal Dental Colleges.

The 'EFG' and the 'old' type of training at the Dental College ceased to exist from 1 January 1991. The third 'old' training path based in general dental practice will be permitted until 31 December 1993.

**Manpower policy in the 1980's in Denmark**

The overall dental manpower concern in the '80s was increasing unemployment among dentists.
Table 2.11 shows the employment situation for dentists in 1983, 1986 and 1991.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed in Denmark</td>
<td>979</td>
<td>1427</td>
<td>300</td>
</tr>
<tr>
<td>Working abroad</td>
<td>252</td>
<td>386</td>
<td>446</td>
</tr>
</tbody>
</table>

Source: Fauerby 1986, Danish Dental Association 1991

Fauerby (1986) concluded in a paper written on behalf of the Danish Dental Association, based on figures from the Interior Ministry, that the demand for dentists in the general dental service as well as the public dental service was falling and that the number of unemployed dentists would continue to increase.

For several reasons this did not happen, as can be seen from Table 2.11. By 1991 the unemployment figure had fallen to about a fifth of what it was in 1986 and less than a third of what it was in 1983. Although these figures have to be taken with some caution, as there are problems with recording the data (DDA 1991) there is no doubt that unemployment among dentists has fallen dramatically. One of the reasons why fewer dentists are being recorded as unemployed is because many dentists have left the profession or never entered it, but instead are employed in the medical, pharmaceutical and other industries. Also many dentists have left Denmark (446 in 1991). The policy of reducing the number of dental students must obviously also have had some effect. Altogether it can be stated that the number of unemployed dentists in Denmark is less than it was expected to be and much less in the early nineties than in the eighties.

It should be noted that during the same period the annual
intake of dental hygienists and dental assistants has remained unchanged. It is difficult to obtain unemployment figures, but it is estimated that unemployment is low (less than 10%) and has not changed over the last ten years. The key difference in dental manpower between Denmark and the UK is that the provision of dentists has been and still is much more generous in Denmark.

2.1.8 Dental Manpower Situation in the UK

Personnel Categories

At present the British dental team comprises five different categories: dentists, dental surgery assistants (DSAs), dental technicians, dental therapists and dental hygienists.

Educational Policy

Dentists

Dentists have been educated in UK since the late nineteenth century. Early in this century considerations regarding the number of necessary dentists were expressed in official Scottish reports. Thus in the report of the Department of Health for Scotland 1931 (page 50), it is stated that 'to secure adequate dental supervision and treatment of defects, it is estimated that one whole-time dentist is required for not more than 5,000 children'. In the conclusion and recommendations of the Committee on Scottish Health Services Report (Department of Health for Scotland 1936) it is stated:

(1) "The value of dentistry as part of preventive medicine and the need for a greatly extended dental service are universally recognised."

(2) "We do not consider it practicable to establish a complete service at present and we take the view that effort should be directed in the main
to prevention and treatment in the early years."

(4) "The school service should INCLUDE INSTRUCTION IN DENTAL HYGIENE and should be supplemented by as much dental work as possible under maternity and child welfare and other schemes.

It is interesting to notice that already at this time (1936) instruction in dental hygiene was regarded as highly important. The Final Report of the Inter-Departmental Committee on Dentistry (Ministry of Health 1946, Teviot Report) concluded that there was a need for at least 20,000 dentists in ACTIVE PRACTICE and that, if this target were to be achieved within a reasonable timescale, say, some 20 years, the annual dental school intake would need to be increased from its then level of about 300 to 900.

A further review was undertaken by the Committee on Recruitment to the Dental Profession, the McNair Committee, which in their report in 1956 (Ministry of Health, Department of Health for Scotland) restated the manpower target as 20,000 on the Dentist Register, implying a rather smaller target for the members in active practice. In order to achieve this target the McNair Committee recommended an annual dental student intake of 1,000 instead of the current annual intake of 650. The annual target entry to dental schools was subsequently set in 1958 at 954 — although this figure was not actually achieved until the mid-1970s. The McNair Committee target of 20,000 dentists on the Register was not achieved until 1978.

In 1979 the Royal Commission on the National Health Service recommended in their report that no decision to alter the annual dental student intake should be taken until the implications of a
shift in dental policy towards prevention had been identified.

In 1980 the report of the Nuffield Inquiry into Dental Education concluded that, in the light of current knowledge, it would be a mistake to propose specific targets for the number of dentists required by a particular year.

The Dental Strategy Review Group suggested in their Report "Towards better dental health" (Department of Health and Social Security, 1981), that current dental school intake was too high and a cut of 10% might be in order. The Ministers decided that it would be premature to take a decision on the Reviews Group's recommendation until the Dental Manpower study had reported and a public announcement of this was made.

The Dental Manpower Study was announced in May 1981 and given the following remit:

"To review likely trends in the supply of and demand for dental manpower over the next 20 years or so."

In its report of 1983 The Study Group on Dental Manpower (Department of Health and Social Security) proposed a reduction of 10% in the annual dental school intake from 1983 (thus supporting the Dental Strategy Review Group recommendation). They further proposed that dental manpower planning should be subject to regular review.

During the eighties, a decision was taken to close two dental schools (one London and one Scottish, the Edinburgh Dental School). In 1989 the undergraduate intake in the UK was 805 (BDA 1991).

Unemployment has never been an issue amongst dentists in the UK. The dentist-patient ratio has risen over the last ten years from 1 dentist per 3682 population in 1981 to 1 per 3095 in 1991 (BDA 1991). The number increases every year and is predicted to
increase even with the closures of the two dental schools (BDA 1991).

Dental Ancillaries in UK

A dental ancillary is a person who is given responsibility by a dentist so that she or he can help the dentist render dental care, but who is not herself or himself qualified with a dental degree. The duties undertaken by dental ancillaries range from simple tasks, such as sorting instruments, to relatively complex procedures which form part of the treatment of patients (Elderton 1981).

The Dental Hygienist

This is a person who is permitted to carry out, to the prescription of a supervising dentist, certain specified preventive and treatment measures including some operative procedures in the treatment of periodontal disease. The dental hygienist is not permitted to carry out any operative procedures for the treatment of dental caries.

The duties of the dental hygienist are essentially the scaling and polishing of teeth, the topical application of fluoride and the provision of dental health education.

The Dentist Act 1957 allowed for the establishment of dental hygienists as the first group of ancillary dental workers, consequently detailed regulations were drawn up in which they could work.

In the UK, training is from nine months to one year. Training may or may not take place in an undergraduate dental school. Young and Striffler (1969) have pointed out that in America a peculiar relation exists between the supply of hygienists and the demand for their services by the dentists. In States with relatively large
number of hygienists the demand exceeds the supply, whereas in areas with few hygienists this is not the case. The former areas have had hygienists for many more years than the latter. This seems to demonstrate, perhaps without surprise, that as dentists become more accustomed to employing hygienists, they realise the advantages of so doing and consequently increase their demand for them.

In the UK the hygienists' enrolments with the General Dental Council have risen following an expansion of training in the early 1970s. About 180 hygienists qualify each year and there are now around 3,000 hygienists on the roll. At present rates of production we can expect continued growth of enrolment, but the roll is unlikely to grow much beyond 4,000. At that point, and assuming that three-quarters of enrolled hygienists work in primary care, we would have about eight dentists for one hygienist.

**Dental Therapists**

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 the UK the dental therapist was only allowed to work in the public health service.

The dental therapist (originally called dental auxiliary) began operating in the UK in 1962. Training commenced in 1960, following a revision of the Dentist Act in 1957 (mentioned above under Dental Hygienists).

They were permitted to work to written treatment plans devised by the supervising dentist, including the administration of local infiltration or analgesia.

The therapists' training course was of two years' duration,
but the school was closed in 1988. There were never any training in Scotland.

Dental Surgery Assistant

This is a person who assists the dentist with her/his clinical work but who does not independently carry out any procedures in the mouth (equivalent to the dental assistant in Denmark.)

This type of ancillary has probably been in existence since the time that dental treatment began and they are mentioned in all the major dental manpower reports and Acts from the Dentist Act in 1921 up till now.

The dental surgery assistant is working to help the dentists and other members of her/his staff so that they are able to spend more time providing actual care to the patients. Traditionally the dental surgery assistant has been given responsibility for the management of instruments, equipment and materials, including the cleansing, sterilising and recycling of these as necessary between patients. Some dental surgery assistants are also given patient reception and appointment-making duties, and general secretarial and clinical work.

In the past, dental surgery assistants received their training by apprenticeship in the employ of a dentist. While this situation still exists, formal training courses, usually of one to two years, have been introduced. Whether the dental surgery assistant has been attending a course or not, she may sit a national examination, the passing of which gives her official recognition as a qualified dental surgery assistant.
2.1.9  **Dental Health, United Kingdom, Scotland and Denmark**

Ideally, dental health policy and dental health education in any country should be based on accurate information of the dental health status of the populations concerned. It could therefore naively be thought that there was a direct link between dental health status and dental health policy. However major political, economical and cultural factors influence the decision making and implementation of dental health policy and dental health education so that the link may not be that obvious. It is not the purpose of this paper to examine to what extent the actual dental health status of the concerned populations have influenced decision making. Nevertheless it may be relevant briefly to look at and compare dental health in the two countries using existing data.

Comparison of any type of data which have not been collected with the purpose of comparison can be dangerously flawed. In the present case the presented data should thus be interpreted with care and are only meant to give a rough estimate of the dental health climate in which decisions have been taken and programmes implemented.

Data relating to children and adults have been dealt with separately and difficulties related to either child or adult dental health data will be mentioned as they occur. Some general problems will be mentioned first.

The surveys or studies used in the analysis between the two countries are not strictly comparable having been carried out by different investigators, with different standards of diagnosis. Also within each country it must be recognised that records do not always strictly satisfy epidemiological requirements in that the methods were not calibrated nor standardised. It is possible that
diagnostic criteria particularly relating to 'initial caries' have moved during the eighties. Individual dentists have found that the lower incidence and slower progression of carious lesions results in changes of the diagnostic criteria and strategies for treatment (Bille, Hesselgren and Thylstrup 1986, Heidmann et al 1988).

The comparisons between UK, Scotland and Denmark are further hampered by the fact that dental health data in the UK traditionally have been collected and published as whole tooth data (DMF-T), whereas data in Denmark traditionally have been collected and published as 'tooth surface data' (DMF-S). It is possible to convert DMFS to DMFT or visa versa but no reliable conversion factor has yet been acknowledged in the available scientific literature. In the following, all data are presented as they were in the original source without any conversions. Despite all these considerations some broad comparisons are possible.

Only data originating from the second half of this century have been included in the present analysis. It can be mentioned however that caries prevalence increased considerably in both countries in the 18th century, and a more 'modern' type of caries developed. Lesions in contact areas and fissures became the dominant type and the disease gradually affected younger individuals. The most serious increase in both prevalence and severity of caries is considered to have taken place in the 19th century (FEHR 1986).

Child Dental Health

UK - Scotland

The first national survey of children's dental health was carried out in 1973. It included England and Wales but not Scotland. A number of surveys had been carried out previously but
as they only included samples from various parts of the country and as such, were not representative for UK or Scotland, these cannot be used in a direct comparison with Denmark. However an analysis of these surveys can give an impression of the general pattern and trend of dental caries within the UK. Jackson (1974) thus summarised the results of over 70 published and unpublished surveys of caries experience in English children and young adults during the period of 1947-1972. With regard to 5-year-old children, he concluded that there had been little change in caries experience, that is the mean dmft during that period. In the permanent dentition, an apparent increase in caries experience (mean DMFT values) for 12-year-old children was reported according to the Ministry of Education quinquennial surveys between 1948-1968, and this trend was supported by results from other studies (Murray 1989). In Scotland, Mansbridge and Brown (1985, 1986) reported a substantial increase in caries experience in children aged five, eight and fourteen years during the period from 1952 to 1970.

From the early seventies, a steady stream of papers, by research workers using strict epidemiological techniques, along with the national surveys, have shown a clear downwards trend in caries experience among children and pre-school children in the whole of UK. All of these surveys have shown a substantially higher prevalence of dental caries in Scotland than in England in all age groups.

Table 2.12 shows the declining caries experience among English and Scottish 5-year-old children. It also shows fewer caries-free children and a higher caries experience in Scotland compared to England and the UK. The latest Scottish survey of 5-year-olds (Scottish Health Boards’ Dental Epidemiological Programme (SHBDEP)
1989/90 Report) did not show any further decrease from the 1987/88 SHBDEP survey. The authors (Pitts and Davies 1990) conclude:—

"The most important conclusion from this survey is that there has been no overall improvement in the dental health of Scottish 5-year-olds since 1987...."

TABLE 2.12 Declining Caries Experience in 5-year-old Children from the UK During the Period 1973-1989/90

<table>
<thead>
<tr>
<th></th>
<th>Scotland</th>
<th></th>
<th>England</th>
<th></th>
<th></th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dmft % caries free</td>
<td>dmft % caries free</td>
<td>dmft % caries free</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>3.3</td>
<td>4.0</td>
<td>28%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>2.73</td>
<td>1.6</td>
<td>51%</td>
<td>1.8</td>
<td>38-49%*</td>
<td></td>
</tr>
<tr>
<td>1987/88</td>
<td>2.73</td>
<td>1.35-2.46</td>
<td>64%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989/90</td>
<td>2.82</td>
<td>1.14-2.82</td>
<td>43-69%*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(varying with district)

* The total deciduous decay experience has in the OPCS studies from 1973 and 1983, been estimated based on various assumptions made concerning the reason for loss of the deciduous teeth and their health prior to loss. These estimations give the range rather than one exact figure.

Source:
Todd, J E (1975); Todd, J E and Dodd, T (1985); Pitts, S B and Davies, J A (1988); Pitts, N B and Davies, J A (1990)

Scotland has always lagged behind England during the period of improving dental health observed throughout the 1980s, having started with poorer figures. The question now is whether the results presented here mark just a "pause" in the downward trend for overall caries experience levels or whether Scottish figures have reached some kind of "plateau" at a level above that achieved in England. Also in the latest BASCD Report of 5-year-old children (Evans and Dowell 1991), it was concluded:

"... the trend in falling caries rates observed previously in this age group (Dowell and Evans 1989) is beginning to level off and the level of untreated disease among this young age group remains unacceptably high".
Table 2.13 shows a clear downward trend in 12-year-old children's caries experience in the whole of UK during the period of 1973 to 1988/89 and in Scotland from 1983 to the latest survey in 1988/89. Again the caries experience is much higher in Scotland than it is in the rest of the UK.

TABLE 2.13 Declining Caries Experience among 12-year-old Children from Scotland, England and the UK

<table>
<thead>
<tr>
<th></th>
<th>Scotland DMFT, 12-yr-olds</th>
<th>England DMFT, 12-yr-olds</th>
<th>UK DMFT, 12-yr-olds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>4.7 (England and Wales only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>4.5</td>
<td>2.9</td>
<td>3.1</td>
</tr>
<tr>
<td>1988/89</td>
<td>2.23</td>
<td>1.21-2.17</td>
<td>1.21-2.23 (England, Wales and Scotland)</td>
</tr>
</tbody>
</table>

Source:
Todd, J E (1975); Todd, J E and Dodd, T (1985); Pitts, N B and Davies, J A (1989); Evans, D J and Dowell, T B (1990)

Denmark

National data on Danish children's dental health have been reported by the National Board of Health annually since 1972. Dental health data prior to 1972 have been published but only including samples of children from selected parts of the country. These data cannot be used in a national comparison with Scotland or the UK but can give an impression of the development of dental caries in Denmark up to 1972.

Helm and Helm (1990) reported data on caries prevalence in 8- and 16-year-old Danish children from a northern community. Every fourth birth-cohort from 1950 through 1970 was followed longitudinally. In the 8-year-olds, caries prevalence decreased in the primary dentition from 17 to 3 dmfs and in the permanent dentition from 3.4 to 0.3 DMFS over a 28 year period. Among the
16-year-olds, a reduction was observed from 16.4 to 5.1 DMFS over 20 years. The oral health status of children was poor in the fifties, both in the concerned community and nationally, when the present school dental care was introduced, and the first noticeable decrease in DMFS score was not observed until 1970. In contrast to the primary dentition the decrease in DMFS level in the 8-year-old children had already started in 1962.

The national decline in caries prevalence for all age groups of Danish children since 1972 is well documented by the National Board of Health's annual statistics. A few illustrative examples will be presented. About 90% of all Danish children are seen and treated by the school dental service whereas the remaining 10% of the children are seen and treated by general dental practitioners. All the data presented here refers to children from the school dental service.

Figure 2.2 shows a continuous decline in caries prevalence (defs and DMFS) among first year school children (about 7 years of age) from 1972 to 1986. It is noticeable that whereas the D (decayed) and M (missed) component decreased constantly during that period, the F (filled) component increased towards the late seventies and decreased in the eighties.
Figure 2.2 Caries Experience (defs & DMFS) in Danish Firstyear Schoolchildren (about 7 years old) from 1972 - 1986.

Tables 2.14 and 2.15 show a consistent decline in defs and DMFS respectively in children from first to sixth school grade (about 7 to 12 year olds) during 1972-1988.

**TABLE 2.14** Caries Development in the Primary Dentition (defs) in Danish Schoolchildren from Class 1 to Class 6 during the Period from 1972 to 1986 (From 1988 figures are given by age of the children)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>12,4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>12,1</td>
<td>13,3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td>11,8</td>
<td>13,1</td>
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<tr>
<td>1975</td>
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<td>4,3</td>
<td>2,2</td>
</tr>
<tr>
<td>1985</td>
<td>5,1</td>
<td>6,2</td>
<td>6,6</td>
<td>5,7</td>
<td>3,9</td>
<td>2,0</td>
</tr>
<tr>
<td>1986</td>
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<td>5,7</td>
<td>6,3</td>
<td>5,4</td>
<td>3,6</td>
<td>1,8</td>
</tr>
</tbody>
</table>

**Source:** Sundhedsstyrelsen (1989)
TABLE 2.15 Caries Development in the Permanent Dentition (DMFS) in Danish Schoolchildren from Class 1 to Class 6 during the Period from 1972 to 1986 (From 1988 figures are given by age of the children)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>1973</td>
<td>2.6</td>
<td>4.1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>1974</td>
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<tr>
<td>1975</td>
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<tr>
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<td>3.4</td>
<td>4.5</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>1977</td>
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<td>3.3</td>
<td>4.3</td>
<td>5.5</td>
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<tr>
<td>1978</td>
<td>1.7</td>
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<td>6.5</td>
<td>8.3</td>
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<tr>
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<td>1.4</td>
<td>2.4</td>
<td>3.2</td>
<td>4.3</td>
<td>5.7</td>
<td>7.1</td>
<td>9.0</td>
<td>11.0</td>
<td>13.0</td>
</tr>
<tr>
<td>1981</td>
<td>1.1</td>
<td>2.1</td>
<td>3.0</td>
<td>3.9</td>
<td>5.1</td>
<td>6.8</td>
<td>8.6</td>
<td>10.5</td>
<td>12.3</td>
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<tr>
<td>1982</td>
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<td>7.7</td>
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<tr>
<td>1983</td>
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<td>3.1</td>
<td>4.1</td>
<td>5.3</td>
<td>6.9</td>
<td>8.7</td>
<td>10.4</td>
</tr>
<tr>
<td>1984</td>
<td>0.7</td>
<td>1.2</td>
<td>1.9</td>
<td>2.6</td>
<td>3.6</td>
<td>4.7</td>
<td>6.0</td>
<td>7.7</td>
<td>9.6</td>
</tr>
<tr>
<td>1985</td>
<td>0.6</td>
<td>1.1</td>
<td>1.6</td>
<td>2.2</td>
<td>3.0</td>
<td>4.2</td>
<td>5.4</td>
<td>6.7</td>
<td>8.5</td>
</tr>
<tr>
<td>1986</td>
<td>0.5</td>
<td>0.9</td>
<td>1.4</td>
<td>1.9</td>
<td>2.6</td>
<td>3.5</td>
<td>4.8</td>
<td>6.1</td>
<td>7.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>0.4</td>
<td>0.7</td>
<td>1.0</td>
<td>1.6</td>
<td>2.2</td>
<td>2.9</td>
<td>3.9</td>
<td>5.1</td>
<td>6.6</td>
</tr>
</tbody>
</table>

The Danish National Board of Health recommend that the development of caries experience should not merely be evaluated by mean caries (dmfs and DMFS) data. Thus in addition data on the severity of caries is published along with the conventional data.

Figures 2.3 and 2.4 are examples of data showing the development in carious severity. Four zones are defined according to severity: Zone 1 is caries free, Zone 2 includes pit and fissure caries, Zone 3 includes approximal caries and Zone 4 includes incisors or smooth surface caries. The principle is the higher the zone the more severe carious experience. Zone 3 will normally imply pit and fissure as well as approximal caries and Zone 4 will normally imply pit and fissure caries, approximal caries and smooth surfaces caries. Figure 2.3 shows the severity of caries experience in 12-year-old Danish children from 1978 to 1988. During this period caries has become less severe. The percentage of caries-free children (Zone 1) has consistently increased, whereas the percentage of children with more severe caries decreased. In 1988, only around 8% of the 12-year-old children had caries of the Zone 3 and 4 type. Figure 2.4 shows the change in caries severity among 8-, 12- and 15-year-old children from 1978 to 1988. The dramatic increase in the proportion of caries-free children has first and foremost been among the younger children (50% more in Zone 1). The same tendency, although not as marked, can also be seen among the 12- and 15-year-olds. Among the 15-year-olds a larger proportion has remained in Zone 2 and about 50% less were in Zone 4 in 1988.
Figure 2.3  Distribution of Caries Experience in 12 years old Danish Children in the Period from 1978 to 1988 According to 'Zones' of Caries Severity.

Zones:  
(4) Incisors or smooth surfaces caries  
(3) Approximal caries  
(2) Pit and fissure carries  
(1) Caries free

Source:  
Sundhedsstyrelsen (1989).  
Primaer Sundhedstjenestestatistik iii:11:1989  
Borne-og ungdomstandplejen in Danmark 1988
Figure 2.4: Caries Experience in the Permanent Dentition in 8 years old, 12 years old and 15 years old Danish Children in 1978 and 1988 According to 'Zones' of caries severity.

Zones:
(4) Incisors or smooth surfaces caries
(3) Approximal caries
(2) Pit and fissure caries
(1) Caries free

Source:
Sundhedsstyrelsen (1989).
Primær Sundhedstjenestestatistik iii:11:1989
Børne- og ungdomstandplejen in Denmark 1988
In summary, the caries experience as well as the seriousness of caries in Danish school children of all ages, has declined from the early seventies (maybe late sixties for certain age groups) until the late eighties. No signs of discontinuation of this development has been observed so far.

Comparison of Child Dental Health in UK, Scotland and Denmark

As the comparison of child dental health is hampered by various, previously mentioned limitations of available data, it was decided not to go into too many details. Therefore only two age groups, 5- and 12-year-old children have been compared.

Table 2.16 shows caries experience (dmft) and percentage of caries-free 5-year-old children in the UK, in Scotland and in Denmark. Since the first data from national surveys it appears as if caries experience is much less in 5-year-old Danish children than in Scottish 5-year-olds. The latest data 1989/90 shows that not only is a much smaller proportion of Danish children affected by caries but also that among those affected, the Danish children have less disease than the Scottish (2.8 dmft in Scotland, 1.28 dmft in Denmark). The quality of care, as measured by f/dmf, that is the number of filled teeth divided by the number of decayed-plus missed-plus filled teeth, is also much higher in Danish children compared to Scottish children (Table 2.16). One of WHO’s global goals for oral health in the year 2000 is that 50% of 5- to 6-year-olds will be caries-free. Denmark had already reached this goal in 1984/85 when 55% of 5-year-olds were reported caries-free (it is possible it was reached even earlier but data are not available). In Scotland this goal had still not been reached in 1990.
TABLE 2.16 Caries Experience (dmft) from 1968 to 1990 in 5-year-old Children, UK, Scotland and Denmark and Care Index Values for Scotland and Denmark

<table>
<thead>
<tr>
<th></th>
<th>UK dmft</th>
<th>% caries free</th>
<th>Scotland dmft</th>
<th>% caries free</th>
<th>Denmark dmft</th>
<th>% caries free</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>(4.5)*</td>
<td>(22%)*</td>
<td></td>
<td></td>
<td>(7/0)*</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>1.8</td>
<td>38-49%</td>
<td>3.3</td>
<td>20-26%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984/85</td>
<td></td>
<td></td>
<td>1.92</td>
<td>55%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985/86</td>
<td></td>
<td></td>
<td>1.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986/87</td>
<td></td>
<td></td>
<td>1.66</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987/88</td>
<td>1.35-2.73*</td>
<td>42-64%*</td>
<td>2.73</td>
<td>42%</td>
<td>2.73</td>
<td>42%</td>
</tr>
<tr>
<td>1989/90</td>
<td>2.8</td>
<td>42.4%</td>
<td>1.28</td>
<td>62%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

'care index' =

\[ f = \frac{\text{dmft}}{\text{dmf\%}} \times 100 \]

\[ 0.52 \times 100 = 18\% \]

\[ 1.4 \times 100 = 56\% \]

- data not available
- * figures in bracket: limited groups - not necessarily representative for whole child population
- ^ range in different regions within UK (BASCD Report 1989)


N.B. dmft data is not normally published by the Danish National Board of Health (= Sundhedsstyrelsen). The presented data have been kindly given by special request.

In the latest national health education policy statement for Scotland (The Scottish Office Home and Health Department, 1991) this fact is referred to as "the saddest statistic ...

Nevertheless in the same document the dental health target for the year 2000 is that 60% of 5-year-old school entrants should be caries-free.

In this relation it is relevant to note that Scotland, in all available data, has shown much worse dental health than the rest of the UK (apart from Northern Ireland) and that children from other parts of the UK are likely to have more similar caries experience to Danish children. Dowell and Evans (1989) reported many areas
with more than 50% caries-free 5-year-olds in the 1987/88 survey. The DMFT ranged from 1.35 to 2.46 (when not including Scotland). The levelling off of caries experience decline reported in the UK has not, so far, been reported in Denmark where caries decline appears to continue. Table 2.17 shows caries experience (DMFT) in 12-year-old children in UK, Scotland and Denmark during the years where national data have been available. A few earlier non-national figures have been included from a WHO survey of child dental health in Europe in 1974 to demonstrate that, whereas both UK, Scotland and Denmark have all shown a decline in 12-year-olds' caries experience, the decline among Danish children has been more drastic starting at a much higher level. During the eighties both Scotland and Denmark have reached the WHO global goal of no more than 3 DMFT at 12 years of age. The caries experience is lower in Danish children than Scottish children in 1988/89 but similar to certain regions of England.

TABLE 2.17 Caries Experience (DMFT) in 12 year-olds in UK, Scotland and Denmark

<table>
<thead>
<tr>
<th></th>
<th>UK</th>
<th>Scotland</th>
<th>Denmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>(5.5)*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1971</td>
<td>-</td>
<td>-</td>
<td>(10.00)*</td>
</tr>
<tr>
<td>1973</td>
<td>4.7 (England &amp; Wales)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1978</td>
<td>-</td>
<td>-</td>
<td>(6.4)*</td>
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<tr>
<td>1983</td>
<td>3.1</td>
<td>4.5</td>
<td>-</td>
</tr>
<tr>
<td>1984/85</td>
<td>-</td>
<td>-</td>
<td>3.41</td>
</tr>
<tr>
<td>1985/86</td>
<td>(3.0)*</td>
<td>-</td>
<td>3.05</td>
</tr>
<tr>
<td>1986/87</td>
<td>-</td>
<td>-</td>
<td>2.63</td>
</tr>
<tr>
<td>1988/89</td>
<td>1.21 - 2.23</td>
<td>2.23</td>
<td>1.63</td>
</tr>
</tbody>
</table>

* - data not available

* - figures in bracket: limited groups - not necessarily representative for whole child population

Source:
Adult Dental Health

The Adult Dental Health Survey 1988 is the latest in a series of periodic national surveys. The state of adult dental health in the UK in the late eighties is thus well known and it is also possible to make comparisons with similar studies carried out in the 1960s and the 1970s. In contrast, only one national adult dental health survey has been carried out in Denmark in 1981 (Kirkegaard et al 1987). The comparison between UK and Denmark can only give a static impression for the early eighties although, from the well documented improvement of child dental health and studies of limited groups, it is anticipated that adult dental health in Denmark also has improved.

Figure 2.5 shows the overall condition of dentate adults in Denmark 1981 and in UK 1988. Although the age categories are slightly different, it clearly shows the same pattern. During the lifespan the mean number of decayed teeth is low, never exceeding 2 DT. The number of filled teeth begins at around 10FT, increases until the mid-thirties and decreases again towards older age. The number of healthy teeth decreases all the way through life.
Figure 2.5: The Overall Condition of the Teeth of Dentate Adults. Means of Decayed, Filled, Missing and Healthy Teeth in the Respective Age Groups in UK in 1988 and in Denmark in 1981.

Source: Kirkegaard et al 1987, Todd and Lader 1991
If people are to be reliant on their natural teeth, it is desirable that they retain a considerable number of them. For the purpose of analysing data, the UK has set an arbitrary level as a desirable goal, that is, the retention of 21 or more out of the maximum of 32 teeth. In Denmark data are only available for 20 teeth or more. Given this difference, Table 2.18 shows the percentage of the population in each country in various age groups with a minimum of 21 respective 20 teeth. In the UK, data are available for 1978 and 1988 showing a significant improvement over the ten years. With a little precaution taken into account and the different age-categories, it could be argued that the proportion of dentate adults in Denmark with at least 20 teeth in 1981 is about the same as the proportion with 21 teeth in the UK in 1988.

**Table 2.18** Adults with 21 (UK) or 20 (Denmark) or more Natural Teeth in 1978, and in 1988 in UK and 1981 in Denmark

<table>
<thead>
<tr>
<th>Age</th>
<th>UK - 21+ teeth</th>
<th>Denmark - 20+ teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 - 24</td>
<td>97%</td>
<td>100%</td>
</tr>
<tr>
<td>25 - 34</td>
<td>85%</td>
<td>95%</td>
</tr>
<tr>
<td>35 - 44</td>
<td>65%</td>
<td>83%</td>
</tr>
<tr>
<td>45 - 54</td>
<td>34%</td>
<td>60%</td>
</tr>
<tr>
<td>55 - 64</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>65+</td>
<td>8%</td>
<td>17%</td>
</tr>
<tr>
<td>All ages</td>
<td>51%</td>
<td>63%</td>
</tr>
</tbody>
</table>


Certainly the Danish situation in 1981 is much more similar to the 1988 UK situation that the 1978 UK situation. Overall, the proportion of UK adults who have 21 or more natural teeth has increased from 51% to 63%. The UK figures for the different age groups shows dramatically that there is a large cohort effect in the distribution; passing the threshold of 12 missing teeth as the cohorts move through the age structure is small compared to the
historical levels for different cohorts. For example, in 1978, 65% of adults aged 35 to 44 had 21 or more natural teeth, ten years' later in 1988 as many as 60% of adults aged 45-54 still had 21 or more natural teeth, compared with only 34% of 45 to 54-year-olds ten years earlier. Since longitudinal data are not available in Denmark it is impossible to say whether the same development is taking place. With the well documented drastically improved child and youth dental health (Fejerskov et al 1982, Schwartz 1983, Bille et al 1986, Sundhedsstyrelsen 1989, Helm and Helm 1990), it is tempting to assume so. However all that can be stated for certain, is that the proportion of adults in Denmark with 21 or more natural teeth was significantly higher than the proportion of adult with 21 teeth in the UK in 1978 and very similar to the proportion in 1988.

The total tooth loss as well as the changes in total tooth loss over time is well described in the UK. All areas of the United Kingdom as well as all age groups have improved between the national surveys. Toothlessness, however, is still in 1988 relatively common, worst in Scotland where as many as 26% were reported to have no natural teeth. Apparently toothlessness is much less common in Denmark in all age groups. In 1981 only 17.1% had no natural teeth, the vast majority of these being over 65 years of age (Tables 2.19 and 2.20). In this relation it should be noted that tooth loss is not necessarily related to disease experience, but also reflects attitudes among dentists as well as patients.
### TABLE 2.19  Percentage of the Adult Population with Total Tooth Loss in UK and Denmark

<table>
<thead>
<tr>
<th></th>
<th>All ages</th>
<th>England and Wales</th>
<th>Scotland</th>
<th>UK</th>
<th>Denmark</th>
</tr>
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<tbody>
<tr>
<td>1968</td>
<td>37%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1972</td>
<td>-</td>
<td>44%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1978</td>
<td>29%</td>
<td>39%</td>
<td>30%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1981</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>17.1%</td>
<td>-</td>
</tr>
<tr>
<td>1988</td>
<td>20%</td>
<td>26%</td>
<td>21%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>


### TABLE 2.20  Percentage of Total Tooth Loss in Different Age Groups in Scotland in 1972, 1978 and 1988 and in Denmark in 1981

<table>
<thead>
<tr>
<th>Age</th>
<th>Scotland 1972</th>
<th>Scotland 1978</th>
<th>Scotland 1988</th>
<th>Denmark Age 1981</th>
</tr>
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<tbody>
<tr>
<td>16-24</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>16-19</td>
</tr>
<tr>
<td>25-34</td>
<td>13%</td>
<td>10%</td>
<td>2%</td>
<td>20-29</td>
</tr>
<tr>
<td>35-44</td>
<td>35%</td>
<td>27%</td>
<td>7%</td>
<td>30-39</td>
</tr>
<tr>
<td>45-54</td>
<td>54%</td>
<td>54%</td>
<td>33%</td>
<td>40-49</td>
</tr>
<tr>
<td>55-64</td>
<td>78%</td>
<td>64%</td>
<td>48%</td>
<td>50-64</td>
</tr>
<tr>
<td>65+</td>
<td>87%</td>
<td>85%</td>
<td>72%</td>
<td>65-81</td>
</tr>
<tr>
<td>All Ages</td>
<td>44%</td>
<td>39%</td>
<td>26%</td>
<td>All ages 17.1%</td>
</tr>
</tbody>
</table>


**Summary**

**Concluding remarks regarding dental health in Denmark and the UK**

Taking into account the limitations of available data, it seems as if dental health and the quality of care is better in Denmark than it is in the UK and particularly Scotland, among young children. Also toothlessness is much less common. The same patterns through life seem to take place and in both countries oral health has improved through the eighties. No cause relationships have been analysed as it is not the purpose of this presentation. Nevertheless it should be possible from the presented data to see, in the following analysis, whether differences or similarities have
influenced dental health policy and/or dental health education in any of the two countries.

2.1.10 Structure and Organisation of Dental Health Education in Denmark

The Three Different Sources of Dental Health Education

The history of dental health education in Denmark has, on a structural and an organisational level, been very different from the history in the UK.

In principle, dental health education in Denmark has three different sources. One is the national school service which from its beginning included some general health education. The second source is the dental health service. The third source is the Preventive Council established in 1980. In contrast to the UK no governmental body concerned with health education existed in Denmark until 1980! In the following sections these three sources will be described separately.

Dental health education in the school service

The first signs of any form of health education in schools didn’t appear until the end of the nineteenth century. In 1889 the first course in health education was established at the Danish College for Teachers (Danmarks Laererhojskole) (Olrik 1906). In 1903 natural history became an obligatory subject and health education part of it (Law of 27 April 1903).

In 1942 health education became for the first time an obligatory subject with its own specific topic description (Undervisningsministeriet 1942). It included a theoretical part and a practical part concentrated on hygiene.

In 1969 health education again lost its status as an
independent subject and the separation between theoretical and practical health education became even more prominent. Theoretical health education became part of the biology teaching and practical health education became part of physical training. Further it was stated that teaching the effects of alcohol and the misuse of drugs should be included. Finally it was pointed out that health education should not become disease education even though the most common diseases and their prevention should be mentioned (Jensen 1986).

With the Primary Education Act in 1976, when compulsory education was expanded to nine years, the teaching of health education was changed again. Health education was taken away from the biology teaching and became a "paragraph six topic" (Act No.313 of 26 June 1975 about Primary Education). The teaching of health education would from then on be integrated in the teaching of Danish, (1-5 grade), biology (3-7 grade), contemporary orientation (8-10 grade) and if necessary physical training and home content subject (Undervisningsministeriet 1975). In an analysis of health education in schools, Jensen (1986) explains this change in health education teaching as follows:

"The integration of health education teaching with several different subjects in primary school was a reflection of the general tendencies in the mid-seventies to perceive and understand health as not only having to do with biological aspects such as anatomy, physiology or hygiene but having a much broader definition and being related to many different contexts of human life."

Another reason for the change in health education teaching was the concern with biology teaching. It had become traditional that health education took up a large part of biology teaching thereby leaving too little time for more specific biology. After
negotiations between the Ministry of Education and the professional consultants ('biology experts') the aim of health education teaching was agreed and stated as follows (Undervisningsministeriet 1975):

Para. 13. "The aim of the teaching is, that the pupils obtain knowledge about the basic conditions for human health and well being and a special knowledge about the harmful effects of stimulants and drugs.

Part 2. The aim must be that the pupils become familiar with their own personal role in preventing diseases and avoiding misuse of stimulants and drugs and that they know about society's possibility of contributing to this".

With regard to the causes of health problems it is stated (Undervisningsministeriet 1976):

"The task of health education teaching is to point to social questions on human health and well being ... The knowledge of social inequalities in health can lead to discussions about the reasons for inequality in health. On this basis it can be demonstrated how improvement of the environment may counteract many serious diseases" (author's translation).

The question of the relationship between social class and health has led to the debate on the contribution of individual behaviour versus the influence of the social environment on health. This has always been a focus of health discussion in Denmark (Jensen 1986). That it became much more pronounced in the mid to late seventies was reflected not only in the Act of Primary Education but also in the governmental establishment of a Health Priority Committee which lead to the creation of the first health education body in 1981 (see later).

Even though health education thus by law became part of the Primary School Curriculum it is questionable how much health education teaching is taking place.

In order to study how each municipality acted in relation to
the Ministry's guidelines for health education two surveys have been carried out, one in 1978 and one in 1985 (response rate 72% and 99.6% respectively). In an analysis of the results comparing these two surveys Jensen (1986) concluded:

1. Regarding the content of the teaching: some municipalities have divided health education into physical and mental health. Other municipalities have given stimulants and drugs an extremely high priority and a rather large group of municipalities have added new topics or elaborated the governments guidelines

2. The structural changes are all characterised by an emphasis on ensuring that health education is actually taught. For example, some municipalities have appointed one teacher to be responsible for co-ordination of health education through all years of school, other municipalities have specified exactly what should be taught, for how many lessons and in which year of primary school.

Jensen (1986) points to several problems in the existing health education teaching. One is the absence of directions for responsibility. Another is that the teachers themselves are taught very little about health education during their own education. A third problem is the poor availability of teaching materials.

Even though there are a number of difficulties with health education in schools, it is at least being carried out with the support of the law. It is not possible to say exactly how much of this teaching has been or is related to dental health education. However, many health education/health promotion projects have been developed and carried out collaboratively between schools and the child dental health service. In this respect it has to be remembered that the child dental health service and its surgeries are physically placed at the premises of the municipality's school which obviously makes co-work easier.

Dental health education in the dental health service

As previously described the dental health service for adults
and for children in Denmark differs considerably. The history of structure and organisation of dental health education will therefore be described separately for children and for adults.

Dental health education in the child dental health service

From an organisational point of view the child dental health service was rather limited from its early beginning around the turn of the century up until the 1950s. Also health education activities were few and limited. It was predominantly instruction based upon one-way communication.

In 1958 the National Associations of Municipalities recommended to the Ministry of the Interior that the problems involved in children’s regular dental care should be analysed by a government commission.

As a result of this proposal a government commission on Children’s Dentistry was established in 1959. Seven years after, the commission published the report on Public Preventive Dental Care for Children. The report contained a detailed situation analysis and recommendations concerning the development of a free and comprehensive oral health care programme for all Danish children. The report also contained a fully prepared proposal for a framework law to be negotiated in the Parliament. It was underscored by the commission that the future oral health care system for children should be free of charge and based on prevention. Further it was implied that treatment of disease was to be considered only as a safety net for the preventive programmes. In the proposed ministerial regulation to the law it was stated that the oral health care system should contain the following mandatory measures:

1. General preventive measures including health
education activities etc. which are necessary and realistic according to the local needs

2. Individual preventive measures including health education of the individual child and the parents (author's emphasis)

3. Regular full-scale examination and supervision of the growth and development of the dental complex

4. Full treatment to the extent necessary to maintain the adequate function of the orodental complex.

The commission found that the future planning and evaluation should be based on better and regularly collected epidemiological data and information. Therefore another section of the bill made it obligatory for the municipalities to collect and report data according to rules laid down by the National Board of Health. Another five years passed before the commission's recommendations were passed by the parliament.

Lind (1983) writes in a report of the history of the school dental service:

"The report of the commission was handed over to the Minister of the Interior in 1966. However, due to the fact that there was still a marked shortage of dentists and also for economic reasons it was decided by the government to postpone the introduction of the bill to the Parliament"

and further:

"The Act on the children's oral health care system

In 1970 the previous 1,300 municipalities and 25 counties were reorganised with the purpose of creating larger and economically stronger municipalities. The reorganisation reduced the number of municipalities to 277 and the number of counties to 14. This important municipal
reform became the administrative and economic platform for the introduction of the so-called Social Reform which included several health reforms as well. During the first years of the 1970s laws concerning the social welfare system and the health care system were passed by the parliament. One of the first to be passed by the parliament was in fact the Act on the Children’s Oral Health Care System. Simply because it was fully prepared and ready to be introduced. The bill proposed by the commission fitted quite perfectly to the new philosophy advocated by the creators of the social reform. With a few changes the bill was passed by the parliament in 1971 and came into force on August 1st, 1972" (author’s emphasis).

A translation of the full Act including later amendments is attached as Appendix I.

The regulations related to the Act outlined by the Ministry of the Interior (Ministry of Interior 1971) are rather interesting because of their extremely strong emphasis on dental health education.

In para.3. on the obligatory extent of the child dental service it is stated in the order as presented:

The child dental service shall include:

1. General preventive measures including information systems which are needed and feasible in the municipality
2. Individual preventive methods, including information to the individual child and the parents, and instruction in dental care for each single child
3. Frequent examinations of dental development and health status
4. Treatment of dental diseases and malocclusions necessary to maintain the dentition in a good functional state (author’s translation).
It is further interesting that although participation in the service is voluntary, withdrawal can only be done by the parents in writing.

The admission to the dental service in Denmark is automatic, and does not need notification from anybody. Further, the service is outreaching so that children who are not going to school in a particular municipality (i.e. taught at home, living in institutions etc.) have to be included as long as they live in the municipality.

In the National Health Board's guidelines for the Child Dental Health Service (Sundhedsstyrelsen 1972), the preventive methods were outlined as follows:

a) Information services about the importance of a healthy, functional teeth mouth and jaw region, including the importance of appropriate diet, good oral hygiene and regular dental examination and the consequences of undesirable oral habits

b) Motivation for appropriate dental health care in the broadest sense after leaving the child dental service

c) Instruction in regular home dental health care

d) Prophylactic medication in agreement with current regulations, including the use of fluoride, orthodontic prophylaxis etc.

(author's translation).

It is striking that when prevention is defined in detail, by far the most important features are in reality dental health education activities.
Prior to this law being passed, many of the 275 municipalities, on a voluntary basis, had established free school clinics for school children. In 1972, the first year of the law, 377,000 children under compulsory education (7 to 15 years of age) were included in the oral health care system.

During the first decade from 1972 the number of municipalities with their own oral health care facilities increased noticeably under the provisions of the Act.

Thogersen (1983) states in a review of primary prevention in the CDHS:

"Over the first decade since the Act a high priority has been attached to prevention of oral and dental diseases. Prevention is a broad-spectred area and the programmes introduced by the various municipalities have differed from place to place. However, preventive efforts have appealed strongly to both the municipal authorities and the personnel. This has lead to a continuous upgrading and enrichment of the preventive measures as well as the health education activities.

A significant proportion of the preventive activities takes place outside the clinical facilities, mainly in schools and day-care institutions. The focus of this fieldwork is on groups of children and generally the programmes contain regular mouthrinses with fluoride solutions. The personnel seek to involve the children actively with the purpose of motivating them towards a meaningful oral health related behaviour. The health education component also includes instruction to raise the level of knowledge about teeth and dental diseases. Effective oral hygiene technique is considered an important part of the programme. Health education and sometimes health entertainment is usually initiated in the kindergartens and has more and more become an on-going activity throughout school age. The planning of the preventive activities take place locally by the personnel, usually in co-operation with the teachers and the school authorities. The practical execution of the accepted plan is taken care of by oral hygienists or specially trained chairside assistants. The preventive activities are
generally speaking backed up by the teachers
and quite often they become motivated to play a
more active role, which understandably enough
secures a more in-depth learning.

Also professional groups such as day-care
mothers, public health nurses and medical
doctors are approached with the purpose of
establishing a local platform for the promotion
of oral health. Through local papers and
journals the efforts can be translated into
commonsense communications with the local
people. However, the most important key
persons are the parents, and through parent-
teacher-association meetings and a standing
invitation to visit the clinics, parental co-
operation and active support is sought,
established and maintained" (author's
emphasis).

Regarding secondary prevention (interception of oral diseases,
i.e. incipient dental decay) she further states:

"Local application of fluorides, individual
instruction in oral hygiene including the use
of dental floss and diet counselling are some
of the most conspicuous measures practised.
All these measures are followed-up at later
visits. The examination intervals may also be
individualised to ensure early detection of
disease symptoms and prompt treatment."

It thus seems as if dental health education plays an important
role in the CDHS in agreement with the intention of the law.

No national surveys have been carried out with the intention
of measuring exactly how much dental health education takes place
in each municipality. However, individual reports and a few
surveys will be described.

Heidmann (1982) examined the changes in the CDHS in two
municipalities in the period from 1972 to 1980. He concluded that
among the important features were the general changes that had
taken place in society, the increasing role of the parents who had
participated in the CDHS and changes among dental personnel towards
a more preventive effort. From a questionnaire answered by parents
and teachers he further concluded that teachers felt that the CDHS
did not disturb their teaching (most dental health education activities take place during teaching time) and they perceived the contact with the CDHS to be positive. They thought that the children enjoyed participating and they preferred the CDHS to remain public and with the majority of activities taking place within the school time. In his discussion of the reasons for the considerably improved dental health programme in the municipalities concerned he states that the improvement cannot be related to any single factor, but the general effect on the population was possibly due to the positive evaluation of the CDHS of teachers and parents.

In a report from another municipality (Farum 1980) it is stated that to improve dental health (further), preventive dental services, especially health education should be continuously expanded. In another municipality the report about prevention in the CDHS stated that, in order to improve dental health it was necessary to establish permanent positive dental behaviour and this should be obtained by dental health education activities through all the years of childhood in close co-operation with key persons surrounding the children (parents, teachers, health visitors and dental staff) (Social og Sundhedsforvaltningen 1979).

In general it seems as if the DHSC in Denmark is thought highly of by both providers and consumers and that dental health education plays an important role. However, these are all "insiders" viewpoints. In order to obtain a critical evaluation from outside, the Danish Dental Association invited three internationally recognised experts (British) in community and child dental health to carry out an objective evaluation of the service.

In their report (Davies, Downer and Holloway 1982) they state:
"What a visitor sees is a future of healthy mouths containing beautifully restored teeth in people with a high dental awareness, happily attending for regular dental inspections to detect early signs of disease ... It would be difficult to imagine reality coming so near to perfection than is the case with the Danish Child Oral Health Care Service, and it would seem churlish therefore, to offer any criticism. However, that is what the assessment team were asked to do".

The main criticism from the team was that the service was far too expensive, it could and should be rationalised in several ways. Specifically about dental health education they write:

"Although individual and community dental health education is very important for raising dental awareness and giving the population the knowledge by which they can care for their own dental health, it is again important to ensure that this is controlled and that the correct emphasis is placed on the messages given. The team gained the distinct impression that there was an over-emphasis on toothbrushing at the expense of sugar control in the advice given to children. This might have been encouraged by the lavish provision of facilities in the clinics for the instruction of patients in oral hygiene techniques."

They further criticised that dental health education to them, seemed to be carried out by fully trained dentists instead of lesser trained staff at lower cost.

The Youth Dental Care Scheme

The group of youths (16 to 18 year olds) poses a special problem because they have to transfer from the public to the private system. During their participation in the CDHS they have automatically been regular attenders and included in the various preventive measures. In order not to lose this group during the transfer and to maintain 'lifelong motivation' which they should have gained from the CDHS various transfer schemes have been established.

In 1965 the National Sick Benefit Association and the Danish
Dental Association reached a contractual agreement concerning a regular dental care scheme for the youth which would encourage the teenager to continue the regular dental health behaviour practised through the school age.

The youth dental care scheme covered all citizens born in 1945 or later and being at least 16 years of age. In 1980 the scheme covered the age group from 16 to 35, i.e. 1.5 million individuals and was simply called the Regular Dental Care Scheme.

It favoured those who had registered by a lower patient share of the charges and also the regular dental examinations were free of charge.

In 1976 an addendum to the contractual agreement with the National Health Insurance was introduced. It included an automatic recall system and, for participants between 16-20 years of age, clinical prevention and oral hygiene instruction were to be given free of charge. Part of this agreement was that the effect should be evaluated by a joint group of the Danish Dental Association (DDA) and the National Health Insurance. Michaelsen (1983) from the DDA states:

"During the evaluation period from October 1976 to January 1979 a significant improvement was shown in utilisation rate, gingival health and in the control of plaque formation."

In 1982 the contractual agreement between the DDA and the National Health Insurance states:

"The youth scheme does not include dental care, after the termination of the calender year in which the insured reach the age of 30 years."

In 1986 a new law on dental health care was introduced. The National Health Board's guidelines for organisation of public dental health care (Sundhedsstyrelsen, December 1986) states that the free preventive and curative dental health care includes all
children and youths between 0 and 18 years of age. In relation to the new Act on dental health care the contractual agreement between the DDA and the National Health Insurance states that the 18 to 30 year olds will no longer automatically be called up with regular intervals by the National Health Insurance. The dentists themselves will, from then on be responsible for calling in all patients whatever age. Because of this and other changes resulting from the new Act and the new agreement, the DDA in co-ordination with the National Health Insurance, planned a national information campaign for late 1987 - beginning of 1988.

All these different and changing arrangements obviously not only reflect the problem of changing from public to private dental care services but also reflect the fact that the group of youth, despite the intentions of the CDHS, are not motivated for life. It seems as if the dental health education message on regular visits to the dentist works almost perfectly when the attenders are automatically 'taken' to the dentist (as in the CDHS) but not quite as well when it is left to the patient to seek dental care.

In a study of the regular call-up system for the youth Antoft (1978) found that the 100% attendance in the CDHS is reduced to 65% during the first 4-5 years after participation in the CDHS has been terminated. The survey showed that the 'drop-out' group consisted mainly of young men from the lowest social class. Of particular relevance to dental health education was the fact that the study population's knowledge, attitudes and beliefs about preventive and curative dental care could not be related to their lack of preventive dental health behaviour.

Thus in conclusion it can be said that the Danish Dental Health Service for children and youth by law and in practice has an
extremely strong emphasis on prevention, dental health education being the major component, but this may not create lifelong motivation for preventive dental behaviour.

**Dental health education in the adult dental service**

As previously mentioned, the adult dental service in Denmark has, since the beginning of this century, been a private service with different reimbursement schemes and based on a fee per item payment system. Up to date it would be wrong to say that dental health education in any way has been strongly emphasised. Apart from the youth scheme and a short-term limited periodontal scheme, no provisions for prevention have ever been made until the new Act of Dental Health Service came into force from 1 January 1987. It has, of course, been assumed that the dentist in his/her practice provided the necessary dental health education along with relevant treatment but there was never any special payment for this.

Since no national health education organisation (governmental or non-governmental) existed until 1980 and no organised commercial input took place (except from ordinary toothpaste advertisements though not through television or radio), it is a fact that dental health education for adults has been extremely limited. The only possibility for receiving any dental health education at all has been either through the school dental service if you had any children, or from your dentist if you saw one and he/she volunteered the information without payment.

Despite this the population’s dental health care has improved over the last decade (National Health Board 1985, ATFO Report). It also seems as if there has been an increase in the number of regular adult attenders (Sundhedsstyrelsen, 1985). In 1984 the Minister of the Interior asked the National Health Board to provide
suggestions for revision of the Act on Child Dental Health care and to prepare a review of the problems and models for solutions for total dental health care in Denmark. In 1985 the working group under the National Health Board published their report which became known under the name of the ATFO report. The report clearly states that there exists a large need for dental care in the adult population and if this need is to be met certain changes, in the form of different priorities, has to take place. What the working group really says is that to improve the adult population's dental health emphasis has to be put on prevention (dental health education is not explicitly mentioned). They further state that the essential reason for the adult dental service not having developed in a preventive direction is the contractual agreement with the National Health Insurance. The group therefore bases its suggestions for an improved dental health care service on a fundamental change of the remuneration system in the National Health Insurance for the adult population.

Although they suggest several models for improvement, all the models included a general change, namely the introduction of a so-called "diagnostic and preventive basic payment". Cited from the report (ATFO):

"This payment which has to be offered to everyone entitled to National Health Insurance dental care once per year, has to include an out-reaching element and a total examination as well as basic prophylaxis. By basic prophylaxis is understood typically, demonstration of plaque and calculus and instruction in effective home dental health care or fluoride prophylaxis".

Obviously the new Act could not include any regulations about the Health Insurance payment but in the agreement between the DDA and the National Health Insurance valid from 1 January 1988 the
recommendations from the working party were taken into account.

The new contractual agreement included, among other changes, an expanded diagnostic and preventive payment.

In conclusion it can be said that dental health education in the adult dental service has been extremely fragmented until now but the new Act and the new contractual agreement open possibilities for increased dental health education for the adult population.

The Preventive Council

The third potential source for dental health education is the Preventive Council.

Background

A growing concern with the development of the health sector during the sixties and early seventies, led to a decision on the establishment of a plan for priorities within the Health sector in the Danish parliament in early 1974 (Figure 2.6).
The following proposal was submitted for parliamentary resolution:

"The Danish Parliament requests the Government to prepare a general plan for the development of the entire health sector. The plan shall aim at developing the primary health service, viz. medical practice, home nursing, homes for the elderly etc. and at the same time try to bring about a certain abatement within the hospital sector" (Indenrigsministeriet, 1981).

Owing to the uncertainty that had been manifested during the first reading of the proposal in Parliament, the then Minister of Interior and of Social Affairs and the Parliamentary Committee on Social Welfare agreed that the continued work with setting priorities within the health sector demanded preparatory work in committee. The Parliament accordingly adopted the following resolution:

"The Parliament requests the Government to appoint a Committee with the task of providing the basis for establishing priorities within the Health sector."
Later that same year, November 1974, a committee was appointed with the following assignments:

The Committee has the task of providing the basis for setting general priorities concerning the treatment and prevention of illness with the aim of exploiting the limited resources in the best possible way.

The Report on Priorities

The committee's report was published in 1977 (Figure 2.6). It states that higher priority should be assigned to preventive measures and it particularly points to health information and health education as significant areas of future efforts.

The committee further found that the need for assigning a higher priority to preventive measures was so urgent that, at least for some time, a National Preventive Council should be established at an early date. The council should be able, through a submission of proposals for preventive measures, to urge the administration and politicians to include the concept of prevention in their considerations.

The working group further indicated that increased health education was essential for the endeavour to limit current health problems. It considered health education necessary to create radical changes in attitude towards the importance of prevention in all sectors of society including the public, politicians, administrators and professionals. It suggested that health education should be concentrated on two areas:

"1. health education aimed at the individual citizen in order to teach him the effect of his own behaviour on his own state of health and make him act accordingly
2. an educational effort to teach decision-makers such as politicians, administrators, technicians to consider the effects on health of their dispositions" (Ministry of the Interior 1981).

The Committee found that the task of health education was so comprehensive and difficult that there was a need for a more detailed expert analysis and evaluation and therefore recommended that the question of health education should be considered as soon as possible in the National Preventive Council. The committee further suggested that health education should be integrated into the existing training programmes at many different levels to a much greater extent than hitherto. However it disagreed with the working group’s suggestion of creating a special intermediate educational training programme. In other words, it did not recommend training of health educators similar to those in the UK.

The financing of the increased preventive efforts as suggested by the committee was especially interesting. The working group recommended that the assignment of a higher priority to prevention in terms of resources should take place primarily through a changed distribution of the resource investment. However the committee thought that an increased preventive effort would, on a short view, demand a certain net increase in the expenditure of resources. The committee further pointed out that the other sectors (other than the health sector) should also contribute to the promotion of preventive measures through an internal reallocation of priorities as regards resources.

"From an overall health political view, the Committee finds it proper to assign a higher priority to the preventive effort, even if, this may imply that new treatments of a specially refined character, but of a limited field of application, will have to be postponed or abandoned in certain cases."
In their final recommendations the committee states:

"In support of the development of a co-ordinated preventive effort the committee proposes that a special, possibly temporary, inter-disciplinary preventive council should be established. Furthermore, the committee recommends that a broad health educational effort be directed towards the population from the health sector, the sector of education and other sectors. Common conditions of realising the proposals of the committee are: an adoption of the politico-administrative structure, a co-ordinated planning for the entire health sector and an information basis developed for this purpose."

The Beginning of the NPC and the Creation of The Central Health Education Committee

In 1980 the Ministry of the Interior established the National Preventive Council (NPC) (Figure 2.6) according to the Act on the Preventive Council passed by the Danish parliament in May 1979.

The Act states two main tasks namely:

1. to currently and critically evaluate existing preventive and health promotion activities in and outwith the health sector and

2. to prepare suggestions for health promotion activities to the Minister of the Interior.

According to para 2. of the Act the Council consists of 17 members, all appointed by the Ministry of the Interior for 4 years at a time. Of these, seven are personally appointed, and ten are appointed after recommendation, from the Ministry of Working Affairs, Ministry of the Environment, Ministry of Social Affairs, Ministry of Education, the National Municipality Committee, the County Council’s Association, the Council for Planning of Research, the States Council for Home Affairs and the National Council for Consumers.

The Council immediately established a temporary working group
with the task of analysing present health education activities in Denmark and on that basis point to ways of promoting health education development.

Less than a year after its establishment the working group delivered their report, which was published in three separate publications by the Council (Forebyggelsesrådet, 1981A, 1981B, 1981C). The first publication described where most of the health educational activities in Denmark were initiated, what it was based on and the significance of official central or local governmental bodies involvement. In addition it contained a description of health education organisation in "Two countries with a traditionally large emphasis on health education" namely England and Sweden. The description on health education in England states:

"the emphasis hitherto has mainly been on building a traditional educational system in the health area whereas the Danish emphasis increasingly has been on developing the educational side and discovering new activating and engaging ways of making health education effective" (author's translation).

The report indicates that centrally (i.e. HEC) the main focus seems to be on the production of traditional (old fashioned) health information materials. The report further points to the constitutional differences between the HEC and the NPC, all the members of the HEC being personally appointed and thus not implicitly representing different sectors of the society as the Danish NPC does. They further state that an essential part of the resources is used for traditional health information in the form of major campaigns of which the materials from a Danish viewpoint seem rather alien. This was partly because of the use of fear-effect particularly seen in tobacco and alcohol materials and also because
of the, according to Danish norms, exerted popularisation and idealisation in the form of the use of comic competitions etc.

In almost all written materials about health education from the late seventies in Denmark there was a clear distinction between traditional health information (sundhedsoplysning) and the new concept health promotion (sundhedspædagogik), which was considered to be a much wider concept containing traditional health information as just a rather minor part.

The second report 'Research on health education (Forebyggelsesradet 1981B), was a summary of selected scientific literature about health education. Among several conclusions can be mentioned:

a) the studies that had been examined could not be used as an argument for either centralisation or decentralisation

b) disagreement in the literature with regard to professionalism of health education

c) no comprehensive synthesis or theory about the effect of health education could be found

d) health education has to be activating

e) health education methods include more than just mass-media and educational methods. i.e. support by legislation, financial political means and other efforts on the social level.

A total of four out of the 47 studies examined were dental health education studies.

The third report 'Health educational activities in Denmark' (Forebyggelsesradet 1981C) shows the results of a survey about current health education activities among all municipality
officials, numerous other officials, institutions, societies, bodies and single persons (about 800 enquiries, including both of the dental colleges). A systematic reading of the results shows that dental health education constitutes a major part of all health activities. In fact it seems to be the single topic most frequently occurring.

The working group on health education under the NPC recommended the establishment of a centrally placed body to co-ordinate administrative functions and to secure access to and co-operate with the central government administration. Parallel to the central body they recommended that a network of broadly constituted local and/or regional groups working with health education development should be established. In November 1981 the Central Health Education Committee were appointed as a subgroup of the NPC.

The Work of the Central Health Education Committee

In the report of the first two years of its existence (Forebyggelsesradet, 1982) the committee stated their goals as follows:

- to develop consciousness of the personal responsibility of a healthy lifestyle
- to develop consciousness of the influence of living conditions on health
- to develop skills necessary for a healthy lifestyle and healthier living conditions.

In its work it has given priority to two main tasks:

First, outreach:

a) collection of information about health education initiatives
b) initiation of new initiatives  
c) initiation of development of methods and tools for evaluation  

Second, development:  
a) a running evaluation of health education initiatives and of the relationship between health education, health policy and other activities  
b) co-ordination of different types of activities  
c) marketing of the idea of health education towards politicians, administrators, professionals and the public.  

Among the many activities they reported can be mentioned:  
a) applications to all municipalities and counties proposing the establishment of local preventive councils to promote health initiatives. Eighteen months after the applications were sent out the committee evaluated the outcome by enquiries to all counties and municipalities. The results showed that about half of the counties and a total of 45 municipalities in fact had established multi-sectorial groups with the purpose of promoting health education and prevention locally  
b) a number of conferences and seminars on health education and health policies for local and central politicians and administrators  
c) establishment of a working group with the purpose of developing health education in
primary and secondary schools. Participation in a major Nordic project on health education in primary and secondary schools. (A chief administrative dental officer was appointed project leader of the Danish project, a special report is available - Gurevitsch 1985)

d) health education in later life - Establishment of a working group to initiate various activities targeted towards health promotion in later life

e) other areas where health education has been promoted were in relation to children and accidents, back problems, breastfeeding and passive smoking

f) a major directory on health and disease associations has been published (Forebyggelsesradet, 1984).

Altogether the NPC and perhaps especially the Health Education Committee had been active and outreaching. It appears from the Journal 'Nyt om forebyggelse' (News about prevention) published by the NPC and the Committee on Health Information that numerous activities have been initiated and are currently taking place. They are not characterised by the production of health education materials or being organised as major campaigns. On the contrary, up to now the NPC and the health education committee appear to be living up to their stated goals and objectives. However, it should be noted in this context that dental health has not been made a priority and no specific dental health education activities have been initiated.
2.1.11 Structure and Organisation of Dental Health Education in the United Kingdom

The history of dental health education in the UK has recently been thoroughly reviewed by Towner (1987). The historical aspects of this section are largely extracted from her publication.

The Early Days of Pioneers

Apart from word of mouth advice on dental health among a few of the socio-economically privileged members of society, no dental health education (DHE) existed before the nineteenth century. Although DHE in the nineteenth century began to be written about in a number of dental manuals (Towner 1987) it was still limited to the middle and upper classes and was in no way organised at national level. Yet the late nineteenth century was the time when dental diseases suddenly increased because of the dramatic change in sugar consumption (Hardwick 1960).

Towards the end of the nineteenth century and during the beginning of the twentieth century DHE was characterised by the ideas of a few pioneers.

The School Dentists’ Society emphasised hygiene by producing charts, booklets and slides. The Society also lobbied the National Union of Teachers to interest them in dental hygiene and to get the subject included in the teachers’ training (Taylor 1977). Of more practical use, the society organised cheap toothbrushes to be made available to schools (Fox and Maddock 1980).

George Cunningham established the Cambridge Institute before the 1907 Education Act was passed. It was subsequently taken over by the borough and became the first clinic of the new school dental service (Davis 1969). As well as providing for treatment and inspection, oral hygiene instruction and dental health education played a large part in the clinic’s programme.
Cunningham saw two tasks for dental health education: firstly, to raise awareness of the need and desirability of good dental care amongst the public and, secondly, the instruction of the individual at the chairside. He founded the Children’s Dental League for which he wrote stories, and he commissioned Pathe Freres from Paris to make a one-hour film about sound diet, breast feeding and a properly used toothbrush. Cunningham’s method was not to preach the maxims of dental health but to make them relevant and fun (Davis 1969). In this way, his methods were the forerunner of future dental health programmes, such as the Ivory Castle League of the 1920s and 1930s and the programmes and methods advocated today (Towner 1987).

Central Council for Health Education (CCHE)

In 1927 the Central Council for Health Education was set up by the Society of Medical Officers of Health. It was funded by local authorities and voluntary bodies and the aims were to promote and encourage education and research in "the science and art of healthy living" and assisting and co-ordinating the work of all statutory bodies (Sutherland 1979). In the editorial of the Health Education Journal (1953) the first ten years of the Council’s work is described as the era of propaganda. In the inter-war period dental health education was also characterised by mass propaganda.

The Dental Board and the Ivory Castle Leagues

During the 1920s and 1930s two bodies, the Dental Board of the United Kingdom and the Ivory Castle Leagues, funded by Messrs D and W Gibbs Ltd. provided dental health propaganda material on a nationwide scale (Towner 1987).

In 1923 the Dental Health propaganda Committee was formed as a standing committee of the Dental Board; a year later its title was
changed to the Dental Health Education Committee (Guy 1928).

The Dental Board co-operated with a wide range of external agencies including the National Union of Teachers, The British Red Cross Society, National League for Health, Maternity and Child Welfare, the International Health Education Council and the Women's Co-operative Guild.

The other major source of dental health propaganda during this period was The Ivory Castle League set up by Gibbs in 1923. The activities of the Dental Board as well as the Ivory Castle Leagues were described by Towner (1987) who concluded:

"In common with the Central Council for Health Education, the Dental Board and Gibbs did not appear to conduct any evaluative studies of their material, other than estimating their success by the number of leaflets and pamphlets distributed or numbers of people attending lectures".

The inter-war period was characterised by considerable mass media dental health propaganda. Towner stated:

"For the first time, during the inter-war period national campaigns of dental health education were launched in Britain. Vast quantities of materials were produced and circulated, many methods were tried and a variety of target groups selected. Unfortunately no evaluations were conducted on the impact of the campaigns. The propaganda was directed primarily at improving dental hygiene and visiting the dentist, rather than at diet. Other developments during this period could simultaneously have assisted more widespread general and dental cleanliness, such as improvements in washing facilities in houses and wider availability of toothbrushes. Consequently it is not possible to isolate the impact of the mass propaganda on dental health attitudes and behaviour".

Scottish Council for Health Education (SCHE)

In 1943 the Scottish Council for Health Education was set up in order to fulfil much the same function as the Central Council for Health Education in England and Wales. It appears from the
first annual reports (The Scottish Council for Health Education 1945, 1946) that dental health education only occupied a very minor part of their work. The only referral to dental health was a listing of a film "Your Children’s Teeth" which was available for loan.

The War Period

The inter-war period of considerable mass media dental health propaganda was followed by severe limitations in organised dental health education during and after the Second World War. The two major organisations, the Dental Board and the Ivory Castle League were economically restricted and very little material was produced. Ironically this period was the time when dental health on a national scale improved tremendously. The reason for this decrease in dental decay was the rationing of sugar.

The war period was also the time for major changes in the health service. In the Interim Report of the Inter-Departmental Committee on Dentistry (Teviot Report, Ministry of Health 1944) dental health education played an interesting part. The Report states in a separate section entitled 'Dental Health Education':

"We have shown already how far the general public is from appreciating the need for regular inspection and treatment of the teeth, let alone any more positive or preventive attitude to oral health. The undoubtedly great efforts that have been made by the Dental Board, by individuals and by individual authorities, have not yet produced the general state of mind we wish to see. Nor do we believe that any short-term publicity methods would do so. Our view is that the following elements should all be combined in a steady policy rather than a "campaign".

100. First, and by far the most important, will be the quality of treatment given to the public.

101. Secondly, the Health Centre offers (e.g. by means of lectures, films) great opportunities for dental health education.
102. Local education authorities will have the duty of encouraging children to accept treatment and this duty can more easily be fulfilled if lessons include a rational teaching of the need for regular dental care. This is not to suggest that the encouragement should be delayed until the age when the explanation can be fully understood. We consider that dental hygiene should form part of school routine.

103. Dental health education should be one of the essential parts of the advice given at maternity and child welfare clinics.

104. Material for publicity (e.g. films, posters) should be supplied from central sources, but they can never achieve success without the support of local and personal effort. We agree with the Central Council for Health Education that valuable assistance can be given in dental health education by a central organisation, and also that "dental health education and general health education must be the concern of the authorities responsible for the dental and general health of the various sections of the public". Dental health education should deal with questions of diet and dental hygiene as well as stressing the need for regular inspection and treatment.

105. We do not wish to separate dental from general health education; the one is a sentence on the page of the other. But we are anxious that that sentence should not be crowded out; rather than that, we would have it given a page to itself.

106. We recommend therefore that whatever central consultative body of dental experts may be set up should have a standing duty to keep under review the state of public enlightenment in dental matters and the measures to be taken from time to time to increase it. We have spoken before of "the two horses", demand and supply. It is for dental health education to keep demand well up to supply, and even a little ahead." (author's emphasis)

It is interesting to note that the recommendations for the content and organisation of dental health education in 1944 was very similar to many of the issues discussed in health education today:
... short term publicity will not achieve our aim
... steady policy rather than campaign
... health centre involvement
... maternity and child welfare clinic's involvement
... diet, dental hygiene, regular inspections
... dental health education not separated from general health education

In fact, the only major issue of today's dental health education which is not mentioned is fluoride (the preventive effectiveness was not known then).

The Post-war Period Recommendations

At the time of the Teviot Report the Dental Board decided that they could no longer attempt to continue a general programme of public instruction, which should be properly carried out by the Government on a national scale. In order not to waste useful experience if they were to abandon the work entirely before the Government or some other body was ready to adopt it, they therefore drew up a dental health education programme designed for primary school children and their parents with three aims (General Dental Council, 1957):

"1. To foster tooth consciousness and appreciation of the importance of the part that dental health plays in general health and appearance
2. To initiate and encourage sound methods of oral hygiene, including proper diet
3. To ensure that the available dental services are used to the best advantage."

The Board then continued to produce material to set an example of what they thought should be produced on a national scale, but because of the popularity of the material they produced and
distributed a far larger quantity than had been intended.

In 1956 the Report of the Committee on Recruitment to the Dental Profession (Ministry of Health 1956) states (McNair Committee):

"Even now, many people think of their teeth only when they trouble them and believe that the effective remedy for toothache is simply in the removal of the tooth. There is little sign that the majority of the public see any weighty reason why they should take trouble to care for their teeth any further ... we do not think that the profession in this country should bear the chief and final responsibility for publicity on dental health. We conceive of the stimulation of a continuous public interest in it alone. It is a national task to secure public interest in good teeth, so that the main responsibility must rest with the Government. Various Departments of Government have an interest: the Ministry of Education, the Scottish Education Department and the Ministry of Labour, for example. All have a part to play, but the chief concern lies with the Ministry of Health and the Department of Health for Scotland. We have no hesitation in saying that the ultimate responsibility for implanting in the minds of the public a proper realisation of the importance of dental health, must rest upon the Minister of Health and the Secretary of State for Scotland, and that this will involve ensuring both that the public knows what to do and that the means to do it are available. We would also emphasise that any campaign to increase public interest must be accompanied by provision to make the necessary dental services available. We do not suggest that the responsibility for publicity should be implemented by the Government exclusively and directly. The General Dental Council and the British Dental Association should play an important part in co-operation with the Minister and the Secretary of State."

In their final recommendations the Committee strongly urge for:

a) a national programme of dental health education

b) the establishment, initiated by the Secretary of State, of an independent and representative standing Committee to examine in all their
aspects, measures necessary to secure public awareness in dental matters, to advise on the form that publicity should take and to ensure that the several agencies carrying it out work together.

More interesting than the recommendations themselves is the motivation behind them. The main concern of the Committee was the recruitment to the dental profession, and dental health education came into focus as a means to overcome the shortage of recruits. The report states:

"Recommendations: We are certain that there are two causes of particular significance for the shortage of recruits to the dental profession. One is the public ignorance of the importance of dental health and the other is the attitude of dentists towards their conditions of practice. We are equally certain that there will be no lasting improvements in recruiting until these difficulties have been resolved."

In 1958, on the recommendation of the McNair Committee two independent Standing Advisory Committees were established, one in England and Wales, and one in Scotland (Ministry of Health 1964). They were representative of the various interests concerned and were to examine in all their aspects the measures necessary to secure public awareness in dental matters, advise on the form that publicity should take and ensure co-ordination between the agencies involved.

By this time the Dental Board had been (in 1956) replaced by the General Dental Council (General Dental Council 1957) who had decided that they would continue the work of dental health education within the limited means at their disposal.

On the commercial side Gibbs made efforts to revive the Ivory Castle League after the war but due to lack of resources this
attempt was disbanded. In 1952, however, the Oral Hygiene Service was set up funded by Gibbs as an independent organisation (Oral Hygiene Service 1954).

In the beginning none of the material it produced was branded. By the end of the 1960s a degree of branding was becoming acceptable and a number of firms became involved in the production of dental health education material (Fox and Maddick 1980).

With the passing of the National Health Service Act in 1946, Central and Scottish Health Education Councils had been set up to advise the Minister on matters affecting the NHS. Sutherland (1987) reported:

"It was said that by 1959 the Councils were finding time on their hands and were at a loss about what advice to give next. Searching around they were pleased to respond to the suggestion, supposedly on the spur of the moment, that health education was a matter of importance and should be given some consideration".

Under the Chairmanship of Lord Cohen, a joint committee was set up to consider recommendations for the future of health education on a national basis.

The Health Education Council (HEC) and the Scottish Health Education Unit (SHEU)

The Cohen Committee met first in July 1960 and reported in December 1963. Obviously its task was clearly a formidable one and naturally it presented a pot-pourri of recommendations of immense range.

By far the most significant of the Committee’s recommendations was to establish a strong Central Board in England and Wales and a parallel board in Scotland. These Boards should:

a) promote a climate of favourable opinion to health education
b) develop programmes of education on selected priority subjects, securing support from all possible national sources, commercial and voluntary as well as medical, and assist local authorities and other agencies in the conduct of programmes locally

c) foster the training of specialist health educators

d) promote training in health education of doctors, nurses, teachers and dentists

e) evaluate the results achieved by health education (Ministry of Health 1964, recommendation 19).

In February 1966 the government announced their acceptance of the main conclusions of the Cohen report and agreed that the first priority was a new and stronger central organisation. The Health Education Council as it was named, for England and Wales, was finally constituted and incorporated as a company in exactly the same way the CCHE had been. The whole story of the establishment of the HEC including who said what, when and where, is described by Ian Sutherland (1987A) who himself was involved. In his opinion (Sutherland 1987B) the HEC had very little real power:

"Although registration under the Companies Act gave the Council the appearance of independence, in truth the control of its funds by the Minister was such that, although it might be able to do anything in theory, it could do nothing without permission, in fact".

In Scotland the Secretary of State decided to establish a Health Education Unit within the Scottish Office, rather than a new body outside it. He also arranged for the unit to work in close co-operation with the Scottish Council for Health Education, which
had agreed in future to restrict its functions to providing training in health education for staff in local authorities. The new unit would be responsible for promoting health education, developing effective methods and techniques, and for evaluation. It was to be staffed by people with appropriate skills in medicine, education and publicity.

The Scientific Basis of Health Education

During the late fifties and sixties dental health education increased considerably in the sense that more and more materials were produced and more organisations, companies (mainly toothpaste) and individuals got involved. At the same time a number of problems became apparent. Some of the major problems were:

1. the need for evaluation
2. the need for empirical data on the state of dental health
3. the need for theories of dental health education, i.e. theories of behavioural change and
4. the need for a scientific basis for the dental health messages.

Although extremely important for dental health education as a science, points 1, 2 and 3 will not be dealt with here as the focus is on the history of organisation and structure of dental health education. Point 4, however, will briefly be described since it lead to what has become 'the Bible' so to speak, for all dental health education in the UK.

In 1971 the Health Education Council (HEC) organised a seminar to determine the scientific evidence in support of the dental health educators' message and this was subsequently published
In 1976 a joint review of the evidence was carried out by the HEC and the British Association for the Study of Community Dentistry. They organised a seminar at which dental scientists actively involved in research presented papers to a group of experts in preventive dentistry. The papers and ensuing discussions were then combined into a series of draft publications which were circulated to all those at the seminar. Only when consensus was obtained were the conclusions included in the resulting policy document published by the HEC in 1979 (The Scientific Basis of Dental Health Education). The document was reprinted in the British Dental Journal (1979) and by 1983 about 100,000 copies had been distributed (Craft and Holloway 1983). The policy document reduced the number and complexity of the messages and advocated only three:

1. Insist on fluoridation
2. Restrict sugar-containing foods and drinks to mealtimes
3. Clean the teeth and gums thoroughly every day with a fluoride toothpaste.

In order to "take full advantage of more recent evidence on the course and prevention of dental disease and to provide more detailed and specific advice over a wider range of subjects" the policy document was again revised in 1985 (HEC 1985). The revised document contains the same three messages as the previous plus a fourth; regular dental attendance. A third edition was published in 1989 containing the same four major messages. It is distributed free by the two major health education organisations and is widely used all over the UK.

During the seventies dental health education really took
off'. Numerous studies and campaigns were carried out. Many materials were produced and some aspects of dental health education were on the agenda of most meetings or conferences related to dental health or prevention of dental diseases. It became evident that dental health education could not develop without using knowledge and experience from other fields such as sociology, psychology, anthropology and education.

**Dental Health Education in the Eighties**

Although health education has been on the political agenda for the past century, it has become even more of a political issue over the last decade. The realisation that neither greater understanding and control of the biological determinants of ill-health nor the establishment and running of a national health service significantly altered total morbidity and mortality but only the patterns of disease (Townsend and Davidson 1982) led to increasing emphasis on health education. Thus individual behaviour such as smoking, drinking, eating habits and physical exercising which all can be influenced by health education, has increasingly been on the public, as well as the political agenda.

However dental health education, on the immediate surface, seems less controversial than other health education issues where major industries are involved (i.e. tobacco, alcohol). Except for the sugar industry, most if not all commercial interest has been on "the same side" as the dental health educators. Since the very early days of dental health education, Gibbs has been strongly involved and since the seventies three more commercial agencies, Proctor and Gamble, Colgate and Beechams, have also been involved in dental health education on a national scale.

Until now dental health education, in principle, has had two
different sources. Recommendations, materials, programmes etc. come from professional and governmental bodies and also to a large extent from commercial agencies. As described previously, government has included DHE in several policy documents regarding dental health services. Increasingly in the 1980s government has encouraged and supported DHE as part of the dental health services in various guidelines for the dental service. Details of these are described in 2.1.6. The intentions, in contrast to the Danish approach, have been to encourage and facilitate but not to coerce or regulate.

**Commercial Influence on Dental Health Education**

A number of school dental health education programmes have been produced more or less free by the major toothpaste companies. Thus Procter and Gamble produced the 'Crest Programme' for junior school classes, Colgate produced 'Yours For Life' for 13 - 14 year olds and 'Gleam Team' for 5 - 8 year olds, Signal produced a programme for 9 - 11 year olds and Macleans produced 'Teethline' for 5 - 8 year olds. Some of these programmes, but not all, have been described and evaluated (Maddock and Fox 1982, Dowell 1983 and Towner 1984). The programmes have been largely used by the Community Dental Services. However, in the mid to late eighties many of these were withdrawn or partly offered for cost price by some of the firms. This constituted a major change for DHE. Many of the health authorities, to a varying degree, had relied on these programmes as the major source of DHE materials for school children. Now they have to carry out DHE with whatever amount of money they can draw from the community dental service general budget (which, of course, is facing drastic cutbacks) or whatever the national bodies are producing.
Conclusion

Dental Health Education in the UK has a long history of organisational and structural changes. Numerous recommendations have been put forward in official and non-official reports. A high number of governmental, professional and commercial bodies and organisations have been involved. Equally many Health Educators and Dental Health Educators have been educated and employed by health authorities, the central health education bodies, and even by commercial firms. A consensus on the scientific basis of DHE has been obtained and clearly defined messages to be put forward to the public have been agreed, published and used by more or less everybody involved in DHE.

However, no regulations or coercive means have been used by government or health or educational authorities. The strategies have been to facilitate, encourage and support.

2.1.12 Comparison of Dental Health Education in the Two Countries in Relation to Sugar, Oral Hygiene, Fluoride and Visits to the Dentist

On the basis of the previous literature review and the description, obtained through analysis of relevant documents, of organisation and structure of dental health education in each country a number of similarities and contrasts were found. These can be summarised as follows.

The four main dental health education messages in both countries are related to frequency of sugar intake, means of plaque removal, fluoride exposure and visits to the dentist. However, their origins, implementation, emphasis and content, are rather different.

In the UK, a consensus document on the four dental health education messages has been published, distributed and used all
over the UK. The document titled "The Scientific Basis of Dental Health Education" has been revised and kept up to date with current knowledge. Except for the addition of the message regarding visits to the dentist, no content changes have taken place so far. In Denmark, the same four topics have been put forward, not as a dental health education publication or document, but through the laws and regulations regarding childrens' dental health care service and general practice. Thus it is up to the individual dental or other health personnel in the UK to ensure the implementation of the messages, whereas implementation for children is ensured by law in Denmark. The situation for adults in the two countries seems to be similar with regard to implementation, with reliance upon the individual dentist or other health personnel, although the Scientific Basis of Dental Health Education is intended for adults as well as children in the UK. The national health education bodies in the UK have a specific dental programme which includes adults whereas the equivalent body, in Denmark, the National Preventive Council (NPC), does not have a specific dental programme.

The Oral Hygiene Message

With regard to the actual content of the four messages, there is only one which seems to be about the same, namely plaque removal. Both countries recommend daily plaque removal by means of toothbrushing. This message in the UK is put forward through numerous dental health education programmes, dental health education campaigns and dental health education packages from the community dental service, the national health education organisations and especially commercial firms. In Denmark the commercial input is limited, the NPC does not produce any dental
messages and therefore the main source of this message is the CDHS and individual dentists on a voluntary basis for adults.

It might be appropriate here to remember the British 'expert' team's criticism of the Danish CDHS (Davies, Downer and Holloway 1982):

"there was an over emphasis on toothbrushing at the expense of sugar control in the advice given to children. This might have been encouraged by the lavish provision of facilities in the clinics for the instruction of patients in oral hygiene techniques."

Many Danish dental researchers seem to believe extremely strongly in the importance of oral hygiene sometimes at the expense of sugar control. A clear example of this is the conclusion in a review of "The Scientific Basis for Oral Health Recommendations for Self Care" recently published as part of a Scandinavian book on promotion of self care in oral health (Glavind and Nyvad 1987):

"1. Clean all tooth surfaces at least once every day with fluoride toothpaste
2. Pay special attention to the interproximal and lingual tooth surfaces and to the posterior teeth
3. Examine teeth and gums at regular intervals for the presence of bacterial deposits and gingival inflammation
4. Improve oral cleanliness on all sites with plaque and gingival inflammation
5. Seek qualified help if the symptoms do not disappear
6. Avoid in-between-meals if tooth cleaning is ineffective
7. Have a regular professional caries and periodontal check
8. The less effective the tooth cleaning the more professional help or help by others is needed
9. Poor oral hygiene is a risk factor even if no obvious sign of ongoing disease is present at the time of examination" (author's emphasis).
Undoubtedly the oral hygiene message has been strongly emphasised in both countries, but whether it has been effective is a different matter. In a recent review of the dental health knowledge, attitudes and behaviour in Scandinavia, Sogaard (1987) concludes that there is a clear trend towards

"more frequent performance of oral hygiene practices. Toothbrushing daily or twice a day, and the use of a fluoride dentifrice have become universal in almost all subgroups of the population."

Thus, individual behaviour has improved and it also seems as if periodontal health might have improved slightly although not at all to the degree that dental decay has improved. The question is whether the improvement is caused by the dental health education message? An exact scientific answer cannot be given on the basis of the present analysis, but it seems reasonable to assume that the dental health education message must have played at least a partial role.

For the United Kingdom the OPCS (1983) states:

"There was some suggestion that children's mouths tended to be cleaner in 1983 than 1973 (there were lower proportions of children with debris) but in terms of inflammation there was no apparent improvement over ten years comparable to that seen with respect to decay".

On the other hand the same survey showed that at least 90% of all age groups of children brushed their teeth once per day or more often.

Again it cannot be said, on the basis of the present study, that the high toothbrushing frequency is caused by the dental health education message put forward, but it seems unlikely that there is not some sort of relation. It is disappointing though, that the gingival or periodontal status cannot be shown to have improved any more on a national basis despite the increased
toothbrushing frequency.

The Sugar Message

The importance of the message on frequency of sugar intake differs in the two countries. In the UK it is almost unanimously put forward as "Restrict sugar-containing foods and drinks to meal times". The Danish National Health Board's guidelines for the CDHS states: preventive measures should include "Information activities ... including the importance of appropriate diet". It does not specify 'appropriate diet' neither does it mention sugar, which seems to be reflected in the weight of and the way dietary information has been given.

In December 1985 the Danish Medical Research Council and the Danish Hospital Institute jointly organised a public "dental caries consensus-conference" which was organised as a hearing. Corresponding to the jury and the judges there was a panel of non-experts and experts in all aspects of dental decay. In the report from this conference (Statens Laegevidenskabelige Forskningsrad 1985) it is stated:

"It has been known for 50 years that dental decay is caused by an acid-attack on the surface of the tooth. Most important for the creation of acid are the oral bacteria, saliva and its composition and the food passing through the oral cavity. The relative importance of these factors is not yet known. The damaging effect of the bacteria demands that they can develop undisturbed, and that food is added; sugar is particularly activating for the acid-process. On a clean tooth surface there is no possibility for dental decay to develop".

It is clear that the Danes, although accepting that sugar is a factor in the development of dental decay, pay much more attention and importance to the removal of plaque and almost ignore sugar. Sogaard (1987) concludes in a review of oral health behaviour in
Scandinavia:

"The majority of adolescents and adults do not realise the importance of dietary control as a means of preventing dental decay ... somehow, along the line the importance of the frequency of sugar intake for the prevention of caries seems to have been ignored, in spite of the overwhelming evidence as to the validity of this relationship".

Not only is the sugar message often ignored or rather not accepted, but when it is included in 'dietary advice' it is only targetted towards the part of the population who either cannot keep their teeth clean or who have an extremely high sugar intake.

Bille (1987) expresses this view quite clearly:

"We are, of course, aware of the fact that other preventive measures such as frequent disturbance of the plaque by way of toothbrushing or professional cleaning may play an important role in the reductions, whereas indirect preventive measures such as restrictive sugar consumption may play an insignificant role."

Thus there exists a difference in the understanding of the relative importance of the role of sugar in development of dental decay between the UK and Denmark which is clearly reflected in the dental health education concerning sugar.

The Fluoride Message

The dental health education activities related to fluoride also differ between the two countries. For years there has been no attempt in Denmark to try to promote water fluoridation. In fact it has not been mentioned in any paper or document known to the author, with the purpose of promotion, for the last decade. It seems to be perceived by most dental personnel and politicians as "something from the past". The opposite situation exists in the UK. As mentioned previously what was known as "the biggest court case in Scottish history" was about water fluoridation and took
place in 1983, and the bill legalising water fluoridation was passed in parliament in 1985.

The two countries seem to disagree over the other fluoride messages as well. In the UK fluoride tablets are widely distributed and in some areas recommended to all parents to be given from childbirth. A recent fluoride policy document (BASCD 1986) did not recommend the use of fluoride tablets until the age of 6 months.

In Denmark fluoride rinsing has been the most popular fluoride prevention method although other methods are used as well. When fluoride tablets are recommended this is only from when the teeth have erupted usually about 6 months of age (2.1.3). Dental health education about fluoride in Denmark is mainly only for children and tends in later years to be targetted towards high-risk groups and given on individual basis to children in special need.

The use of fluoride toothpaste is recommended unanimously in both countries from dental professionals as well as from commercial firms. As previously mentioned, dental decay has decreased dramatically in both countries. Although most researchers believe that the reason for this decrease is multifactorial and the relative importance of each factor is unknown, there exists a general agreement that the use of fluoride has played a major role, especially the use of fluoride toothpaste.

The 'Visit the Dentist' Message

The frequency of visits to the dentist has been a controversial issue for at least 10 years in both countries. In the UK the discussions were mainly prompted by an article in the Lancet by Professor Sheiham in 1977. The article "Is there a scientific basis for dental examinations every six months?"
concludes, based on a review of existing knowledge about the progression of the most common dental diseases, that there is not a scientific basis for a dental examination every six months. The article created a considerable reaction in the dental as well as the public press.

The 'Scientific Basis of Dental Health Education' did not until its second edition include any message about regular dental attending. The second (HEC 1986) and third editions (HEA 1989) state:

"Regular dental attendance.

Studies on the control of periodontal disease have emphasised the importance of regular professional cleaning in addition to daily plaque removal. It is the dentist's responsibility to ensure that this is carried out effectively at intervals depending on the needs of individual patients, to monitor the health of the mouth and to provide dental health advice. Once decay is established and a definite cavity is present, it cannot be remineralised, but the tooth can be restored. Whilst many people may need fillings only infrequently, the importance of early detection and treatment makes regular attendance advisable."

The statement resists from defining 'regular' and thus leaves it to other people (the dentist?, the public?) to decide whether regular is every six months, twelve months, shorter or even longer.

Many different questions have been raised in relation to dental attendance. In the UK the question of unnecessary treatment was raised in Parliament in 1984 and a committee was set up by the Minister of Health in December 1984 with the following terms of reference:

"To enquire into the extent of unnecessary dental treatment in the General Dental Service; to consider methods of preventing and detecting such treatment; to consider any amendments which may be necessary to the relevant legal provisions; and to make recommendations
together with the estimated costs of those recommendations".

In the report of the Committee (DHSS 1986) it is concluded:

"Although the evidence has led us to conclude that unnecessary dental treatment is significant, it has not led us to believe that it is so widespread that patients in general should lose confidence in their dentists. In our view the vast majority of dental practitioners in the General Dental Service provide a thoroughly professional service on which the general public can continue to rely".

Particularly relevant to dental health education was the emphasised recommendation:

"the Health Education Council should encourage patients to visit the same dentist regularly for as long as they find him or her satisfactory" (author's emphasis).

This recommendation was based on a finding that patients who changed dentists received, on average, nearly twice as many restorations as those who stayed with the same dentist. This new message was not included in the recent updated version of "The Scientific Basis of Health Education" from the Health Education Authority (HEA 1989).

In Denmark the question on 'regular visits' has also been discussed. Again the situation for children has been simple because it is regulated by the law on CDHS which requires each municipality to send data on children's dental health to the National Health Board every twelve months. Most municipalities have nevertheless examined children twice per year whereas others, and increasingly now, have established more individual intervals so that children with high need are seen more frequently than children with low need. The frequency of adult attendance has been influenced by individual dentist's recommendations and by the reimbursement scheme. The new Act on dentistry (1987) previously
mentioned, indirectly promotes annual visits with the introduction of the basic examination prevention fee which is given once per year per patient.

The question of visits to the dentist should also be seen as an overall political question. Among many factors influencing 'visits to the dentist' is the dentist/population ratio. As discussed elsewhere (2.1.7 and 2.1.8) this ratio is 3 to 4 times higher in Denmark than in the UK. In Denmark, the question of regular attendance or even more the changing of 'irregular attenders' to regular attenders has become increasingly important as the number of unemployed dentists has increased.

In conclusion it can be said that regular visits to the dentist have been promoted in both countries but implemented in different ways.

2.2. POLICY LITERATURE: POLICY ANALYSIS AND HEALTH POLICY

2.2.1. Defining and Accounting for Policies

The Health Debate

Before considering the detailed features of policy analysis or policy-making and health policy, it is appropriate to consider the concept of health. In a way, the debate on 'what is health' appears unending. Can it be expressed positively, as 'health is ...' or only negatively as 'the absence of disease, infirmity, handicap or distress'? (WHO 1978). According to the World Health Organisation, the aim of Health for All (WHO 1981) is to bring within reach of everyone, a condition that enables a person to lead a socially and economically productive life. This transformation cannot be achieved by the health services alone, though they can
make a major contribution. In the developing world, planners and policy makers are increasingly recognising that factors such as more food and improved diet, safe water supplies, and better hygiene, are more important to the improvement of public health than high technology medical care. However this concern about the appropriate role of health services and the limitations of 'orthodox' medicine is not confined to the developing world.

As medical services have demanded and absorbed more and more resources, the belief that a finite quantity of need would systematically be reduced by efficient and effective medical services has appeared unfounded. Instead, there is the prospect of an 'infinite demand', whether stemming from patients or providers, for increasingly sophisticated and hence expensive equipment and manpower (Lee and Mills 1982). Moreover, the claim that medical care, per se, has dramatically improved public health, has increasingly been challenged. It is now accepted that social and economic factors are contributing significantly to the overall pattern of disease (McKeown 1976, Whitehead 1988, RUHBC 1989).

The critique of 'medicine as health' and the debate over causal influences on health is well understood by most health planners and policy makers. However, as stated by Lee and Mills (1982),

"the methods and means are not. The Lalonde Report (Lalonde 1974), while not necessarily leading or actively encouraging a revolution, nonetheless has served as a catalyst in focusing thinking upon health as a major public policy issue ... In essence, Lalonde argued that the 'health field' contained four elements - human biology, environment, life-style and health care - which, when taken together, provided a model for all relevant policy making activities".
It is interesting in this context to briefly look at a dental example. The pathology and aetiology of the most common dental disease - dental decay - is well understood by dental professionals as well as health planners and policy makers; too frequent sugar intake causes the development and progression of dental decay. However the methods or means to solve this substantial problem (more than 90% of adults in most developed countries have suffered some form of dental decay), are not known or at least, no policy has been agreed. Traditionally, only the health care system has been involved in the 'fight against sugar'. Perhaps all of Lalonde's four elements; the environment, the life-style, human biology and the health care system should be considered if an efficient and relevant sugar policy should be formulated. This question will be dealt with later in the discussion of the results of sugar policy in the UK and Denmark.

Policy definitions

If the debate on health and 'what is health' appears complicated and unending, the debate on policy and 'what is policy' does not appear any easier. In fact the statement:

"No term in social sciences has suffered more ambiguity and abuse in the 1960s and 1970s than 'policy'" (Feldman 1978)

seems to be relevant for the 1980s and 1990s as well. The term 'policy' is still being defined, classified and categorised in numerous different ways.

According to Lee and Mills (1982), two sharply differing interpretations can be identified. The first and most common usage defines health policies as authoritative statements of intent, probably adopted by governments on behalf of the public, with the aim of altering for the better, the health and welfare of the
population. Health policy, in this sense, implies a centrally determined basis for action, designed to alter some situation, system, practice or behaviour towards given ends. Their second interpretation defines health policy as what health agencies actually do, rather than what government would like them to do. Defined this way, policies can be determined only by examining the outcomes of decision making, and hence, the accommodations and patterns of dominance prevailing both within, and between, organisations. It is clear in either interpretation that policies will always be value-laden. Government policies reflect government objectives, but in many instances policy-actors or agencies may not share these values and thus significant changes in the actual provider/behaviour may have been slow to appear.

Doern and Aucoin (1971) emphasise the plurality of structures in the policy process and argue that most of the present literature (at that time 1971) tends to imply a single pattern. The reason for this is that policy process is virtually equated with 'politics', that is, with the way in which the total political system responds to meet the demands and needs of society. They argue that the tendency for equating policy and politics is further reinforced by both laymen's and even political scientist's understanding that 'policy' refers to a high level general statement of preferences by a cabinet or prime minister, or an announced intention to act in a certain way on matters of new policy issues about which there is current political controversy. The third and perhaps most important reason why we are restricted, at least in the published literature, to these general notions about a policy process, is the paucity of studies undertaken from an explicit policy-making perspective (Doern and Aucoin 1971).
Although Doern and Aucoin wrote this criticism 20 years ago, the dental literature is still characterised by its paucity of explicit policy-studies. In fact using all available computerised and manual citation indexes for literature search in a major university (Edinburgh), not a single reference can be found under keywords such as 'dental health policy' or 'oral health policy'.

In his book 'Improving policy analysis' (1980), Stuart Nagel defines policy analysis research as the "how-to-do-it" methods associated with determining the nature, causes, and effects of governmental decisions or policies designed to cope with specific social problems. He further suggests that research methods should focus on

"(1) taking policies as givens and attempting to determine what causes them,
(2) taking social forces as givens and attempting to determine what policies they are responsible for,
(3) taking policies as givens and attempting to determine what effects they have, or
(4) taking effects or goals as givens and attempting to determine what policies will achieve or maximize those goals."

Nagel claims that one new development in policy analysis research is an increasing concern with the fourth type of analysis. If 'taken as given' is what is meant, (interpreted as 'accepted as they are'), Nagel's suggestions for policy analysis research in the dental health field raise some difficulties.

Before we can take oral health policies 'as given', we must know what the policies are. The first step in this thesis has thus been to ask the question, "What are the policies in the four areas of concern?" (oral hygiene, sugar, fluoride and dental visits), or indeed "do policies exist?" In the 'results' section these questions are answered and in the discussion it has also been attempted (as Nagel suggests) to determine what has caused these
Another way of categorising policy analysis has been suggested by Lee and Mills (1982). They distinguish between analysis of policy and analysis for policy. This distinction can be made clear in terms of a continuum, or range, of activities, all of which can be said to fall under the rubric of 'policy analysis' (see Figure 2.7).

FIGURE 2.7 Policy Analysis, by Type of Activity

<table>
<thead>
<tr>
<th>Analysis for Policy</th>
<th>Analysis of Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advocacy</td>
<td>Policy Information for Policy</td>
</tr>
<tr>
<td>Advocacy</td>
<td>Policy Monitoring</td>
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<tr>
<td>Advocacy</td>
<td>and Evaluation</td>
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<tr>
<td>Advocacy</td>
<td>Analysis of Policy</td>
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<td>Advocacy</td>
<td>of Policy</td>
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<td>Advocacy</td>
<td>Determination</td>
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<tr>
<td>Advocacy</td>
<td>Analysis of Policy</td>
</tr>
<tr>
<td>Advocacy</td>
<td>Content</td>
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</table>

Lee and Mills 1982

The five types which they identified through the literature are:

1) literature in the normative tradition which directly advocates a particular policy direction;

2) literature in the analytical and theoretical traditions which provides policy makers with information, and perhaps advice, to assist in the formulation of appropriate policies;

3) literature that monitors and evaluates policy, as a post hoc analysis of policies and programmes;

4) literature that provides an analysis of policy determination in terms of how health policies are formulated and constructed; and finally
5) literature that takes as its primary concern, the analysis of policy content, that is the study of the intentions and operations of specific policies.

As tradition in relation to oral health policy literature is as yet non-existent, it remains to be seen whether this distinction will be useful in the dental literature.

Finally, a rather simple but practical definition of policy has been used by Leichter (1979) in his comparative analysis of Health Care Policy in four nations. Public policy is defined as a series of goal-orientated actions taken by authoritative (usually governmental) actors. As such, policies are usually contained in legislative enactments, including budgets, executive and administrative orders and decisions, judicial decisions, and the like. However, it is recognised that a policy can consist of what is not being done. To illustrate this last point, Leichter gives the example that the absence of a national health care system in the United States is as much a statement and a measure of policy as is the series of decisions that led to the establishment of the British National Health Service.

In summary, and without ignoring the many suggested definitions and ways of classifying or categorising policies, but in order to ease and simplify the following discussion, it may be helpful to operate with merely 3 simple terms; 1) Policy 2) Policy output and 3) Policy impact. In this context 'policy' will be understood as authoritative (usually governmental) statements of intent, 'policy output' as what in fact is done to enforce such intentions and 'policy impact' as the consequences of policy and
policy output.

Comparative policy analysis

In his description of comparative policy analysis, Leichter (1979) uses an illustrative Indian folk tale; four blind men are led to an elephant, each positioned at a different part of the animal; one feels the elephant's leg, another the tail, a third an ear and the last one the body. As a result of their tactile experiences, each in turn describes what he felt as a log, a rope, a fan and a wall. Students of public policy are much like the four blind men; each tends to examine a small part of a very large animal. The diversity of conclusions concerning the alleged primacy of social, economic or political factors in the policy process has, in a large measure, been a product of the particular part of the elephant each one has examined. But the problems for the students of comparative public policy are potentially more severe than those facing the four blind men. Presumably the four, given a reasonable amount of time, the ability to move around the beast, some degree of intelligence, and the opportunity to compare their feelings, would ultimately arrive at an accurate conclusion about what it was they had actually felt. Consider the complexity of the problem if the four men had been presented, not with an elephant but with an elephant, a giraffe, a hippopotamus, a gazelle and so on. Students of comparative public policy are like blind men in a corral of exotic animals. They are asked to explain the behaviour of a large number of nation-states and an almost infinite variety of policy activities. Furthermore, they approach the task from different analytical perspectives.

Leichter (1979) claims not to be surprised that policy research has been so confusing and conflicting but is disturbed
about the seemingly haphazard and disjointed fashion in which comparative policy analysis has proceeded. In an attempt to improve the 'state of the art', he is suggesting a common analytical framework. Policies are thus being categorised into five major types:

1) distributive-policies that involve the allocation of goods and services and the necessary appropriation of funds to provide those goods and services;

2) extractive-policies that provide for the collection of revenues;

3) symbolic-policies that allocate status and knowledge achievement;

4) regulatory-policies that seek to control some aspects of human behaviour; and

5) administrative-policies that concern the organisation or administration of government.

Oral health policy concentrates on the first and the fourth of these policy areas: distributive policies and regulatory policies that seek to control some aspects of human behaviour. In order to make comparative study of policies more manageable and to bring some order to the infinite variety of policy-relevant variables, Leichter (1979) supplies a common classification system and demonstrates its usefulness in comparing health policy in four nations.

The scheme is an inventory of those factors that influence the making of public policy and based on a framework originally introduced by Robert Alford (1969). According to Alford:

"Decisions, policies and government roles can be explained by a combination of situational,
structural, cultural and environmental factors."

In this context, each of these factors can be defined as follows:

A situational factor is a more or less transient, impermanent or idiosyncratic condition or event that has an impact on policymaking. The qualifier, "more or less", is included to stress the fact that even a seemingly transient event can be relatively long in duration. It is impossible to put a time limit on when a transient event becomes institutionalised and therefore part of a nation’s social, political, or economic structure.

Structural factors are the "relatively unchanging elements of the society and policy". Structural factors include the more permanent and persistent features of a system, such as its economic base, political institutions or demographic structure. These features have a more sustaining and therefore, generally more predictable impact on policy than situational factors.

Cultural factors are the "value commitments of groups within the community or the community as a whole".

Environmental factors are events, structures and values that exist outside the boundaries of a political system but that influence decision within the system.

Table 2.21 illustrates the range and variety of variables included in each of these factors. It should be noted that the list is illustrative not exhaustive. Nevertheless, this scheme can be used as an instrument or perspective to explain why governments pursue the policies they do.
TABLE 2.21  A Scheme for Analysing Public Policy

I.  Situational factors

A.  Violent events: international and civil wars, communal conflict, terrorism, assassination.
B.  Economic cycles: depression, recession, inflation.
C.  Natural disasters: epidemics, droughts, floods, oil spills, earthquakes.
D.  Political events and conditions:
   1) Political status change: achieving independence, joining or leaving an international association, integration with another political unit.
   2) Political regime change: revolution, coup d'etat, election of a radical political party.
   3) Change of government: electoral shift in power from conservative to liberal party.
   4) Political reform: extending suffrage.
   5) Political corruption or scandal: Lockheed scandals, Watergate.
   6) Change in political leadership: election of a de Gaulle or an F D Roosevelt, death of a Stalin or a Franco.
E.  Technological change: inventions such as the automobile, airplane, nuclear weapons.
F.  The policy agenda: competition among policy issues and their proponents for the time, attention, and resources available to decision makers.

II.  Structural factors

A.  Political structure:
   1) Type of political regime: military or civilian, socialist or non-socialist, competitive or non-competitive party system.
   2) Type of political organisation: federal or unitary system
   3) Form of government: parliamentary, presidential, non-democratic.
   4) Group activity: number, strength, and legitimacy of interest groups.
   5) Political process: legislative-executive relations, budgetary process, nature of bureaucracy.
   6) Policy constraints: incrementalism, prior policy commitments.
B.  Economic structure:
   1) Type of economic system: free market, planned, or mixed economy.
   2) Economic base: primarily agrarian or industrial, diversified or one-product dependency.
   3) National wealth and income: size and
growth rate of GNP, distribution of wealth.
4) Complexity of economic organisation: modern or traditional economy.

C. Social, demographic and ecological structure:
2) Degree of urbanisation: proportion of population living in urban and rural areas.
3) Natural resources: land, water, minerals.
4) Geographic location: island or landlocked, tropical or temperate climate, proximity to militarily strong or weak neighbours.

III. Cultural factors

A. Political culture:
1) National heritage.
2) Political norms and values: concerning the role of the individual and the state.
3) Formal political ideology: Marxist, fascist, democratic.

B. General Culture:
1) Traditional social values, relating to social institutions and arrangements such as marriage, the family, sex roles.
2) Religion: religious values and role of religious institutions in society.

IV. Environmental factors

A. International political environment: cold war, detente.
B. Policy diffusion: emulation and borrowing of policy ideas and solutions from other nations.
C. International agreements, obligations, and pressures:
1) World public opinion.

D. International private corporations: International Telephone and Telegraph, Chase Manhattan Bank.

From: Leichter 1979
In a comparative study of national health care policy in four nations, Germany, Great Britain, the Soviet Union and Japan where Leichter (1979) used this analytical framework, he found certain general tendencies. One such general finding was that the type of political regime (a structural variable) was relatively unimportant in terms of levels of expenditure for health and also that political regime did not appear to have influenced the introduction of national health care policies. However, the differences in political regime did play an important role in shaping the content, operation and evolution of those health care systems. Another general finding was that dramatic situational factors, such as wars, international crises, epidemics, and economic depressions, as well as more commonplace events such as change in political party, had profound impact on the development of health care policy. In the four concerned countries, events such as inflation, economic depression, epidemic or an election played a key role in the policy process. The study also demonstrated that policy imitation and diffusion were important determinators. A nation’s political culture or ideology were important, like for example, in Great Britain the move to the Left, in the form of general acceptance of the ideology of the modern welfare state, was instrumental in the change from National Health Insurance to National Health Service.

Among the structural variables found to be of considerable importance was the economic wealth or level of economic development of a nation. Wealthier nations were more likely to allocate larger proportions of their incomes to education and health policy. Another political structural variable of importance was the impact of interest groups like the medical profession, who exercised considerable influence over content and administration of health
care policy. Finally, the study emphasised the impact of inherited policy, procedures and experience on present and future policies. The major conclusion was that both present and future policies were frequently anchored in the past. In the British case, the National Health Service, in appearance a radical concept, was really a logical extension of health care policy.

The scheme was not designed specifically for analysis of oral health policies. However, the scheme proved useful as a framework for the comparative analysis (4.1.3, 4.2.3, 4.3.3, 4.4.3).

2.2.2. Policy-makers

In the study of policy-making, two questions appear to be of particular relevance, namely the questions of 'who?' and how?' To the layman, or, in this field inexperienced person, these questions and consequently their answers seem relevant and simple. However they are on the contrary, extremely complex questions. In the pursuit of analysing health policies and indeed comparing national health policies, questions such as the 'who?' and 'how?' are of extreme relevance and importance.

The question of how policies are made can and has been discussed from many different perspectives and in many different ways. In terms of the process of policy-making, various theories exist of which some of the best known such as incrementalism, rationalism and mixed scanning will be discussed in the next section (2.2.3)

The Question of Who is Closely Related to the Notion of Power

Brian Smith (1976) emphasises two dimensions to the study of policy-making: power and rationality. The first, power, is concerned with explaining how social groups and organisations bring influence on those entitled to take and enforce legally binding
decisions. Such decision-makers include those who hold office within the formal or constitutional system of rules which assign formal powers to various positions within the governmental structure. The study of power in relation to policy-making also concentrates on those who are further away from the centres of decision-making but who, at any given time, may perform one or more of the specialised roles which constitutes influencing behaviour; initiating, veto-ing, planning, adjudicating, controlling, moralising, theorising, co-operating and agitating (Smith 1976).

The second dimension emphasised by Smith, that of rationality, relates to the process of policy-making. The extent to which policy-making is rational has been discussed by many previous authors and several theories have been suggested. These will be discussed separately in section 2.2.3.

The idea that policy-making is partly a manifestation of power makes it necessary to consider how power is exercised in the policy-making process. To illustrate this a model suggested by Smith (1976) may be useful (Figure 2.8).

**FIGURE 2.8 Power in Policy-making**

From: Smith 1976
In a social context, power may be defined as the capacity of an individual, or a group of individuals, to modify the conduct of other individuals or groups in the manner he/she desires, and to prevent his/her own being modified in a manner in which he/she does not. In terms of public policy the exercise of power means determining the way decisions are made. However, the sources of an ability to effect change in other people's behaviour are many and it may often not be possible to identify who had power in the sense of bringing about a crucial change at a significant moment. The problem may be further compounded by the fact that even the most powerful leaders are dependent on others for the support which is a necessary condition of their power.

Four different types of power involved in policy-making can be distinguished (Figure 2.8).

Firstly, power may have its origins in office. This is what is meant by saying that someone is in authority. Authority in this sense is clearly a special sort of power relationship. It implies legitimacy - that the person in authority has the right to exercise power and that those over whom the power is exercised recognise this right and therefore their own duty to obey.

The second form of power is that of expertise. To be an authority on a particular subject may give one power. Health professionals for instance in the service of government, are said to have power because of authoritative knowledge. The two forms of power, the authority of the office-holder, through legitimacy, and the expert-power can be termed causative, i.e. they can produce change in behaviour. Another form of power is coercive power. Two types of coercive power can be distinguished. When applied to the acts of governments in backing up their decisions with the
effective use of sanctions, it is referred to as 'just power'. When applied to groups outside government, it resembles coercion in that threats may be involved. Often the offer or rewards or the use of persuasion are part of the relationship between groups and the government and more appropriately the term 'influence' rather than coercion is used. Influence or pressure to induce or constrain governmental action takes the form of offering or withholding support for governmental measures. The concept 'influence' suggests a relative rather than an absolute power and the interplay of competing influences representing the conflicting interests concerned with practically every policy issue.

It is interesting to consider the model of power (Figure 2.8) in the context of health policy. Health professionals have the potential of using both coercive or influential powers through support or sanctions and causative power through legitimacy and expertise. Obviously different types of power and different combinations are used relating to particular issues or particular time in history. In the dental field power in the form of expertise may be most effective on issues such as water fluoridation policy whereas 'influential power' in the form of support or sanctions may be more useful on issues relating to payment. In the first case they act as experts whereas in the latter case they are perceived and operate as an interest group.

Whereas Brian Smith and many others with him thus describe the study of policy-making as the study of power, other ways of looking at this subject have been proposed. Peter Self (1985) draws a distinction between theories about the use and distribution of power and theories about the influence of personal and social values. He claims that 'power' on its own, is an inadequate
explanatory notion because it leaves out the social meanings which people attach to its use. Authority represents an exercise of power which is supported by social beliefs and norms; and when their supports weaken, the exercise of authority becomes challenged. A 'values' approach is concerned with the procedures and goals which individuals or groups accept as being desirable or necessary, and which they suppose may justify the use of the coercive power of government. Each type of theory is concerned with questions of both power and values. There is also a difference between what may be called a realist and an idealist approach to politics. The 'realist' approach is concerned with material interests and power relations, whether these are treated in units of individual groups, classes or nation states. 'Idealist' or normative theories start from the opposite end of recommending certain political goals and values as being right or desirable. The 'realist' and 'idealist' positions are clearly simplified since these elements can be mixed in many ways. However it has some historic relevance, in as much as modern theories of government tend on the whole to be 'realistic' rather than 'idealistic' in their character and assumptions (Self 1985, p.12).

To illustrate the fact that policies and decisions are determined in different ways the 'Arena Approach' has been suggested. Several authors have studied 'policy arenas' and Jordan and Richardson are thus focusing on five main arenas; the public arena, the parliament, the party arena, the Cabinet and the bureaucratic arena. They add a sixth group, namely pressure groups, who in some circumstances can be an arena in themselves. However their importance is mostly as actors in other arenas, and shall be discussed as such.
The public arena extends beyond the fact that voters have a say in public policy merely by their electoral power. Even if the actual difference between parties in government is commonly much exaggerated, it is very important to politicians which party wins. Thus as one of the considerations of the policy process, there is the sensitivity of the politicians to public moods. Since the 1960s, there has been a tremendous increase in demands for public participation in political decision-making. Jordan and Richardson (1987) states:

"Indeed, the demand for 'participation' may itself be a reflection of the stage of development of most Western industrial democracies, as they enter the post-industrial era. Britain has experienced a gradual increase in political mobilisation and participation, particularly via the formation of new pressure groups and the increased membership of existing ones. Groups formed in the 1960s for example, Shelter formed in 1966 and the Child Poverty Action Group formed in 1965, are now an accepted part of their respective policy fields."

Parliament in a formal sense, sets the parameters of public administration. It lays down the functions of all public agencies and is the ultimate source of their authority. In practice, however, executive dominance over the last hundred years, has severely restricted its role. Parliament's legislative work has nevertheless increased enormously as the role of the state has expanded.

Technically, Parliament holds the 'power of the purse'; parliamentary authorisation is necessary for raising taxation and for government spending. In reality, Parliament's role is far more limited, partly because the huge sums involved make effective scrutiny and control almost impossible. Greenwood and Wilson (1989) write:
"In the last decade public expenditure has usually been somewhere between 40 and 50 per cent of gross domestic product, and although much of this is actually spent by agencies with little or no accountability to Parliament - local authorities, public corporations, quangos and so forth - government departments, which are accountable to Parliament, nevertheless control the bulk of public spending. The inadequacy of parliamentary scrutiny of public finance stems not only from the size of the task, but also because parliament's procedures have not adapted to the increasing demands of the job."

A full description of parliament and its role in public administration, and as such as a policy arena, has been given elsewhere (Jordan and Richardson pp.57-91, Greenwood and Wilson pp.273-298).

The Party Arena

In the context of policy-making, the 'party arena' is important in its ability to influence decision-making, which shapes policies. The party platforms on which elections are fought constitute a basis for the party leadership when, as a government, it engages in the formulation of policies. One determinant of government policy is thus party policy. In British political parties the power of the leadership, by which is meant the parliamentary group and within that the leader him/herself, is very great. Having said that, there exists a rather complex set of relationships between - on the 'leadership' side of the equation - the party leaders and the parliamentary parties, the latter divided between front and backbenchers, and on the 'rank and file' side, the professionals in the party organisations and the party activists and supporters from the constituency organisations and affiliated bodies. Following Smith (1976), the really important question is the most difficult to answer: When can the influence, which the different sections (the leader, parliamentary party,
party conference, party bureaucracy) of a party attempt to exert over the policy-making process, become decisive? When the answer is difficult this is partly due to the fact that each section rarely constitutes unified opposing groups. On the contrary, and more commonly, each section of a party will have some support among the members of other sections. However the mass membership and non-parliamentary organisations of the political parties are mainly involved in a largely supporting role. At constituency level the parties are mainly concerned with fund-raising, spreading propaganda, selecting candidates and fighting on their behalf in parliamentary and local elections. Very little influence is exercised over the formulation of policy, except indirectly by the selection of candidates.

Although the central bureaucracies are more concerned with policy issues, through reaseach activities, they do not constitute autonomous sources of policy initiative, but rather provide organisational support for the leadership.

The Cabinet Arena

Smith (1976) argues that the office-holders who are closest to the points at which policy decisions are made are the members of the Cabinet, and states three sources of cabinet power. The first source is the rights conferred upon its members by the constitution. It is the Cabinet’s constitutional task to decide the policies which are to be submitted to Parliament. The second source is unity. Once a Cabinet decision has been made, it is a rule that ministers must be prepared to follow it or resign. The third source is the Cabinet’s capability to control and co-ordinate the work of the executive, through the Cabinet Office.

The literature reveals great disagreement about the relative
power within the Cabinet of the Prime Minister. According to Jordan and Richardson (1987, p.120), this debate, mainly between cabinet government and prime ministerial protagonists, has reached no conclusion partly because of the restricted amount of empirical data and partly because the proponents of each interpretation have been willing to concede that the picture is complicated. However there is little disagreement that there is a ranking and pecking order within the government generally and the Cabinet in particular. Some ministers are politically stronger or weaker than others. The literature (Jordan and Richardson p.122) quotes many ministers and surveys saying that there simply is very little time for Cabinet as most time is occupied with departmental policies.

A relevant example of the nearly institutionalised conflict between departments and their ministers has been given by Jordan and Richardson (p.123).

"The former Minister of Health, Kenneth Robinson, has been quoted as saying, 'There's an unspoken conflict between Ministers of Health and Treasury Ministers. One was just aware that if, by some miracle, one cut smoking down by fifty percent, the economy would be in a dicky position. My job was not to look after the economy but to try to do something about public health'."

Obviously tobacco and alcohol are the two issues where the Ministers of Health and the Treasury are most likely to disagree on policies, but perhaps less visible health issues are caught in the same conflict of contrasting interest between the departments or ministers. A tempting area to suggest is sugar policy which will be discussed later. In principle, the Cabinet should be the organisational unit where such conflicts should be solved. Where they actually are solved in a democratic manner, in Prime Ministerial Dominance or sheer 'power fight' between ministers,
appears to be disagreed upon in the literature but in any case is more likely to vary with various issues being discussed.

The Bureaucratic Arena

In theory a democratic government should be political not administrative. Politicians are chosen by the people, and public servants, whether civil servants or local government officers are employed to serve political leaders by carrying out their decisions. Following this theoretical line, ministers and councillors decide on policies and their paid officials take the necessary executive actions to implement them. However, much of the literature is concerned with discussions on the actual degree of power within the bureaucracy. Doubtless the theory of the civil servant merely 'serving' the politician is unrealistic if not impossible in today's Western societies. On the other hand, arguing that most of the decision-making power lies with the bureaucracy does not appear to reflect reality either.

Peter Self (1985 p.139) argues that there has been a growth in the size, influence and discretionary powers of bureaucracy, and writes that these developments can be seen (1) as a necessary product of economic and social change, (2) as the outcome of the material ambitions of bureaucrats themselves and (3) as the results of alliances between interest groups and bureaucracy or (4) as the outcome of international economic competition and the requirements of capitalism.

The notion that civil servants are not only serving political leaders but interacting in a complex symbiotic relationship in respect of both the formation and implementation of policies, has been supported by Jordan and Richardson (1987, pp.163-) who suggest that a 'dualism' has developed in which there is both bureaucratic
power and political power. They believe so because

"there is a necessary depoliticisation and simplification in the way which most decisions in complex industrial societies are made."

The logic of this, they argue, is primarily accounted for by the 'sectorisation' of policy-making. They claim that:

"sectorisation is possibly the only practical way of governing, as it is quite impossible to take account of all possible linkages across all policy areas"

and further:

"There are strong political and psychological pressures causing the policy-making system to disintegrate into relatively autonomous sectors or segments. Moreover, there are good practical and intellectual reasons for the decoupling of issues and consequent sectorisation of policy-making."

Perhaps this apparently necessitated 'sectorisation' constitutes one of the main problems for health promotion policy which obviously goes beyond departmental and sector boundaries and on the contrary, necessitates substantial co-ordination between different sectors and different departments. Interestingly, Jordan and Richardson (1987, pp.162-169) give examples of areas where interdepartmental co-work have been necessary, referring to these as 'conflict-areas' which all involved parties preferred to avoid. They also state:

"In any policy area it is thought preferably by those involved to avoid rather than precipitate conflict. Avoiding 'noise' is one of the unrecorded dimensions of the civil servants' job description".

However avoidance of conflict is not always possible, particularly not in modern societies with great mass-media influence on nearly all aspects of policy-making. Much of the media's coverage of conflicts have been related to the concept of 'territory' - each organisation, department or bureau, has a notion
of its own territory. Thus on the one hand each department will defend its territory and try and avoid invasion from other departments. On the other hand certain issues may be regarded as 'problems' and departments will be anxious to present such problems as falling within another department's territory.

The bureaucracy as an 'arena' for policy-making, is thus a changing and complex entity with internal potential for conflicts between political leaders and the civil servants as well as between departments. The bureaucrats themselves are not without power in the sense that they are indispensable to the leadership, having the advantages of their permanence, their freedom from electoral worries (to a certain extent), their knowledge of the files and their control of communications. They thus have the potential on certain issues or certain occasions of either supporting or obstructing ministerial wishes.

The Pressure Group Arena

Pressure groups are, strictly speaking, not an arena in themselves but can under certain circumstances act as such. The number and importance of pressure groups has increased since the sixties. Jordan and Richardson state:

"The persuasive pressure-group literature has moved from presenting the group as articulating demands and making political inputs, to being integrated government participants."

The groups differ in many ways but prior to entering the discussion of the various categorisations of groups it may be relevant to define what is meant by a pressure group. In their review and discussion of pressure groups, Jordan and Richardson (1987, p.187) choose a rather wide definition previously suggested by Lindblom (1980):
"We mean by interest group activities all interactions through which individuals and private groups not holding government authority seek to influence policy, together with those policy-influencing interactions of government officers that go well beyond the direct use of their authority. As well as conventional organisational behaviour, the activities of a multinational company, or even wealthy individuals, could be subsumed under this definition."

They admit that with such a wide definition they have been criticised by applying the label 'group' to everything that moves, but argue that it is necessary to capture all the relevant actors in the policy process. In terms of their interest or goals, groups are most often, in the literature, divided into two categories: the self-interested groups who pursue sectional, often economic end, and those who seek to promote a change in social values or practices.

Another way of distinguishing groups is by the way they pursue their goals or interests and commonly they have thus been divided into the 'legitimate' versus the 'illegitimate' or the 'insiders' versus the 'outsiders'. Insiders are accepted as responsible groups to be consulted on a regular basis. Although some groups might want to be outsiders, it is more likely that they are outsiders as a consequence of non-acceptance by the department. There can be many reasons for non-acceptance but some of the factors involved are recruitment figures and realism in the demands which again is related to economic or political limits.

Some authors see 'access' as a vital dimension but as Jordan and Richardson (1987, p.192) point out, access in itself does not necessarily equal influence.

Although, by and large, most sectional groups are likely to be legitimate or insiders, and promotional groups perhaps more likely
to be illegitimate or outsiders, sectional groups can be outsiders and promotional groups may well be insiders. This categorisation of groups according to type of goal and strategy can as main varieties, be illustrated as in Figure 2.9.

**FIGURE 2.9 Categorisation of Pressure Groups: The Goal/Strategy Mix**

<table>
<thead>
<tr>
<th>Type of Group</th>
<th>Goal</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sectional</td>
<td>Legitimate (insiders)</td>
</tr>
<tr>
<td></td>
<td>Promotional</td>
<td>Illegitimate (outsiders)</td>
</tr>
</tbody>
</table>

In the case of dentistry, the British Dental Association (BDA) and, for example, the Sugar Bureau, could be perceived as sectional groups where BDA is legitimate or insiders whereas the Sugar Bureau could be perceived as illegitimate or outsiders. The Fluoridation Society and the anti-fluoridationists could be perceived as promotional groups where the Fluoridation Society are the legitimate or insiders and the anti-fluoridationists are the illegitimate or outsiders.

Most studies have found sectional groups to have more significant influence than promotional groups. Although activities like demonstrations and petitions with high media profile are more visible, insiders consultations and negotiations may be more significant.

In conclusion then, policy-makers are not easily identifiable groups but consist of many different groups, organisations, politicians and bureaucrats who operate in a rather complex
pattern of negotiation and consultation which again differs according to any particular policy-issue at any particular time.

2.2.3 Theories of Policy-making

The previous two sections have focused on questions of what are policies (i.e. definitions) and who are the policy-makers. This section concentrates on how policies come about. In other words, rather than concentrating on structures, people and content, this section focuses on the process of policy-making.

It has become clear from the previous sections that 'policy' is somehow a product of a bargaining process between a number of people and groups, each of which is dependent on the others, and also that this bargaining network may change membership from issue to issue and also, on given issues, over time. However, it also became clear that there was controversy and little agreement as to the concepts of 'policy' and 'policy-makers'. When it comes to the process of policy-making a number of distinct schools, each reflecting a particular philosophy, have emerged. In relation to the health sector there are basically three main approaches usually referred to as 'rational', 'incremental' and 'mixed scanning'.

Rationalism

The rational model (originally presented by Lasswell) suggested that policies are formulated through a series of sequential steps where the policy-makers:

(1) recognise a policy problem exists
(2) identify the nature of the problem through investigations
(3) call for the presentation of alternatives
(4) rank their priorities
(5) make predictions on the risks and consequences
of the various alternatives, and finally

(6) come to a decision by combining the qualitative and quantitative values they have considered.

In later publications describing and criticising the model (Hunter 1980, Lee and Mills 1982) the number of steps have been reduced to three but the content is still very similar:

(1) the decision-maker considers all the alternatives open to him

(2) he identifies all the consequences which would follow from the adaption of each of the possible actions

(3) he selects that course of action that maximises input for a given output.

The rational model has been both officially advocated and widely adapted but also widely criticised both as a description of decision-making and as a prescription of how decisions should be reached. Lee and Mills (1982, pp.44-48) show how it has been advocated and adapted in relation to national health development both in USA, UK, Europe and major official organisations such as WHO.

The criticism does not so much challenge the concept of being 'rational' but centres around the feasibility and possibility of planning rationality in practice. Hunter (1980, p.47) summarises the critique clearly by citing several previous authors:

"the demands of rational analysis are simply too great despite the sincerest efforts to achieve it".

The critics are thus challenging the assumptions of the rational model that governments are organisations which can state their goals in precise and realistic terms; that they know the
full range of alternatives available to them and their respective cost and benefits; and that they are able freely to choose the optimal or best solution.

In reviews of the critics of the rational model it is often stated that the model overestimates decision-makers' intellectual capacity and the quality and quantity of available data. The decision-makers simply have neither the resources nor the time to collect the information required for rational choice. The model further neglects conflicting values. Some decisions are 'political', i.e. a choice between options with conflicting underlying values cannot be rational. The model assumes that there is a 'correct' answer to any particular problem. However, political alternatives and the need for value-judgment will not disappear with increased scientific knowledge.

Despite this rather strong criticism, many attempts have been made to bring decision-making more in line with the rational model. Hunter (1980, p.47) points to management techniques such as cost-benefit analysis, programme-planning-budgeting, management by objectives, operational research, corporate planning and zero-based budgeting as being such attempts.

**Incrementalism**

To a large extent, the incrementalist model emerged as a reaction to the criticism of the rational model. The theory starts from the premise that rational decision-making is impossible, assuming capacities and powers that do not exist. Lindblom (being one of the fathers of incrementalism) and others, argue that policies are usually limited in scope and policy-makers restricted to those policies that differ in relatively small degree from policies presently in effect. The policy-making process is viewed
as a series of activities in which those who are responsible for arriving at decisions 'muddle through' a limited range of closely related alternatives.

The available alternatives are incrementally rather than substantially different. Decisions tend to be made under pressure of time without full knowledge of all aspects of the situation, or of the implications, so that it is impossible to evaluate all of the possible consequences of every available alternative course of action. In this way, health planning becomes partial, not comprehensive, concerned with increments not major reviews.

The model claims to be not only a descriptive model, a realistic account of how things really are, but also a prescriptive model of how things should be. Little criticism has been made of its being a descriptive model whereas the claim of being prescriptive has been challenged, particularly by those who, accepting the shortcomings of the rational model, still think it should represent an ideal to be attempted. The incrementalist however, argues against this, that values and means are so closely intertwined, policy decisions involve so many different values, and conflicts over values are so widespread, that all decisions about public programmes are saturated with value choices, making a rational choice infeasible (Lee and Mills 1981, p.49). Moreover, the theory of incrementalism is rooted in a belief that choice in practice is very limited. There is little point in generating and formulating strategies when the political and economic resources to sustain and implement them do not exist.

"Neither revolution, nor drastic policy change, nor even carefully planned large steps away from the status quo are ordinarily possible" (Lindblom 1979).

A problem addressed by the opponents of incrementalism is the
problem of recognising or tackling major higher-level issues where radical change may be the required response. The third theory 'mixed scanning' is answering this problem by acknowledging that decision-making and policy-making might require two sets of mechanisms; one for fundamental decision, and the other for incremental steps.

The Mixed Scanning Model

Etzioni (1967) argues that the mixed scanning model provides both of these mechanisms required for policy-making. He suggests that:

"in practice, most 'incremental' decisions assume 'fundamental' decisions, either implicitly or explicitly, and that the cumulative value and power of the incremental decisions are largely dependent on the underlying fundamental decisions."

The mixed scanning model emphasises the scanning of a number of possibilities and the selection of alternatives. By using this model the planner or decision-maker should not miss any major feasible course of action, while not needing to consider all alternatives or undertake the in-depth assessment suggested by the rational strategy.

Lee and Mills (1982, p.52) state:

"In essence, mixed scanning is consciously selective, accepts certain political and value assumptions, and by surveying the whole area of health policy, facilitates the identification of major issues which require in-depth analysis. Mixed scanning also highlights the inadequacies of the other two models of policy-making. It is more 'rational' in practice to be selective and systematic about a limited number of feasible options than 'rationally' to examine all the choices specifically, the criticism that rational planning is impossible, because complete comprehensiveness is impossible, is resolved by the concept of limited or bounded rationality, where only some alternatives and some consequences are related to some objectives. Yet mixed scanning does,
in contrast to incrementalism, provide the opportunity for a more systematic, conscious approach to the identification and resolution of planning issues, which goes beyond merely reacting to problems as they emerge."

Although the mixed scanning model currently appears to be the most feasible and realistic guide for policy-making it has its difficulties. One of the most frequently discussed weaknesses is the problem of deferring criteria for 'selection' of planning issues. Wiseman (1978, 1979) suggested a set of such criteria and discussed these in the context of policy-making for the Scottish Health Services at national level. The criteria concentrated on four headings; (1) size of issue, (2) nature of the issue, (3) future implications and (4) the political setting of the issue.

In the first - size of the issue - are included the resources (financial, human and physical) which require to be devoted to a particular problem. Regarding (2) - nature of the issue - attention is most likely to be given to those issues where choices on future developments are not tightly constrained and where choices are particularly complex or contentious. The third general set of criteria - future implications - comprises four more specific criteria: (a) the type of innovation involved; (b) future resource implications; (c) future flexibility of action; and (d) significance of the outcome. From a planning point of view, those problems which, if tackled, are most likely to lead to future improvements in health, need to be identified.

Finally, the political setting of the issue may be determined under four sub-headings. Firstly the level of urgency: systematic approaches cannot be attempted on issues requiring an urgent response. Secondly, the political cost of selecting an issue which might lead to a change in policy for which commitment has already
been made should be taken into account. Thirdly, the strategic relevance of the sensitivity of an issue means that certain problems will be more difficult to scrutinise than others. Fourthly, an assessment of how important it is for a department to respond to advocacy of change from outside a department by professional groups, consumer groups, the media etc. is relevant in considering whether or not to mount a detailed planning study.

The introduction of criteria for selection of issue obviously strengthens the mixed scanning model. However, the success of the model still depends on the ability of all the involved parties to be at the same time systematic and selective and, precisely because of the criteria, their capability and willingness to clarify the role of their different interests and values in the decision-making process.

Lee and Mills stated in 1982 (p.56):

"It is unclear whether mixed scanning will prove acceptable to decision-makers. Politically and intellectually it may be more painful than 'muddling through', and for that reason may be immediately unattractive."

It appears that the British Conservative government over the last 10 years and particularly more recently, have attempted major policy changes regarding the National Health Service. These attempts have not been unnoticed by opponents or the mass-media, who were not slow to criticise strongly these attempts under the umbrella term 'privatisation' of the NHS. Preliminary poll results, public statements by Conservative MPs and mass-media speculations indicate that these policy-change attempts may already have been politically painful. Forthcoming (hopefully) analysis of the current 'health policy decision making' process may be able to show whether it is an incremental, or a mixed-scanning process
which is on-going regarding the NHS at the moment.

2.2.4 Political Theories

In the attempt to understand and explain health policies, several authors have recommended going beyond the process of policy-making in government and consider elements of the socio-economic structure which is relevant to the way in which power is exercised in society generally (Smith 1976, p.177, Ham 1985, p.192, Harrison, Hunter and Pollitt 1990, p.14). This is a difficult task because of the disagreement among political scientists over the appropriate conceptual schemes to be used in such analysis. Also it would be impossible here to summarise all the major political theories, which leads to the problem of choice. Apparently arbitrary choices have been made by previous authors. Ham (1985, p.192) thus chooses to examine three approaches: Marxist, pluralist and what, for want of a better term, he calls structuralist. Smith (1976, p.177ff) describes pluralism and class elitism. Self (1985, p.73) explores public choice, pluralism, corporate pluralism, Marxism, nationalism and elitism. Harrison, Hunter and Pollitt (1990) chose neo-pluralism, public choice, neo-elitism and neo-Marxism in their analysis of health policy in Britain.

For the purposes of this presentation, a brief introduction will be given of the major theoretical approaches most often referred to in the current literature. These are: pluralism, neo-pluralism, elitism and Marxism.

Pluralism

The essence of the pluralist theory of power is that the resources which contribute to power are widely distributed among different groups. Access to government is guaranteed through electoral choice, through lobbying and other forms of pressure
group activity and through the politically free mass media. Developments in health services and health policies are explained in terms of the interplay between different pressure groups. The question of who has power is for the pluralist an empirical question, to be answered by means of careful studies of particular policy areas. According to Ham (1985, p.194) the strength of pluralist theory is the richness of detail provided about decision-making and the high degree of sophistication which has often been achieved in the analysis of individual groups or organisational influences of policy processes.

According to Smith (1976, p.179) pluralism in Britain is manifested in the decline of class and ideological politics and the rise of organised producer and consumer groups as the main channels of communication between the people and the government. Both Smith (op.cit) and Ham (1985) argue that pluralism does not provide an adequate theory of power. Some groups have more power than others. Ham (1985, p.195) states:

"In particular, the strength of producer groups and the relative weakness of consumer groups cast doubt on the pluralists' argument that any group can make itself heard effectively at some stage in the decision-making process, and that no group is dominant."

**Neo-pluralism**

For neo-pluralists the pressure groups and lobbying activity are still the main focus, but unlike classic pluralists they do not see this 'bargaining' process as being more or less equally open to all interests who trouble to organise themselves, nor do they see the state as a neutral or fairly passive actor. Harrison, Hunter and Pollitt (1990) state:

"the neo-pluralists, impressed by the growth of large corporations and large-scale interventionist, bureaucratic government, see
the bargaining process as rather lop-sided. Big business occupies an especially privileged position, not least because, through its simultaneous and highly organised control of wealth, employment and expertise, it can often effectively veto public policies which it perceives as threatening”.

According to neo-pluralists, there exist among the numerous interests and pressure groups, more exclusive networks which exert a strong continuing influence over a wide range of health policy issues. The members here are senior officials in the health departments, chairs and senior managers in the health authorities and the representative institutions of the medical professions (Haywood and Hunter 1982). It is through such networks, that political integration, or at least, avoidance of outright conflict, is maintained.

Another feature of the neo-pluralist model is that by accepting that not all interested parties are equal, it begins to examine and explain the major role often played by big business. Harrison, Hunter and Pollitt (1990, p.16) give some interesting examples of how difficult it is for governments to regulate corporate power, even when they want to.

"The story of the painfully slow and incremental attempts by the DHSS and its predecessor department to control the prices of drugs supplied to the NHS by the major pharmaceutical companies is one such. The failure - despite being in the position of being a fairly large customer indeed - to achieve satisfactory cost control dragged on from the early 1950s well into the 1980s, punctuated by occasional enquiries, repeated renegotiations and odd scandal. A second example is the equally tortuous tale of government's attempts to discourage cigarette smoking. Despite its long-attested association with a variety of serious medical conditions the DHSS moved very cautiously indeed and bent over backwards to achieve voluntary agreements with the tobacco companies."
Elitism

According to this theory power is not equally distributed but disproportionately concentrated in the hands of the so-called elite. Various sub-groups of elite theorists exist. Class elitism thus refers to the political system of a society in which there is a 'ruling class' in the sense of an economically dominant and cohesive social group which owns the major instruments of economic production and controls the political instruments of resource allocation (Smith 1976, p.180). Economic inequality affects not only lifestyle but also political power. Those who lack economic resources tend also to lack other resources relevant to the exercise of political power. The educational background of elite members further reinforces the bonds of class between the elites. Smith (1976, p.180) states:

"When the middle and upper classes purchase public school educations for their children they are starting their children on the road to power and influence."

In describing how the ruling class uses its power he further states:

"One way, unrecognised by pluralist approaches to power and decision-making which focus exclusively on policy decisions is to exclude from the decision-making arena major issues which would threaten its interests."

Neo-elitists believe in several elites who can be functional or occupational groups. These groups may compete among themselves but are more likely to join forces to resist any attempts extensively to broaden participation in decision-making. A variety of elite theory is 'liberal corporatism' (Dunleavy and O'Leary, 1987). In this model the state offers favours and status to a few selected interest groups in turn for their agreement to behave in moderate ways and to help in disciplining the rank and file.
Harrison, Hunter and Pollitt (1990, p.23) see the relevance to health policy as follows:

"The medical profession is surely just a state-licensed elite - at least for the purposes of its national-level dealings with government. The state uses its legislative authority to prohibit non-members of the profession effectively from practising medicine, and the profession undertakes to control and discipline its members in a wide variety of ways. Various professional bodies such as the BMA and the Royal Colleges (of Physicians, Surgeons and so on) are in close and constant contact with ministers and government officials ... They are routinely consulted on matters going far beyond the terms and conditions of service of their members. No organisation representing patients enjoys anything like this degree of influence."

In their review of elite theory, Harrison, Hunter and Pollitt (1990, pp.22-26) also mention various limitations. One is that elite theory is overwhelmingly a theory of political and organisational processes which has little to say about economic and technological change other than, perhaps, that whatever changes do occur, elites will try to suppress those which threaten them and take advantage of those which will enhance their power. Another limitation more related to the study of policy and decision-making is the problem of access. If there are elites who are fixing things behind the scenes they are unlikely to welcome prying researchers.

A final point about elitism is that elites may be internally divided and the various divisions may at times be fighting for territory and resources rather than appearing as a unified and disciplined entity.

**Marxism**

It is not the intention here to describe Marxism as a political theory. Millions of words have been written and said
already and it would be an impossible task to enter this enormous continuing discussion of criticism or support. Instead, the Marxists’ view on health services will briefly be mentioned in the context of policy-making.

According to Marxist theory, state involvement in the provision of health services stems from two sources: action by the bourgeoisie to reduce the cost of labour power and to prevent social unrest; and action from the proletariat through the class struggle, to win concessions from the bourgeoisie. A fiscal crisis may develop when the demand outstrips the state’s ability to meet that expenditure. Inequalities in health and health service expenditure are explained by the lack of productivity of certain groups such as the handicapped and the elderly. However, Marxists are mainly concentrating on the macro-level and are usually not interested in studying micro-factors in the policy process. Marxist studies of particular decisions and issues of health care organisation are thus little developed.

Summary

All the theories appear to have some merits but none provides an adequate account in itself. Several authors argue though that health policy cannot be adequately understood without reference to economic policy (Ham 1985, p.204). Dunleavy (1981) states:

"The key issue, is to develop mediating frameworks to connect macro-theory with specific policy issues".

In order to attempt this Ham (1985, p.196) suggests an approach concentrating on examining dominant value systems in particular policy areas and their influence on policy.

"More specifically, by analysing the operation of professional ideologies in health services, it may be possible to establish links between the way issues are defined and resources
allocated, the nature of structural interests and the distribution of power, and macro-theories of the state."

Acknowledging the considerable difficulties in doing this he suggests that a start could be to explore the role of the medical profession and the way in which the profession's view of health has come to occupy a dominant position.

In a way the study of the role of dental health education/oral health promotion in oral health policy is closely related to this approach. The dental and medical professions' view of health and traditionally accepted medical model are challenged by the concept of health comprised in the notion of health promotion.

The traditional individualistic, functional fitness, curative approach, characterised by doctors having a central role and hospitals playing a major part is, if not rejected, then at least reduced to occupying only a minor space in relation to concepts such as total collective welfare and concentration on environment. The study of the role of oral health promotion in oral health policy thus has the potential of reflecting the role of the dental profession and their views on health.

2.2.5 Evaluation

Evaluation is rarely straightforward. Almost everything can be assessed but the assessment may say more about the assessor's interests or values than about the 'object' he/she is attempting to assess. In relation to health policies and health services, evaluation is constrained by both conceptual and technical problems.

The main conceptual problems are related to the previously mentioned problem of defining health. Even if we can define health in a way that commands general support, can we define operational
indicators of the presence or absence of health? Do we have theories that will accurately tell us what changes in health status will occur from any specific intervention (e.g. screening, or a health education programme)?

Even in the sub-areas of health where we may be able to define health and health indicators and where we attempt to predict outcomes of interventions, there is still the problem of prioritising, as we shall never have the resources necessary to do everything that technically could be done.

Harrison, Hunter and Pollitt (1990, p.140) also point to another conceptual problem, perhaps the most intractable of all. One can only evaluate a policy against a set of objectives. A prerequisite for a stable set of objectives is an underlying, equally stable, set of priorities and, underpinning that, a clear set of values.

In the real world of British health care politics, however, it is far from certain whether any such study pyramid of values, priorities and objectives has ever existed. Some public sympathies (e.g. for small children with life-threatening diseases, or for mothers-to-be) appear fairly constant, but these hardly amount to a comprehensive listing of all the health states which health service staff and health care policy-makers have to deal with. Comparison seems to be one of the most awkward and most avoided issues - who should be put in the less-than-priority category? Conceptually and morally how can decisions like this be formulated and eventually taken? Added to these complex conceptual problems of evaluating are perhaps more easily understood technical problems. The two major ones are time and cost.

The effects of most medical (or health!) interventions take
very long periods to manifest themselves. Health education programmes, for instance usually aimed at changing behaviour, fall clearly into this category.

The other major technical obstacle is cost. Additional funding is rarely available in any area of the health field, and since all monitoring requires some resources, it often becomes a question of diverting resources.

During the eighties, the recession has influenced the public sector, including the health sector in most Western countries. Scarce resources have characterised health services and outright cuts in funding have been a serious reality for most areas of the health sector. This environment of scarce resources, together with the development of expensive new technology, suspicion of bureaucratic inefficiency and Mrs Thatcher’s government support for private sector techniques has led to an increased interest in various performance measurements. The idea of measuring output against input and constructing performance indicators draws heavily on the essentially private sector concept of management accounting (Greenwood and Wilson 1989). Pollitt (1986) observes:

"the post-1979 period has seen such a proliferation of attempts at performance assessment, appraisal, evaluation, review, measurements and indicators that the difficulty is finding a public service that has not been affected. This wave of performance assessment has also been accompanied by other measures designed to produce a more 'commercial' approach within the public sector: for example, privatisation, competition, the development of quasi-commercial trading organisations, the introduction of private sector managers and management techniques into public sector bodies and so on."

The underlying object of these activities is the pursuit of 'value-for-money'. In the private sector the 'value-for-money' concept is highly appropriate as the main objective of most
businesses is to be as profitable as possible. However, concerning the public sector and especially the health sector 'value for money' is obviously most desirable, but the main objective is not profit but health. As mentioned previously, evaluation should be related to objectives.

It could be questioned whether these value-for-money approaches are measuring or evaluating what we would like to evaluate, namely, the extent to which they improve or maintain health of the population. This leads to the question of which criteria should be used in an evaluation of a health service.

Obviously quite a long list of criteria could be suggested, the problem is to find the most appropriate ones. Particularly important in the 'value-for-money' search are what is often referred to as the 'three Es' - economy, effectiveness and efficiency.

The first, economy - using fewer resources - (reducing input) is perhaps the one most often felt by people involved in the health sector. The concepts of effectiveness and efficiency often give rise to confusion.

Effectiveness is essentially concerned with objectives and can be measured in terms of the extent to which objectives are achieved. In the private sector where objectives are relatively straightforward, effectiveness may more easily be measured whereas in the health sector this is far more complicated because objectives are not always clear cut. The question of whether the NHS achieves what it was set up to achieve is rather difficult to answer. In fact it cannot be answered without setting priorities, a thankless task involving not only medical and ethical - but also political considerations.
Efficiency is concerned with the relationship between input (resources) and output (goods or services). If a greater output can be achieved by the same input or if the input can be reduced and still produce the same output, then increase in efficiency has occurred.

Efficiency is distinct from cost-effectiveness, since the latter is a ratio between inputs and outcomes (results achieved, impact) rather than between inputs and outputs (service provided).

The relationship between these concepts is illustrated in Figure 2.10.

FIGURE 2.10 Concepts in Evaluation

![Diagram showing the relationship between cost-effectiveness, efficiency, and effectiveness.]

Adapted from Harrison, Hunter and Pollitt (1990)

In relation to the health service it may be appropriate to add one more criterion, the question of responsiveness. Is the NHS responsive to the needs of its 'customers'? Because of the various needs of customers this is a rather difficult measure, but not less important for evaluation of health policies as well as other public policies and services. Several authors (Greenwood and Wilson 1989) argue that there has been an increased emphasis during the 1980s upon consumerism. Emphasis has been placed upon what Pollitt
(1988) describes as

"the encouragement of greater consumer responsiveness in the public services."

This, as Potter (1988, p.162) explains:

"involves more than being nice to consumers ... - It demands a searching review of the relationship between providers and those for whom services are provided."

Greenwood and Wilson (1989, p.14) acknowledge that perhaps this emphasis on responsiveness has been manifested in British public administration more by rhetoric than reality, and also that obvious difficulties exist in identifying and measuring consumer satisfaction. However, they argue, there are signs of significant differences of practice and of a developing shift in organisational cultures.

Finally, since equity was such an important consideration for those who set up the NHS and still appears to be, at least in all public and political debate, it would be appropriate to monitor the distribution of services between different locations and between different groups in the population. However, if the prevailing philosophy is equality in resource allocation, we may never achieve equality in health.

In conclusion evaluation is a rather complex process where many different criteria can be chosen. There has been an increased emphasis on various ways of monitoring in Britain during the eighties. In their review of key developments in evaluation from 1980 to 1989 (see Appendix II), Harrison et al (1990, p.129) describe the development as follows:

"One can therefore see in the development of the review process a movement from departmental monitoring of broad strategies to deep monitoring of short-term operational plans and of control systems stretching right down to unit level ... it signified an unprecedented
increase in central control. But ... to what kind of evaluation was this tighter control directed? In the main it was directed at economy, efficiency and conformity to plans. During the 1980s, at least, the review process seldom directly addressed questions of effectiveness or responsiveness."

Despite the major conceptual and technical difficulties in evaluating health services and policies, there thus appears to be a clear pattern in terms of what has been attempted, and by whom. Many authors (Cook, Johnson and Wagner 1980, p.153; Greenwood and Wilson 1989, p.12; Harrison et al 1990, p.144) agree that the main emphasis has been on efficiency and economy rather than effectiveness and responsiveness. The promoters of this have been government, parliament and, more recently, managers within health authorities.

The task of evaluating effectiveness and clinical quality has been entrusted exclusively to the medical profession. According to Harrison et al the main exceptions to these generalisations have notably occurred in those areas where doctors are not as numerous or dominant as they usually are in hospitals, namely in the field of preventive health care and health promotion. Whether the development of evaluation of health care and policies will continue in the same direction in the 1990s is questionable. The fact that health care and policies are one if not the key issue on the national political agenda as reflected continuously in every day mass-media, may be a promising sign that change may be forthcoming. It has been clearly illustrated, by the description of the extremely complex pattern of the policy process and the numerous interacting policy-makers that the direction which a potential change will take is almost impossible to predict.
CHAPTER 3 MATERIALS AND METHODS

THE ELITE AND SPECIALISED INTERVIEW

In order to analyse and explain differences in the role of oral health promotion in oral health policy in the two countries, it was necessary specifically to examine the structures and processes of dental health related decision-making. For this purpose the elite and specialised interview technique was chosen.

Dexter (1970A) describes the elite interview as:

'an interview with any interviewee, who in terms of the current purposes of the interviewer is given special, non-standardized treatment. By special, non-standardized treatment is meant:

1. stressing the interviewee's definition of the situation
2. encouraging the interviewee to structure the account of the situation
3. letting the interviewee introduce to a considerable extent (an extent which will of course vary from project to project and interviewer to interviewer) his notions of what he regards as relevant, instead of relying upon the investigator's notions of relevance'.

Elite interviewing is a new and rather unused research instrument within dental research. It should be recognised, however, that elite interviewing is a well known, often used research tool within many other disciplines such as sociology, psychology, political sciences (Kincaid and Bright 1957, Smigel 1958, Hunt, Crane and Wahlke 1964, Glick 1970) and policy research (Majchrzak 1989).

Interviewing in general, as a data collecting tool, is one of the most commonly used methods within the broad area of qualitative research. The volume of qualitative methodological writings increased noticeably in the 1970s and 1980s (Tesch 1990). Among the most widely known books are Filstead's Qualitative Methodology (1970), Lofland's Analysing Social Settings (1971), Schatzman and
Strauss's *Field Research* (1973) and Bogdan and Taylor's *Introduction to Qualitative Research Methods* (1975).

In recent years there has particularly been signs of an increased interest in the empirical study of elites. Principally, this has arisen through the efforts of neo-elitist theorists such as Nordlingen (1981) and Field and Higley (1980) who have attempted to revive the view that elite individuals form a crucial group for understanding the society as a whole. Such an argument was originally put forward around the turn of the century but fell into some disfavour (Moyser 1988). Now for a variety of reasons (Marcus 1983, Burton 1984), the tide has turned.

Elite interviewing encompasses a whole range of interviewing techniques that vary quite sharply in character. One key dimension which reflects most of the essential differences is the degree of structure or directiveness about the exchanges. In these terms, three broad types of interview can be distinguished (Moyser 1988): the (almost) totally unstructured or non-directive interview; the semi-structured interview; and the fully structured interview. In other words, and as previously pointed out (Moyser 1988) 'the main criterion of this taxonomy is the extent to which interview are determined and *standardised* before the interview is held'.

In standardised interviewing the investigator defines the question and the problem. She is therefore looking for and will only get answers within the bounds set by her presuppositions. In elite interviewing, however, the investigator is willing and often eager to let the interviewee teach her what the problem, the question, the situation, is (Dexter 1970A).

In a more recent review of non-standardised interviewing (Moyser 1988) it was stated:
'elite individuals tend to be those for whom a non-standardized interview method is particularly appropriate and fruitful. They have complex and sophisticated outlooks worthy of detailed and individualized exposition; they have unique experiences and vantage-points; not least, they have expertise that the researcher may wish to tap'.

However, the choice of technique is not only a matter of which method appears to be more fruitful or appropriate in practice; it is also a question of the type of understanding being sought.

In the present study the investigator was examining attitudes, structures and processes of decision-making in relation to oral health promotion. She had suggested four factors (fluoride, sugar, oral hygiene and visits to the dentist) as the main and most important factors. The interviews were therefore focusing on these four factors but at the same time allowing and seeking the interviewees' perception and understanding of the framework. In this way the chosen technique for the present study combined both semi-structured and fully structured elements within the same interview.

Several authors (Dexter 1970B) have claimed that many well-informed and influential people are unwilling to accept the assumptions with which the investigator starts; they insist on explaining how they see the situation, what the real problems are as they view the matter. Regarding the present study, this was definitely the case. All the interviewees were very well-informed, if not with respect to the total framework of the study then certainly with part of the study. In addition most of the study population were highly influential people who had rather definite and specific viewpoints.

Another characteristic of elite interviewing is that it cannot be assumed that persons or categories of persons are equally
important, as is the case in the typical survey. In an elite interview, an exception, a deviation, an unusual interpretation may suggest a revision, a re-interpretation, an extension or even a new approach. On the other hand, it is obviously desirable to know how representative an interviewee is. To a considerable extent, careful analysis of what an informant says, how she views the world, how she views the investigator, which organisation/body/company she is working for etc. will provide clues to the ways in which she is apt to be unrepresentative and so as to what is representative.

Phillips (1966) states:

'Interviews should be undertaken, informants should be relied upon, when it is clear that the following conditions can be approached:
(a) alternative techniques have been seriously considered in terms of the research issues,
(b) the research issues have tended to determine the selection of techniques, rather than the reverse, and
(c) inferences drawn from the interviews can be subjected to some sort of independent criticism, or, preferably, vigorous test'.

All of these conditions can be approached with regard to the present study; alternative techniques were seriously considered particularly because elite interviewing as a research method is not yet well established, or well recognised within the dental field. Quantitative methodologies are still more dominant and qualitative methods such as elite interviewing are, by many dental researchers, regarded with some suspicion as well as doubts with regard to representation and validity. For this reason and because the method also was new to the investigator herself, it would have been easier to choose a different technique. In fact the research issue did determine the selection of technique as it was considered unlikely to obtain the required information by any other means;
i.e. a mailed questionnaire or a telephone interview would have been extremely difficult to construct, not to say impossible. Furthermore it could be expected that the respondents would be less willing to participate given their rather busy and tight working schedules. In addition each interview did develop according to each interviewee’s particular input and interviews were rather special and differed from each other and in no way would it have been possible to construct a standardised questionnaire beforehand. As in fact the title of the technique says, each interview was elite and specialised.

The last point made by Phillips that inferences drawn from the interviews can be subjected to some sort of independent criticism demands some comment.

Obviously, validation of data by more traditional methods such as double recording is not possible in a study like this. However, the issue under study, the structures and processes of decision-making, was closely related to the actual dental health decisions themselves, and these were well known to the investigator through analyses of documents and scientific literature. The investigator could, because of a good deal of knowledge about the topic, make appropriate allowances for interviewee statements by reference to other sorts of data - including "common sense" and common knowledge. Additionally in many instances, different interviewees, especially when selected with this possibility in view, could be used to check and correct one another.

The question of validity and reliability of qualitative research has been discussed and presented by many previous authors (Macfarlane Smith 1972, Kirk and Miller 1985, Bryman 1988, Marshall and Rossman 1989) and in a way it should no longer be necessary to
repeat the argumentation. However a brief discussion is relevant. First of all qualitative research does not pretend to be replicable. The researcher purposefully avoids controlling the research conditions and concentrates on recording the complexity of situational contexts and inter-relations as they occur. Moreover, the researcher's goal of discovering this complexity by altering research strategies within a flexible research design cannot be replicated by future researchers, nor should it be attempted (Marshall and Rossman 1989). Marshall (1985) has recommended the following ten standards for assessing value and trustworthiness of qualitative research:

1. Data collection methods are explicit;
2. Data are used to document analytic constructs;
3. Negative instances of the findings are displayed and accounted for;
4. Biases are discussed, including biases of interest (personal, professional, policy-related) and theoretical biases and assumptions;
5. Strategies for data collection and analysis are made public;
6. Field decisions altering strategies or substantive focus are documented;
7. Competing hypotheses are presented and discussed;
8. Data are preserved;
9. Participants' truthfulness is assessed; and
10. Theoretical significance and generalisability are made explicit.

Attention to all ten standards were made at the relevant stages of this study (the planning phase, during the interviews and the analysis of data, as well as when writing up the results). It is hoped that the consistent concern for trustworthiness can be perceived through reading the results and discussion presented in Chapters 4 and 5. If further verification is wished, all written and tape-recorded data are kept in an orderly and accessible manner and open to examination on request with due respect to the confidentiality of interviewees.
A final point stressed by Dexter (1970) should be mentioned.

He states:

'no-one should plan or finance an entire study with the expectation of relying chiefly upon interviews for data unless the interviewers have enough relevant background to be sure that they can make sense out of interview conversation ...'

and that further requirements for elite interviewing are not only a good deal of background information but also the ability to listen to the interviewee's frame of reference.

'"... a large part of listening with a third ear is noting and adapting to a frame of reference different from one's own'.

The investigator agrees strongly with Dexter and found her substantial amount of reading about the background together with years of experience in working with people with different nationalities and a different frame of reference extremely useful.

It is generally agreed that, in working with elites, great demands are placed on the ability of the interviewer, who must establish competence by displaying a thorough knowledge of the topic or, lacking such knowledge, by projecting an accurate conceptualisation of the problem through shrewd questioning. At the same time it is important not to let the interviewee feel unknowledgeable or uncomfortable. However, as pointed out by Marshall and Rossman (1989):

'the interviewer's hard work usually pays off in the quality of information obtained. Elites often contribute insight and meaning to the interview process because they are intelligent and quick-thinking people, at home in the realm of ideas, policies and generalizations'.

Moyser (1988) emphasises the importance of extensive preparations.

He states:
'if the researcher is to realize to the full the benefits of an open-ended and flexible exchange then the ground must indeed be worked over very thoroughly ahead of time. This involves, first of all, the researcher becoming acquainted with the relevant elite procedures, symbols and terminology, as well as significant events, dates and personalities of the moment. As these will form the reference points of responses, the researcher must be able quickly to appreciate their significance and to use them in questions with an air of familiarity. This will in turn help both to build the necessary degree of seriousness and rapport with the respondent and to avoid being fobbed off with trite, standardized or superficial answers'.

As the researcher herself, before the commencement of this study, was already part of the 'dental researcher/experts community' she was to a certain extent familiar with terminology, significant events, dates and personalities. However, this did not prevent a substantial amount of preparatory work in terms of reading and literature search particularly in the area of policy research. Despite the familiarity and all the preparatory work, each interview felt extremely demanding and exhausting.

In discussing the underlying rules of the qualitative research interview, Cunningham-Burley (1985) discusses the way in which the researcher is implicated in the production of data. She notes that

'a contract is set up. Each respondent in agreeing to be interviewed has entered this implicit contract wherein it will be expected that he or she should provide certain information. However, the interviewer too is bound by certain rules and conventions, the interviewer must not deny the credulity of the utterances of the respondents, nor thwart him or her'.

In practice this is reflected in the need for politeness and an acceptance of the interview on the respondent's terms. Again this meant in the present study that each interview developed rather differently dependent to a large extent on the expertise and skills
as well as the personality and mood of each interviewee at the time of the interview. In the end, despite careful preparation and interview tactics, some conversations turned out to be unexpectedly fruitful and others unaccountably flat. As stated by Moyser (1988):

'The elite interviewer must, in short, be prepared for the unpredictable ups and downs that are inherent in this particular type of exercise'.

In order to assess the veracity and reliability of respondents the researcher noted an 'internal' assessment immediately after each interview, comprising a judgment of characteristics such as frankness, openness, spontaneity, embarrassment and co-operation.

Following these introductory comments on elite and specialised interviews the study population and the interviews for the present study will be described.

**STUDY POPULATION**

In choosing the sample for the study it was necessary to identify key people in the dental health policy-making process; in other words, those people who formed the decision-making community. Due to the nature of the policy areas, sugar, oral hygiene, fluoride and dental visits, a number of organisations, associations, industries and societies obviously had to be represented. These were the sugar and the oral hygiene industries, the fluoridation society and the national dental associations. As the overall topic of the study was concerned with health education and health promotion, the major national health education councils/groups also had to be represented. In all these cases the top person, i.e. the chairman, the president or the director of each body, was selected for the interview. In addition, a number of individuals who occupied prominent positions, such as key civil
servants or dental experts who were known to be government advisers, or key influential researchers in the policy areas concerned were also chosen. The latter group, the personal chosen individuals were selected in the following manner. The investigator prepared a preliminary list based on her experience of having worked as a dentist and dental researcher in both countries. In Denmark this list was then discussed with the chief dental officer and two other prominent dental researchers who themselves had been heavily involved in the dental health decision-making process. The final sample comprised all subjects agreed by these four people. The Danish sample thus included 39 individuals representing the following categories:

- The Health Ministry
- The National Board of Health
- The National Health Insurance
- The National County Association
- The National Nutrition Board
- The National Health Education Council
- The National Committee on Guidelines for teaching health education in schools
- The Sugar Industry
- The Toothpaste/brush industry
- The Danish Dental Associations
- Dental Academics (selected prominent influential researchers and government advisers)
- The World Health Organisation, European Region (Office in Copenhagen), Oral Health Division.

Each person was contacted by telephone, given a brief description of the purpose of the interview and an appointment made for the investigator to see the interviewee in his or her office. The interviewees were informed that the interview would last about or at least one hour and that they need not prepare themselves in any way. The appointments were all confirmed in writing.

All the Danish interviews were conducted before the British sample was selected and it was therefore possible to draw on the experience gained in Denmark. In the case of Denmark, all the 39
interviews had been planned and scheduled in advance and it was therefore necessary to conduct all of them. However, half-way through, most of the interviews became rather repetitious and only little, if any, new information was gained from continuing interviewing. Following this experience, it was clear that the sample from the UK did not need to be as large. Furthermore, the planning and timing of the UK interviews could be conducted on a gradual basis and continue only until interviews appeared repetitious. The selection of the UK interviewees followed the Danish approach, in that the top people from all the main involved industries and organisations, associations, etc. were selected. A preliminary list of individually selected dental experts was prepared by the investigator and discussed with the supervisors. An agreed list of interviewees was arrived at and the interviewing began. When the interviewer was suggested additional subjects by other interviewees, these were added after consultation with the supervisors. When it was known in advance that influential prominent researchers held strong opposing views, like for instance in the case of sugar where certain people are known to receive funding from the sugar industry and others strongly oppose this (see later), it was assured that both viewpoints were represented among the interview panel. The selection of interviewees continued gradually in consultation with the supervisors until such time as it was felt that little or no new information would be gained from further interviews. In this way the total UK sample included 19 individuals representing the following categories:

The British Dental Association
The General Dental Council
The Fluoridation Society
The National Consumer Council
The Sugar Industry
The 'Oral Hygiene' Industry
The Health Education Authority
The Scottish Health Education Group
The Chief Administrative Dental Officers' (CADOs) Group
The National Dental Consultative Committee
The Department of Health
Particularly influential dental researchers/experts.

Each person was contacted by telephone, given a brief description of the purpose of the interview and an appointment was made. The interviewees were also informed of the estimated length of the interviews and told that no preparation was needed. Finally, all appointments were confirmed in writing along with additional information about the interview if required. For this purpose a summary of the aims and objectives were forwarded, along with the appropriate questionnaire guide (see below). All the Danish interviews were conducted in 1988 and all the British interviews in 1989.

Originally it had been intended to compare Denmark with Scotland rather than with the UK. However, it was soon discovered that despite the special political relation between Scotland and England, most major policy-making goes on at Westminster level and further the major relevant bodies/institutions for this study, like the Sugar Bureau, the Oral Hygiene Industry, the Fluoridation Society and the Consumer Council are all London-based. It was therefore decided to undertake the analysis at UK level and, where appropriate, take special account of Scotland.

Methods

Although a final standardised questionnaire was not produced, a preliminary questionnaire outlining types of questions for each of the four areas of research (fluoride, sugar, oral hygiene, visits to the dentist) were prepared for each of the categories of interviewees. Questions related to sugar, for example, would
concentrate on whether the interviewee thought there was or should be any sugar 'message' to the public; whether any policies existed, and how these had come about; who had been involved in the policy-making process and had the interviewee himself or his organisation been involved in any way; who advised or lobbied on this issue and in which way; would the interviewee like to see policies changed and in which way; were there any obstacles and, if so, what were they. Examples of these questionnaires are given in Appendix 3. Obviously the questionnaire was not meant to be strictly followed but to act as a guideline and to help in acquiring the desired information.

In addition, preceding discussions about the questions with the supervisors, ensured that the right types of questions were asked and also gave the investigator training in actually formulating questions. The investigator studied a substantial amount of literature about interviewing and the art of asking questions (Merton, Fiske and Kendall 1956, Dexter 1970, Macfarlane Smith 1972, Payne 1973, Brenner 1978, Burgess 1985, Cunningham-Burley 1985, Finch 1988, McCracken 1988, Moyser 1988, Majschrzak 1989) and also consulted and had lengthy discussions with different trained experienced interviewers.

Furthermore, a pilot interview with an expert not included in the final study population was carried out, video-recorded and subsequently analysed.

As previously mentioned, the elite interview technique puts heavy demands on the interviewer. She must listen very carefully to the responses and simultaneously also find a way (preferably through comments made by the interviewee) that allows for a natural progression to further topics on the agenda. She has to develop
appropriate phrases on the spot and then formulate questions that introduce or probe sensitive topics. All the while she must monitor the coverage of the agenda and keep an eye on the time. Perhaps above all she must be on the outlook for what is not said, to observe demeanour and other non-verbal signals that may be of significance and add to the overall picture. Finally she must record what is actually said. It is therefore not surprising that whenever possible researchers attempt to get interviews tape-recorded (Moyser 1988). Although there are situations where recording would be inappropriate, with well chosen equipment (discrete) recording does not generally seem to disturb the atmosphere unduly (Moyser 1988) and indeed some authors state that tape-recording is a 'must' (McCracken 1988).

In addition to writing down as much as possible during the interview, it was thus decided for the present study to tape-record all the interviews, subject to the interviewee’s willing agreement. If any interviewee felt in any way uncomfortable or not relaxed about the tape-recorder it would not be used. This was stated clearly prior to each interview and also that the tape-recorder could be stopped at any time during the interview if the interviewee suddenly felt that there was something he/she would not like to have recorded.

As recommended by McCracken (1988) the tape-recorder was a small but high quality cassette - meant to be kept in a bag during the interview and thus 'out of sight', and the separate (not built-in) microphone was a modern flat one, as unobtrusive as possible. It had a visible power-on light and a reliable tape-counter. Also the tapes were high quality and a consistent detailed labelling system for tapes and tape containers was kept throughout the study.
The investigator gave consideration to her own appearance, and aimed at looking as professional and neutral as possible. As stated by Macfarlane (1972):

'The first interaction between the interviewer and respondent begins when the respondent first sees the interviewer on the doorstep. The first impressions are therefore very important. Several writers have emphasized the dangers of the perception by the respondent of "social distance" between himself and the interviewer. Every effort must be made by the interviewer to appear "classless". She should avoid "extremes" of dress, hairstyle and make-up. She should look neat, attractive, pleasant and businesslike'.

The atmosphere of the interview was planned to be rather dependent on the interviewee i.e. if they were friendly, joking or serious, so would be the interviewer. At the same time the investigator tried to create a relaxed situation where the interviewee did not feel that it was any kind of test or examination - or that there were any right or wrong answers. She simply tried to convey an understanding and an interest in each person's individual knowledge, experience, opinions and viewpoints on the research issue. All interviews were conducted with no other persons but the interviewee and interviewer present in the room.

Data Analysis

Data were analysed by the investigator herself by the use of the notes written during the interview and the tape recordings and by comparing and contrasting information from the interviews with one another. All the tape recorded interviews were manually transcribed by the investigator, apart from two which were fully typed by a secretary. All information was then categorised into the four policy areas and further divided into certain main sub-categories. One sub-category contained all information from each policy area related to the notion of a 'message', i.e. was there
any message, what was it, what should it be, who communicated this message, in which way. Another sub-category was the policies in each area. What were they if they existed, who had been involved and in which way. A third category concentrated on changes in policies, should they be changed, why, by whom, were there any obstacles etc. Whenever any information was placed (written in) in any category, it was systematically 'earmarked' with the name of the person who said it and where on which tape a particular statement could be found, or from which page in which notebook the statement was taken. In this way identified links or themes could always be checked or controlled by simply going back to the original statements. By the end of the analysis the investigator had been through every word or statement from every interviewee at least four or five times. It was therefore easy to find quotes on any existing tape as the investigator by this time more or less remembered who had said what, where and when. All the original data (the tapes and the original notes) will be kept and stored for at least five years. The results from this analysis were related to the information gained from the document analysis and finally a comparison between the Danish and the UK results was carried out using Leichter's (1979) analytical framework.
CHAPTER 4  RESULTS

Of the 39 Danish people selected for the study, only one person had to cancel and two people had to be interviewed by telephone rather than face-to-face. In all three cases the reasons could not have been foreseen and were unrelated to the research issue. Thus a total of 36 Danish interviews were carried out as planned and scheduled, and a further two conducted over the phone.

Of the 20 British people selected for the study, only one person preferred not to participate. Thus a total of 19 British interviews were carried out as planned. The setting in which interviewees were working and the structure and logic of the interview guide has been described previously (Chapter 3).

Most interviewees were unaffected by the use of the tape-recorder. Only two people in each country preferred the interview not to be recorded. Comprehensive notes were taken during all the interviews and in the four cases where the tape recorder was not used, the investigator had to depend on fuller written notes.

No interview took less than one hour. The majority took about one and a half to two hours and some lasted up to five hours.

Although the research framework was unusual or new to most interviewees, nearly all showed a great interest and indeed some were rather eager to make sure that their part of the history and the puzzle, as well as their point of view, were included.

All interviews were conducted following the semi-structured questionnaires previously described (Chapter 3 and Appendix 1) allowing each interviewee to concentrate and emphasise issues of most importance to them.

The empirical results from each country will be presented separately for each of the four policy issues followed by a
comparison between policies in the two countries.

4.1 ORAL HYGIENE POLICY

4.1.1 Oral Hygiene Policy in Denmark

A. Does Denmark have an Oral Hygiene Message?

Effective oral hygiene was regarded by the dental profession as the most important preventive means for the Danish population as a whole. Non-dentists (civil servants from local and national governmental institutions) did not see it as their task to put forward recommendations of this kind but expected these to come from the dental professionals whom they trusted and perceived as agreeing amongst themselves on such professional issues (in contrast to political issues). The oral hygiene industry obviously recommended various oral hygiene performances through advertising but the representatives from the industry claimed always to rely on advice from the dental schools, dental researchers etc. on recommendations such as how to perform toothbrushing. Interestingly one of the major toothpaste manufacturers claims to have been promoting toothbrushing long before the dental profession showed a real interest. To the question of "Which advice should the public have regarding oral hygiene?" the answer was: (translated from Danish)

'Now, this is the usual, traditional message that one should get them to look after their teeth and that is something which the dental profession, really, only more recently have been occupied with. The dentist was, until the Act on Child Dental Health, (in 1971) mainly a person who 'repaired' cavities - and that was all he/she could do because there was a tremendous amount of cavities. This is how it was. Then in 1963-67 we had enormous discussions about water fluoridation and it was decided not to fluoridate the water because that was coercive medication of the public. Therefore, everybody, also the consumer, was aware of fluoride, actually positive towards fluoride, as a preventive agent, although they
didn't want it added to the water supply. And then the compromise was - well then we can add it to the toothpaste. In Denmark we relatively quickly got a major part of the market with our new fluoride toothpaste because of this previous public debate. We reached a much larger proportion of the market much earlier than the other Scandinavian countries because of this positive attitude to fluoride'.

This particular brand became so successful partly because the manufacturer introduced fluoride-containing toothpaste relatively early (and had no governmental regulative inhibitions as did manufacturers in Norway and Sweden) and because they developed a famous and still extremely well known slogan:

"Mum, Mum, - he didn't drill at all"

which appeared on posters and pamphlets distributed all over the country. Thus, in the sixties they had already related oral hygiene to the prevention of dental caries.

Frequency of toothbrushing in itself, did not seem to be an issue of major interest among the dental professionals who found it much more important to explain why and how oral hygiene should be performed. While there was some disagreement as to frequency and which time of day - before or after meals - toothbrushing should be recommended, there was a striking, nearly uniform interest in educating the public and the profession about aetiology and development of dental decay. It was stressed many times that 'dental decay is a dynamic process, caused by bacteria, which can be stopped'. Several people also stressed the importance of understanding oral hygiene as a treatment of a disease process rather than a preventive means.

'People should know that they are interfering in a disease-process when they are removing bacteria from the teeth'.

It was seen as the profession's task and responsibility to
communicate this knowledge, influence attitudes and try to motivate the public to perform effective oral hygiene behaviour.

'The dental profession is responsible for dental health education and should ensure that the public are informed and also learn to co-work with other professions so that dental health education is integrated not isolated'.

Several interviewees also stressed that the public, being given this information, consequently should understand their own responsibility for 'taking care of themselves'. A government spokesman (civil servant) said:

'From the political side there is a great interest in oral hygiene and in teaching people to 'take care of themselves' which is also expressed in the new contract. It is part of the current political line - and also fits well into the 'health for all' policy'.

(This issue of individual responsibility for health behaviour will be discussed in Chapter 5).

Questions related to the use of toothpicks and dental floss did not create much immediate interest. Only when directly asked or asked several times, did the interviewees give recommendations on these cleaning aids. Most recommended these only to be used after the age of 15 to 16 years. The majority of the 'dental people' were of the opinion that everybody should know about toothpicks and dental floss and this should be taught to schoolchildren just before they left school. Only a minority would need actually to use them on a regular basis.

In general, oral hygiene and dental health education about oral hygiene was perceived as extremely important for dental health by all interviewees: however, in addition to teaching at school at a general level, each individual person's needs for oral hygiene should be decided by the person him or herself in co-operation with a dentist/dental hygienist. None of the interviewees believed that
recommendations to the public on oral hygiene at national level would be of much use. All dental health care (including oral hygiene instruction and motivation) should be based on individual need. Most mass-programmes such as instruction for all children in a school, fluoride rinsing or fluoride tablets for all children in a community, were seen more or less as something from the past. Indeed, during the eighties, such programmes had already been abandoned in many places.

These decisions were expressed as being based on data of dental health in each community. There was a general opinion that dental health in the whole child population in many communities had improved so much that mass programmes were seen as superfluous and uneconomical. Dental health education and other preventive means should be directed towards the small proportion who really needed it. Giving up mass programmes meant that more resources could be directed towards the so-called high-risk children. Much effort had been directed towards identifying high risk children although no final conclusion had been reached.

It is interesting that no-one mentioned the National Preventive Council or the Central Health Education Committee as involved in any national recommendations on oral hygiene. Moreover, the interviewee representing the Central Health Education Committee stated:

'It is not customary for the Council or the Committee to formulate or communicate national messages as such and furthermore, oral health in general is not one of the priority areas, probably because health education and prevention is perceived as already well developed and promoted within this area ... Teeth are thus not directly on the agenda - but if the discussion is on activities or issues which have been successful, it is often 'teeth issues' which are given as examples - particularly in relation to projects being
cost-effective. Also when mentioning professions who have been active in the area of health education – it is always dental professionals and the nursing profession who are mentioned’.

In summary it can be said that Danish experts and key people considered oral hygiene extremely important. They did not approve of any general recommendations with respect to frequency or use of toothbrush or other cleaning aids but promoted individually 'need-based' oral hygiene recommendations.

B. Does Denmark have an Oral Hygiene Policy?

As explained in the previous section most interviewees were surprised by the question 'which recommendations should the public have about oral hygiene?' and did not think such general recommendations should be formulated, but that oral hygiene recommendations should be dealt with on an individual need basis. The interviewees were equally surprised when asked who promoted or who or what controlled oral hygiene policy. However, apart from the ones who stated that it was not part of their task (the representatives from the National Nutrition Board and the sugar industry), everybody, given time to think about it, proved to have opinions as well as knowledge which they willingly and happily communicated.

Some interviewees stated that oral hygiene policy does not exist as a government-formulated policy in Denmark. This however, did not mean that oral hygiene was considered unimportant or that oral hygiene was not being promoted.

A number of factors were seen to have influenced oral hygiene policy in the Danish population. For reasons of clarification these factors have been divided into four main categories despite the interaction between the categories (discussed in Chapter 5):
a. Policy documents
b. Industry
c. The Dental profession
d. General hygiene, social development.

a. Policy documents

Although recent changes to the Children's Oral Health Care System Act and current changes in contractual agreements about dental health care were much more on the mind of the interviewees, many subjects mentioned the Child Dental Care Act of 1971 (described in 2.1.5 and 2.1.12) as having had a major influence on oral hygiene promotion. This Act was not formulated or implemented as 'oral hygiene policy' but nevertheless had a major emphasis on oral hygiene. A high proportion remembered the circumstances surrounding the original Act very clearly and many had actually participated in the work of promoting the Act. Moreover it was stated many times that 'the Children's Oral Health Care System Act was unique in the history of oral health care', and it had had a 'tremendous influence on oral health in Denmark'. It was often mentioned that such an Act could never have been enacted in the eighties. It was very much a result of the political and social situation at that time. The Act itself and the regulation and guidelines have already been described (2.1.5 and 2.1.12) together with the tremendous emphasis on dental health education, particularly regarding oral hygiene. The interviewees did not spontaneously mention anything about dental health education (DHE). Only when prompted by the interviewer did they agree that the wording of the regulations in the Act emphasised DHE about oral hygiene.

In examining how and why this law came about it is relevant to describe briefly the legislative process in general.

According to the Act of Public Administration in Denmark,
every citizen has statutory rights to insight in the Law process.

Depending on the kind of legislative work, certain committees can introduce a bill through one of the ministries or through one of the political parties. Parliamentary debate then takes place and the matter is submitted to various parties and finally the bill may or may not be enacted. Thus both prior to the introduction of the bill, and after the introduction during the parliamentary debate, a number of professionals representing various organisations and associations are invited to submit their viewpoints and arguments in writing or verbally. All these reports are kept and every citizen has the right of access. Several interviewees thus mentioned, when discussing the process of enacting the Child Dental Health Care Act (and the 'how' and 'who')

'You can just go and look it up'.

Several examples of the so called 'informal lobbying', i.e. contact with politicians and/or civil servants and with the formalised administrative process, which had taken place both during the first enactment and later revisions of the bill, were openly told to the interviewer by dental professionals who themselves had been involved and who did not find this unethical or wrong in any way. These interviewees justified their 'informal lobbying' by saying,

'Everybody (all involved parties) does it'.

Several interviewees furthermore claimed that prior to the final parliamentary debate in 1971 regarding the children’s oral health care system, every member of parliament had been primed and it was known in advance that the bill would be unanimously supported.

Obviously this unanimous decision was not only caused by the lobbying. Many interviewees agreed that a decision like that could never have been taken in the eighties, no matter how much lobbying
had been carried out. A major reason that it was possible in 1971 was that 'the time was right'. The initiative to the bill came from the dental profession who, based on practical experience on dental health care as well as data on children's oral health (which was scattered and limited), insisted that something had to be done. It appears that the profession were able to convince politicians and other involved parties that a public dental health care system could not only generally improve the rather poor oral health at that time, but also help to equalise the existing social inequalities in oral health. Obviously, the dental profession was helped by the prevailing political wind. In the sixties and early seventies, equalisation of social inequalities in general was extremely high on the political agenda. In addition the dental manpower situation was different (scarcity) and the rivalry between the private and public dental health sectors did not exist. In the eighties, when the Act had to be revised the biggest cause for disagreement was the rivalry between the two sectors.

It could seem that the enactment of the bill and its circumstances had little to do with the role of DHE in dental health policy. The contrary is the case. First of all the passing of the bill ensured that all children, irrespective of socio-economic status, received regular oral health care. The Act was a so-called 'frame-act' which gave the interior minister the right (and duty) to specify regulations for how the health care should be performed. These regulations and guidelines formulated by the dental division of the National Health Board clearly, as previously described, emphasised the role of DHE in dental health policy. Even though several interviewees claimed that a number of children's dental health care 'kommuner' (municipalities) already
gave DHE, the Act ensured that all children in the whole country received dental health education about oral hygiene.

The Danish government can thus be said to have had a strong preventive oral health policy expressed in the Act of Child Dental Health Care and indirectly a strong oral hygiene policy expressed in the regulations specified by the National Health Board. According to most interviewees this strategy has been one of the most influential factors in promoting oral hygiene.

It is also very likely that the implementation of the Act had an impact on the attitudes towards dental health among the profession itself, among the politicians and maybe to a certain extent among the public. The interviewees who had been involved in the mass-media side stated that an enormous amount of interest from the press was created. Numerous articles and interviews were published in newspapers, magazines and on the radio. Thus, dental awareness most likely increased in the general public.

The Danish Parliament introduced another Act in 1979, namely the Act on the Preventive Council (see 2.1.12), which theoretically could have had an impact on oral hygiene or preventive dentistry in general. However none of the interviewees mentioned this Act and even the representative of the Council said that oral health was not one of the priority areas as there were other more pressing issues.

The third possibly influential policy document from the government is the formulation on school curriculum (2.1.12) which does include teaching on health education. No-one mentioned this as influencing oral hygiene policy and the interviewee currently on the school curriculum committee on Health Education teaching said that there was no emphasis on oral hygiene although it was expected
that dental health education would be part of the curriculum.

It was the interviewer's impression that oral hygiene was taught to a certain extent in schools (a few interviewees said: '... of course there is also some oral hygiene teaching in schools ...'), but that this has become such an integrated part of school education that it is nearly forgotten when the discussion is on dentistry and dental health services.

The government's policy on oral hygiene in relation to adults was indirectly expressed in the latest contractual agreement on fees-for-item in the General Dental Services. The introduction of the so-called 'diagnostic and preventive basic payment' allowed to be used once per year per patient at least gives the practitioners the possibility of being paid for oral hygiene instruction and motivation. This fee was so new at the time of the interviews that no-one could say anything about its effectiveness in terms of oral hygiene. However some interviewees had their doubts, thinking that dentists would claim the fee without actually performing any preventive work. Others were more hopeful.

According to the interviewees no other policy documents or policy-related documents, relevant to oral hygiene, have been issued.

b. Industrial influence on oral hygiene policy

Theoretically the oral hygiene industry (toothpaste manufacturers etc.) have an interest in oral hygiene policy: i.e. if effective their sales increase. However none of the interviewees had ever heard mentioned, or thought it likely, that the industry would try to influence oral hygiene policy in terms of laws or regulations regarding dental health services, dental health education, or contractual agreements on fees-for-service. The
industrial representatives themselves claimed that their main interests were in the competition for market shares of their particular product. If and when they had any contact with civil servants (mainly the National Board for Health), this would be over licences for new products (i.e. the new tartar-control toothpaste) or regulations regarding permitted levels of fluoride or enzymes in toothpaste. They might also, through the 'Bran Association', try and influence regulations regarding advertising. However all representatives from the industry claimed that current regulations regarding advertising were acceptable and satisfactory to them.

One industrial representative said,

'We are not on the borderline with any of our products so we simply have no interest in legislation'.

In Denmark toothpaste is categorised as a cosmetic not a medical product which means that advertising regulations are much less strict than they are for medicines but also that no product can claim to have any healing effect. This apparently was not perceived as an inhibiting factor by any of the manufacturers. The control of the toothpaste advertising regulations was according to the National Board of Health's representative easily conducted:

'The manufacturers simply control each other, if one producer makes 'curative' claims in their advertising the National Board of Health will be notified by one of the competing manufacturers'.

One of the manufacturers stated in relation to the classification of toothpaste:

'It has been of no importance whether toothpaste was classified as a medicine or as it is - as a cosmetic - we would have sold toothpaste anyway'.

Apparently the industry has had only limited interest and influence on laws and regulations related to oral hygiene policy
particularly regulations regarding the dental health services per se. On the other hand, there was a striking agreement amongst interviewees that the industry had had a definite and possibly major influence on oral hygiene through its advertising.

In principle the industry can advertise its products directly to the public or indirectly through the dental profession.

The Danish oral hygiene industry does not produce educational packages as the industry in the UK does (see 4.1.2). Its direct advertising towards the public is mainly through the press. Indirectly, industry distributes free samples of toothpaste and toothbrushes mainly to the community dental services. However it does not employ dental health educators or personnel to advertise its products locally to the dental professionals. (Again this is current policy in the UK - see 4.1.2). The contact between the profession and the industry was perceived by both sides to be of mutual benefit. Some of the examples of contact mentioned by the interviewees were:

i) Research funds given to dental research by industry

ii) Prizes from industry to individuals for outstanding work in the dental field

iii) Financial support for dental conferences or meetings provided by industry

iv) Danish Dental Association inviting the industry to annual meetings where new developments in dentistry were presented and discussed

v) Dental school researchers carrying out research to test industry’s products

vi) Ad hoc meetings between industry and dental
experts to discuss dental issues of mutual interest or the industry seeking advice from dental researchers.

In summary it appears, according to the interviewees, that a mutually beneficial and satisfactory co-operation exists between the oral hygiene industry and the dental profession.

c. The dental profession

It is well known that doctors play a major role in health policy formulation and implementation due to the enormous authoritative power they have at both the provider and purchaser side. It is to be expected that dentists also play a major role in dental health policy. Obviously the profession would have an interest in influencing policies related to its members' careers, job-possibilities, working conditions, salaries etc. The question is, whether it has an interest in, and actually does, influence preventive oral health policies. Prior to presenting the results from the present survey on oral hygiene policy it is relevant to examine professional attitudes and scientific knowledge about oral hygiene.

Ever since the early days of dentistry there has been a strong agreement among dental professionals that oral hygiene is extremely important for oral health. During these years there have been some disagreements regarding why oral hygiene was important and also regarding how oral hygiene was most effectively performed. In the past, various theories such as brushing for periodontal reasons or for preventing dental decay or using a special brushing technique have been promoted by dental professionals. The prevailing theory at the moment, according to most interviewees, is that oral cleanliness should be recommended on the basis of an understanding
of the process of dental decay. It should be performed as a treatment of an initiated disease, namely dental decay. The question of which cleaning aids or which brushing technique the individual uses is not important as long as the disease causing bacteria are being removed. It was striking how this was stated almost word-for-word by the majority of the interviewees. Since these arguments, according to the investigator's experience, are hardly ever heard in Scotland she asked the interviewees if they could explain why so many dental 'experts' had arrived at such a uniform argument? One explanation was that a small group of cariology researchers, representing both existing dental schools, have promoted their viewpoints forcefully and strongly almost in a revolutionary way, through undergraduate as well as post-graduate education. Numerous courses, based on laboratory as well as clinical research, have been given all over the country. The reason these theories and viewpoints have been accepted, is that they 'fit practice so well' (cited from many interviewees). The old theories of sugar being the main cause of dental decay did not fit into what dental professionals and the public actually saw. Firstly, many children are growing up without caries experience and still eating a fair amount of sweets or other sugar-containing items. Secondly the caries process could be arrested by effective plaque removal.

These oral hygiene messages have been communicated through dental health education programmes organised by the Children's Dental Health Service (CDHS) and on a one-to-one basis by a dental professional to her patient. The face-to-face oral hygiene instruction is thus closely related to regular dental visits. Policies on oral hygiene are therefore indirectly dependent on
dental visits policies. These are discussed in 4.4. Most interviewees were convinced that nearly all children would receive dental health education about oral hygiene, but some uncertainty existed regarding whether the adult population, even if regular dental attenders, actually received the necessary information and instruction. This was related to the reimbursement schemes which will be dealt with under 4.4.

It thus appears that the dental profession, after having established the scientific knowledge (that effective plaque removal prevents dental decay) have communicated this knowledge throughout the profession by pre- and post-graduate education. Further, it is argued that this knowledge is communicated to the child population mainly on a face-to-face basis but particularly in the earlier days also in mass-programmes. Whether the profession have influenced oral hygiene policy specifically at a national level in terms of policy statements, laws or regulation is another question but at least it can be said that in practice, the profession have promoted oral hygiene.

The Danish Dental Association's (DDA) representatives stated that they had invested resources in oral hygiene promotion and also believed strongly in effective plaque removal. For example a major campaign had been carried out recently. The campaign was also related to dental visits and it can always be questioned whether it was organised to improve public oral hygiene or to create more patients for the general dental service. Interviewees affiliated with the DDA tended to claim the former whereas interviewees from the CDS tended to believe the latter. One individual for instance stated:

'The employment situation or better the unemployment problems had the effect that money
was made available for the campaign. Membership fees (author's note: DDA membership) can much easier be taken for public information in such a situation. Health education and employment "ran" together.

Another possible way to influence policy could be through the National Preventive Council or the Central Health Education Committee. No-one mentioned this as a vehicle for oral hygiene policy.

In conclusion, the Danish dental profession considers oral hygiene to be of great importance and thinks that face-to-face communication with the public is the most effective way to promote oral hygiene.

d. General hygiene, social development

In addition to the previously mentioned factors influencing oral hygiene, several interviewees saw the general development of Danish society over the last two or three decades as another reason for the improvement. As one of the interviewees expressed it:

'Thirty years ago, many children arrived at the surgery poorly dressed, dirty in general and even sometimes smelling of urine. You knew that if they had brushed their teeth at all before they came, it could well have been standing together with 3 or 4 other siblings over a kitchen basin among all the dirty dishes from the previous meal. Nowadays everybody has a bathroom and it is the norm to brush your teeth'.

According to this and several other interviewees the standard of general hygiene has increased tremendously. The vast majority have a bath or a shower every day and it is more or less unacceptable to be dirty. Moreover, not only personal hygiene, clothing, hair, nails etc. have improved but the whole society is cleaner. Private and public buildings, inside and outside, streets and public places are all much cleaner in the late eighties than they were in the forties, fifties and sixties!
Several interviewees thus claimed that oral hygiene cannot be seen in isolation from this social development. Thus when analysing oral hygiene policy and the role of DHE in oral hygiene promotion it should be remembered that all the identified influencing factors have interacted with a general social development. Although such a link is possible it obviously needs further substantiation which lies beyond the scope of the present study.

4.1.2 **Oral Hygiene Policy in the UK**

A. **Is There an Oral Hygiene Message?**

Oral hygiene was not perceived as a topical issue but as something which traditionally and naturally was part of dental health education. Nobody was enthusiastically engaged in this topic and no-one expressed strong opinions. In contrast to other issues like the role of sugar or fluoride, oral hygiene appeared to be non-controversial and non-emotional. There were some disagreements related to toothbrushing frequency and method, and time of day when brushing should be performed, but no-one appeared to feel strongly about this. Many interviewees referred to the 'green book' - *The Scientific Basis of Dental Health Education* which states:

'Clean the teeth and gums thoroughly every day with a fluoride toothpaste. The removal of dental plaque is essential for the prevention of periodontal disease. The toothbrush is the only means of plaque removal that should be recommended on a public health basis, other oral hygiene aids, apart from disclosing agents, being a matter for personal professional advice. Thorough brushing, every day, is of more value than more frequent cursory brushing, and a careful scrub technique should be advised. The toothbrush size and design should allow the user to reach all accessible tooth surfaces and gum margins easily and comfortably. Regular toothbrushing
by itself will not prevent dental decay, but a definite benefit will be gained by the use of a fluoride toothpaste'.

It should be noted here that toothbrushing per se is recommended for the prevention of periodontal disease, not for dental decay. Several of the interviewees also stressed this point which is a strong contrast to the Danish interviewees who (as described in 4.1.1) recommend plaque removal to prevent or even treat dental decay. When the British interviewees relate oral hygiene to dental decay this is due to the benefit gained by the use of a fluoride toothpaste.

Not only 'dental' interviewees but also representatives from the oral hygiene industry referred to the 'green book'. One stated:

'If you ask the dentists you will get hundreds of different opinions, they disagree - it is a lot easier to stick to the green book'.

The use of oral hygiene aids such as dental floss or toothpicks was mentioned by the oral hygiene industry representatives but hardly mentioned spontaneously by anyone else. Only when asked directly if these should or should not be recommended for public use, did the respondents seem to consider them. The majority did not recommend oral hygiene aids on a population basis. If the dentist, on the basis of a clinical examination, identified patients with special periodontal problems he/she could recommend oral hygiene aids on an individual basis for this minority group only.

Dental tape, mouthrinse and disclosing tablets were recommended by very few interviewees. Two respondents were directly against the use of toothpicks, thinking that they could be harmful when used on healthy gingival tissue.
The interviewees from the industry in a way verified the dentists' attitudes:

'The dental floss and toothpicks market in the UK is extremely small - I think the total dental floss market is less than £5m per year. If the dental profession really recommended oral hygiene aids the market would be much larger. Hopefully the capitation scheme may give them more time to discuss oral hygiene with their patients'.

When asked who promoted oral hygiene methods to the public, most respondents mentioned the oral hygiene industry first of all. A high proportion of the respondents also mentioned the Health Education Authority or the Scottish Health Education Group. Seven of the respondents mentioned dentists or dental hygienists on an individual basis and in this case, more related to how to brush efficiently than just the brushing method. One interviewee pointed out that:

'... the industry through their advertising are raising awareness about toothbrushes and toothpaste which is a first step - but the next step is to tell people how to brush and that is what the dentists are doing'.

On prompting and reflection, a few people mentioned various bodies such as the British Dental Association, the Community Dental Service, the British Paedodontic Society, the British Dental Health Foundation, or health journalists (Table 4.1).
TABLE 4.1 Nineteen British Experts' Opinions about which Agencies Promote Oral Hygiene Messages to the Public

<table>
<thead>
<tr>
<th>Agency</th>
<th>Number of experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral hygiene industry</td>
<td>10</td>
</tr>
<tr>
<td>HEA and/or SHEG</td>
<td>12</td>
</tr>
<tr>
<td>Dentists or dental hygienists</td>
<td>7</td>
</tr>
<tr>
<td>The Community Dental Service</td>
<td>3</td>
</tr>
<tr>
<td>The BDA</td>
<td>4</td>
</tr>
<tr>
<td>BPS</td>
<td>1</td>
</tr>
<tr>
<td>BDHF</td>
<td>1</td>
</tr>
<tr>
<td>Health journalists</td>
<td>1</td>
</tr>
</tbody>
</table>

(Answers not mutually exclusive)

In summary most interviewees considered oral hygiene important but at the same time somehow non-topical and certainly non-controversial.

B. Is There an Oral Hygiene Policy in the UK?

Most interviewees were surprised by the question of 'Who or what regulates or controls oral hygiene policy in UK?' As an example of a typical answer one dental expert answered:

'Regulations? Policy? How could you have an oral hygiene policy? That would be over regimental!'

It was generally claimed that a policy on oral hygiene was non-existent in the UK, certainly when perceiving policy merely as documents, laws or regulations issued by Government or governmental agencies. To the question on why there was no policy, many interviewees claimed that the government was not expected to have a policy in such an area, or that it would not be 'government style' to regulate or intervene in such details. However, when hard pushed on whether no-one or nothing was promoting or hindering oral hygiene policy, various suggestions were put forward or agreed when suggested by the interviewer. It was for instance, agreed by many that the remuneration system for general dental practitioners under
the NHS could have included a specific fee for oral hygiene instruction. Several interviewees said that it was anticipated and expected that GDPs do give oral hygiene instruction when considered necessary and that they receive payment not specifically for the instruction, but as part of their fee for examination or periodontal treatment. It could thus be argued that the fee-paying system is, to a certain extent, controlling oral hygiene albeit in a negative direction. Some interviewees thought that a specific fee for oral hygiene instruction would act as an incentive. However, no-one saw such a fee as a realistic future possibility. Several respondents mentioned that the possible forthcoming capitation system could be a way of improving and increasing oral hygiene instruction, although capitation is not being promoted with that particular purpose in mind.

In conclusion, most respondents claimed that there is no oral hygiene policy and did not expect there to be one, "as government would not be as prescriptive as that". On the other hand, oral hygiene was regarded as very important for oral health and expected to be promoted through instruction and dental health education conducted by individual dentists as part of their professional duties and also by various dental and health education bodies as well as the oral hygiene industry.

On the basis of the discussions with the interviewees and the literature and policy documents review, a number of factors which control and promote oral hygiene were identified. It could be argued that these, more than government stated policies, describe practice. However I shall argue that government stated policies do exist, although hidden in documents which have not been written specifically as oral hygiene policy papers. As for the Danish
situation, the factors influencing oral hygiene policy were divided into four categories under the headings:

a. Policy documents, laws, regulations, contractual agreements  
b. Industry  
c. The dental profession  
d. Other factors.

a. Policy Documents, Laws Regulations, Contractual Agreements

It is interesting that despite the fact that most interviewees claimed "there is no oral hygiene policy in the UK" and further argued that "the Government would never be as regimental as that", it is possible to find documents which actually state oral hygiene and recommend its promotion in various ways. Other documents use the terms 'oral self care' and 'dental health education' and it is evident that oral hygiene is implicitly part of these terms.

Already in 1946, the Teviot Report (Ministry of Health) (see also 2.1.11) states:

'... dental hygiene should form part of school routine ... Dental health education should be one of the essential parts of the advice given at maternity and child welfare clinics ... Dental health education should deal with questions of diet and dental hygiene as well as stressing the need for regular inspection and treatment'.

In 1956, the McNair Committee (Ministry of Health) (see also 2.1.11) wrote:

'Even now, many people think of their teeth only when they trouble them and believe that the effective remedy for toothache is simply in the removal of the tooth. There is little sign that the majority of the public see any weighty reason why they should take trouble to care for their teeth any further ... we do not think that the profession in this country should bear the chief and final responsibility for publicity on dental health ... It is a national task to secure public interest in good teeth, so that the main responsibility must rest with the government ... We do not suggest that the responsibility for publicity should be implemented by the government exclusively and
directly. The General Dental Council and the British Dental Association should play an important part in co-operation with the Minister and the Secretary of State'.

In their final recommendations the Committee strongly urge a national programme of dental health education.

A more recent oral health policy document (Towards Better Dental Health, The Dental Strategy Review Group, DHSS 1981) stated:

'strategy 1.5: The changes we are proposing depend heavily on the education of the profession and of the public and the provision of the necessary conditions and motivation. Improving dental health requires a fully integrated approach, the elements of which should seek to: encourage the prevention of dental disease for the community and the individual by dental health education ...

1.7 A fundamental change of direction in the education of dentists both at undergraduate and postgraduate levels will be required.

1.8 ... Every effort must be made to make the public at large aware of the value of oral hygiene and dental care.

3.4 Dental health education and oral hygiene instruction are fundamental to the promotion of good dental health. Increasing its amount, effectiveness and efficiency would have a profound effect on the dental health of the nation.

3.5 One of the main problems to progress would appear to be that the majority of the profession do not yet recognise their role in this field.

3.6 It is important that a national strategy for dental health education should be developed.

3.7 It is important that the public should be encouraged to brush their teeth regularly particularly with a toothpaste containing fluoride. There is a strong correlation between the frequency and efficiency of toothbrushing and the prevalence of gingival disease'.

In summary and without further citations, it is clear that this dental health policy document from 1981, as well as the cited
earlier documents, strongly emphasise dental health education and in certain places, specify oral hygiene. A couple of later government papers also relate to oral hygiene policy.

In the guidelines for 'The Future Role of the Community Dental Service' (HC89) (Department of Health and Scottish Home and Health Department) it is stated:

'The provision of dental health education aimed at encouraging self care and regular attendance at the dentist should be increased, particularly in those areas where dental health and dental attendance is poor ... It will be essential for Health Boards to monitor the value of the programmes'.

Although oral hygiene is not spelled out, it is evident that "dental health education aimed at encouraging self care" is mainly concerned with oral hygiene and dietary advice. Obviously it can be discussed whether these statements can be taken as government intentions regarding oral hygiene policy. It appears, although some interviewees may not have seen the HC89 as it was issued only a month prior to the timing of the interviews, that the majority of the interviewees do not perceive these statements as oral hygiene policy. Perhaps this is understandable as these papers/reports are not concerned merely with oral hygiene policy but a number of topics related to oral health. It is likely that oral hygiene simply gets lost among the major issues such as dental education and manpower or the role of the community dental service or payment systems.

It is also important to differentiate between statements in official reports of government intentions and how these intentions are actually implemented. Many interviewees focused more on what actually happened than what policy papers stated. It was my impression that most interviewees thought the government was
positive and favoured dental health education, promotion of self care, oral hygiene, etc. However, the government would not go as far as, for instance, setting a fee for oral hygiene instruction. If and when the government 'put its money where its mouth is', funding would be directed to the national health education bodies, HEC and SHEG (now HEBS), not to dental professionals. There was disagreement among interviewees whether a fee for oral hygiene instruction would actually improve oral hygiene, whereas everybody agreed that it was an unrealistic thought in any case. The policy paper 'Promoting Better Health' (DHSS 1987) states:

'4.12 Treatment of children in general dental services will require dentists to concentrate on providing advice on oral hygiene ... The fee payable to dentists for examining patients, including the provision of advice, has increased by over 50% since 1984 in recognition of the increasing amount of time devoted by dentists to advising patients. The government welcome these trends. It will discuss with the profession proposals to define more broadly what is required by way of prevention when giving NHS treatment and to amend the dentist's NHS contract to make clearer the requirement to give advice'.

One or two interviewees mentioned that a fee was set out for oral hygiene instruction because it was part of the examination and general advice fee whereas the majority did not count this. A rather cynical comment was given by one interviewee:

'Even if a specific fee was given for oral hygiene instruction it would only result in "Biro" dentistry'.

This notion refers to dentists writing a claim but who do not actually give the advice or instruction. If this attitude is held by government negotiators this could perhaps partly explain why government in policy documents support oral hygiene but choose to direct funding to the national health education bodies rather than fees for dentists. The dental profession's attitude towards oral
hygiene is obviously important in practice whether there is a fee or not. Several interviewees thought that dental education was indeed more important than payment systems. One interviewee, reflecting attitudes similar to those of many others answered the interviewer's question thus:

Interviewer (A):

'Which legislation or regulations surrounds this area - oral hygiene policy?'

Interviewee (B):

'I'd look in X's book again - I really don't know. In terms of brushing - there are a group called British Standards Institutes which lay down standards, quite recently for the manufacturers of toothbrushes, its size, its shape, bristle construction and so on'.

(A)

'It's funny that you immediately think of the sort of technique, standards etc. I am thinking of regulations to promote oral hygiene in the population, of which one could say is the remuneration system where dentists are being remunerated to give instructions to patients - do you consider that to be important?'

(B)

'Well ... yes it is. I think probably more important however, is the dentist's education'.

(A)

'More important than remuneration for the public getting instruction in oral hygiene?'

(B)

'Yes of course, I know lots of school dentists on salary who don't do any prevention so actually the payment system is less important I'm sure, than the actual education the dentist received as an undergraduate and subsequently - it's what's inside their head'.

(A)

'That's a strong statement'.

(B)

'That's my impression. Look at the capitation study which examines the interaction between the age of the
dentist, the undergraduate education of the dentist and the payment system. The hypothesis is that the change to capitation makes it possible for dentists to do prevention but does not require them to do prevention. Whether they do it or not depends on what's in their heads'.

(A)
'That's from during education?'

(B)
'Particularly, yes'.

This citation shows several aspects of oral hygiene policy attitudes which were shared by many interviewees. Firstly oral hygiene is not perceived as being controlled or promoted by any laws or regulations or if it is, then people refer to standard regulations regarding brushes, size, etc. and there is little interest and specific knowledge about such standards. Secondly, payment systems are not considered to influence practice much or not as much as dental education. Thirdly, the forthcoming (now actually implemented) capitation system was seen as a potentially promising way of promoting prevention in general and oral hygiene specifically.

b. Industry

Both the representatives from the major oral hygiene companies and all remaining interviewees claimed that the industry has played an important role in promoting oral hygiene and also that the relation between the industry and the dental profession was very good and non-controversial (in contrast to the relation with the sugar industry). One interviewee expressed it as, 'a positive symbiotic relationship between industry and the profession'.

Altogether the dental profession appears to be grateful for any financial support given by the industry, and indeed a growing competition amongst researchers is now emerging to receive funding
and to work with the industry. No-one expressed any inhibitions about receiving money, this in strong contrast to receiving money from the sugar industry (see later).

Only two interviewees remembered any occasions of controversy between the industry and the profession and both persons told the same story.

Interviewer (A):

'How do you view the relation between the oral hygiene industry and the dental profession?'

Interviewee (B):

'It's very close. It's very good. Occasionally it breaks out into difficulties with issues such as endorsement of products - there was some problem four or five years ago with the BDA. The BDA decided to endorse fluoride toothpastes and the first one they endorsed was a product by Proctor and Gamble and this was done in a rather silly way, that instead of actually producing the regulations and allowing the manufacturers to make a bit for their products, they just negotiated with one company and endorsed their product and then announced the regulations that anyone else that wants to apply can do so. This upset the other companies, one of whom went to the president of the BDA with a very strong complaint. The president that year was the Duke of Edinburgh because it was the BDA’s 100th centenary, so the complaint was actually sent to the Duke of Edinburgh, who was very angry, apparently - being dragged into this commercial punch around between the two toothpaste companies so, it involved the press, the newspapers, and eventually the BDA decided to drop the whole matter and they no longer endorse any products at all. They had their hands burnt. There was some suggestions that perhaps some people in the BDA were too close to one of the companies and so on and so forth. I’m not sure how true that was. But anyway the BDA just dropped the whole business. They may start again but I’m sure they’d do it more carefully if they do it next time'.

(Author’s note: In 1991 BDA started a new accreditation scheme. From September 1991, seven brands of toothpaste will be carrying a 'BDA accredited' logo. According to the BDA Accreditation aims to benefit the public in the following ways:

- To assist the consumer in the choice of safe products which perform in accordance with the
manufacturers' claim
- To encourage research and development in dentifrice manufacture
- To improve the quality of dental health information available to the public.)

Apart from this incident the relation between the industry and the profession has always been and still is, non-controversial and mutually beneficial according to all interviewees. No-one was aware of any incident where the industry had influenced oral hygiene policy at the level of policy-making or at the endorsement level of any such policies.

There was only one interviewee who expressed criticism regarding the role of the industry. This person expressed concern that the industry's emphasis on oral hygiene and fluoride (in relation to decay) took attention away from the real cause of decay - namely sugar.

Although all interviewees claimed that the industry did not influence policy they also agreed that the industry in reality had had a tremendous effect on oral hygiene at a public level through advertising of their products.

A few people said that possibly the industry was influencing British standards for brushes and dentifrice particularly involved in EEC regulations but no-one knew for certain anything specifically about this.

Apparently the industry does not influence oral hygiene policy, but naturally in practice they promote oral hygiene as far as possible. Most companies claimed that the most effective and most important way was through the dental professionals. Among some of the many ways by which the industry channel finances
towards the profession and keep contacts were mentioned;

i) producing educational packages and other dental health education material sometimes distributed free of cost, sometimes at cost

ii) supporting or organising conferences, meetings etc.

iii) funding research

iv) funding a chair in dental health

v) employing representatives or dental health educators locally to contact dentists

vi) one company which keeps a permanent mailing list of 15,000 dentists

vii) development of programmes or concepts such as the 'Gum Health Plan' or the Preventive Dental Unit (PDU) which many dentists claim to use.

In conclusion, the oral hygiene industry does not enter the oral health policy-making arena but in practice engages in what is seen as a mutually beneficial relationship with the dental profession.

C. The Dental Profession

The dental profession obviously plays a major role in the policy and decision-making process regarding oral health policy. The extent to which dentists push oral hygiene or dental health education to become part of oral health policy is questionable. As evident from the previous sections, most interviewees claim that oral hygiene is important for oral health and also most existing policy documents emphasise oral hygiene and dental health education. If the government's and the dental profession's intentions are to promote oral hygiene and dental health education,
why has a strategy for promotion not been worked out? Why are most
interviewees surprised by the question 'Who or what promote oral
hygiene or oral hygiene policy?'

Is the profession more occupied with other policy issues or do
they not really believe in oral hygiene and dental health
education?

The British dental profession apparently believes in oral
hygiene for periodontal reasons. However, effective oral hygiene
is also recommended for the prevention of dental decay when a
fluoride toothpaste is used. Since over 95% of toothpaste sold in
the UK contains fluoride the discussion on whether to brush for
periodontal or dental caries reasons becomes totally academic and
of no real relevance to dental public health.

It seems reasonable to suggest, as several interviewees did,
that one should make sure, in the first place, that the profession
believes in the role of dental health education and oral hygiene
through pre- and postgraduate education and, secondly, that a
recommendation is made for action to develop a strategy for
implementing and evaluating oral hygiene policy. Only by doing so
can it be assessed whether the oral hygiene message actually
reaches the public effectively.

d. Other Ways of Influencing Oral Hygiene Policy

Apart from documents, laws and regulations, the industry and
the dental profession, a few other factors were mentioned which in
various ways, control or promote oral hygiene policy and practice.

The fact that oral hygiene is a non-controversial issue
automatically limits the number of policy makers and policy arenas.
Pressure groups, for instance, are totally non-existent. The
representative from the National Consumer Council (NCC) for
instance stated:

'Oral hygiene has never been on the agenda, neither have we any plans that it should be in the future. This is not because we do not consider it important but we haven't got resources to deal with everything and have to make priorities. What we are concerned with in the area of dental health is dental patients' rights and in fact, we have recently published a document on this issue' (Dental Patients' Rights - NCC's position. NCC, London 1987).

Although the paper states that "consumers should be educated and informed about their dental health" the main concern of the paper is related to access, complaints and cost.

Several interviewees mentioned that oral hygiene and dental health education could be enhanced through the school curriculum. Currently there are no demands for schools to teach dental health education, although several interviewees were of the opinion that many schools did. However modern philosophy of health education in schools does not seem to emphasise or include dental health education - in some ways it seems almost discouraged. The latest document on health education in schools 'Promoting good health' (Scottish Consultative Council on the Curriculum) for instance, describes how there should be a move away from traditional school health education towards the health promoting school. Some examples of this recommended move are:
Traditional Health Education | The Health Promoting School
--- | ---
- emphasises personal hygiene and physical health to the exclusion of wider aspects of health. | - is based on a model of health which includes the interaction of physical, mental, social and environmental aspects.
- concentrates on health instructions and acquisition of facts. | - focuses on active pupil participation with a wide range of methods and on developing pupils' skills.

It is easy to imagine that dental health and oral hygiene may be overlooked or forgotten in this new approach.

Finally, the national health education bodies were mentioned as influencing bodies. It is true that these hitherto have had special dental programmes. The activities of the Scottish Health Education Group and the Health Education Council have been described previously (2.1.11). However, in accordance with modern theories of health education/promotion, dental health education is in both organisations more and more being integrated into other more general health issues. Health promotion should be holistic and not disease orientated.

No other suggestions for promoting oral hygiene or oral hygiene policy were put forward.

4.1.3 **Oral Hygiene Policy in UK and Denmark**
- A Comparative Analysis

Prior to presenting the comparative analysis, it is relevant briefly to focus on the concept of 'policy'. The interviews clearly confirmed, what has previously been described in the literature review of policy analysis (2.2), that the notion of 'policy' is ambiguous. In most cases the interviewer was forced to enter into a discussion with interviewees on what was actually
meant by policy. As far as possible it was made clear that the present analysis comprises both interpretations suggested by Lee and Mills (1982) (previously described in 2.2.1) namely:

1. authoritative statements of intent adopted by government or government agents on behalf of the public with the aim of altering for the better, the health and welfare of the population and

2. what health agencies or other influential parties actually do.

The majority of interviewees in both countries had the opinion that oral hygiene policy defined as in the first interpretation was non-existent. Most interviews therefore concentrated on oral hygiene policies in the sense of what health agencies or other involved parties actually do to control or promote oral hygiene.

However, the discussions on policy were always preceded by a discussion on the 'oral hygiene message': does UK/Denmark have an oral hygiene message, and if so - what is it? The comparison between the results from UK and Denmark regarding the message will be presented first.

a. The Oral Hygiene Message

First of all, oral hygiene is currently perceived in Denmark as a rather important and topical issue whereas in the UK oral hygiene is not perceived as a topical issue but as something which traditionally always was part of dental health education. The answers to the question of a 'public message' regarding oral hygiene differed in the sense that most British interviewees would readily state "brushing once or twice a day with a fluoride toothpaste", whereas the concept of a public message was unfamiliar
to the Danish interviewees. They thought that public messages or recommendations regarding oral hygiene were somehow inappropriate as these would differ from person to person and should be given on an individual basis related to each person's skills and needs. In addition, in relation to a message to the public, the Danish interviewees almost unanimously and enthusiastically stressed the importance of explaining why oral hygiene is so important in order to form attitudes and motivate the public through an understanding of the disease process (Table 4.2).

Table 4.2 clearly illustrates the differences between the British and the Danish interviewees' recommendations on oral hygiene. The main concern of the Danes lies within explaining why oral hygiene is important and in making recommendations relevant to individual needs. The majority (12 out of 19) of the British experts recommend 'brushing' at least once a day with a fluoride-containing toothpaste.
### TABLE 4.2 Nineteen UK Experts' and 38 Danish Experts' Recommendations about which Oral Hygiene Messages the Public Should Receive

<table>
<thead>
<tr>
<th>Toothbrushing Recommendations</th>
<th>Number</th>
<th>UK</th>
<th>DK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brushing at least once a day with a fluoride-containing toothpaste</td>
<td>12</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Brushing twice a day with a fluoride-containing toothpaste</td>
<td>4</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Brushing before breakfast and before bedtime</td>
<td>3</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Brushing before bedtime</td>
<td>-</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Effectiveness more important than frequency</td>
<td>2</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Time of day irrelevant</td>
<td>1</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>No specific brushing technique</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of tooth cleaning aids</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floss, toothpicks, interspace brush for everyone</td>
<td>-</td>
</tr>
<tr>
<td>Floss, toothpicks, interspace brush but only for 'high risk groups' indicated by the dentist</td>
<td>7</td>
</tr>
<tr>
<td>Floss, high risk groups only</td>
<td>-</td>
</tr>
<tr>
<td>Floss regularly, all teenagers and adults</td>
<td>3</td>
</tr>
<tr>
<td>Floss and interspace brush, all teenagers and adults</td>
<td>1</td>
</tr>
<tr>
<td>Dental tape, all teenagers and adults</td>
<td>1</td>
</tr>
<tr>
<td>Mouthrinses, all teenagers and adults</td>
<td>2</td>
</tr>
<tr>
<td>Toothpicks for perio-patients</td>
<td>-</td>
</tr>
<tr>
<td>Toothpicks not recommended</td>
<td>2</td>
</tr>
<tr>
<td>Disclosing tablets according to need</td>
<td>1</td>
</tr>
<tr>
<td>Cleaning aids according to needs and skills</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oral hygiene recommendations</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral hygiene extremely important</td>
<td>-</td>
</tr>
<tr>
<td>Caries process explained and understood</td>
<td>-</td>
</tr>
<tr>
<td>Dynamic process which can be stopped</td>
<td>-</td>
</tr>
<tr>
<td>Dental profession should inform and form attitudes towards oral hygiene</td>
<td>-</td>
</tr>
<tr>
<td>All surfaces kept clean</td>
<td>-</td>
</tr>
<tr>
<td>Sugar less damaging on clean teeth</td>
<td>-</td>
</tr>
<tr>
<td>Sensible daily cleaning</td>
<td>-</td>
</tr>
<tr>
<td>Professional toothcleaning important</td>
<td>-</td>
</tr>
<tr>
<td>Individual responsibility to keep clean</td>
<td>-</td>
</tr>
<tr>
<td>Oral hygiene is a treatment</td>
<td>-</td>
</tr>
</tbody>
</table>
At a superficial level it thus appeared as if the Danish interviewees considered oral hygiene more important and certainly much more of a topical issue than the British interviewees. However, several factors should be borne in mind. First of all, the concept of a public message on any health issue is easily understood and forms a natural part of most health education in the UK. The national bodies (Health Education Authority (HEA) and Scottish Health Education Group (SHEG) (now the Health Education Board for Scotland (HEBS)) frequently issue statements on various health matters, which could be called public messages, such as 'reduce fat intake' or 'eat more fibre' or 'use condoms'. In Denmark equivalent bodies do not exist and national or public messages are only rarely issued.

In the area of dental health, the HEA and SHEG in England and Scotland respectively, have published and widely distributed 'The Scientific Basis of Dental Health Education' which contains four clearly stated public messages related to dental health. These messages are well known to most dental professionals and also other health and education professionals. One of the messages is: "Clean the teeth and gums thoroughly every day with a fluoride toothpaste". No such document exists in Denmark and neither is there a demand for it. It was therefore not surprising that the British and Danish interviewees answered rather differently to the question on a public message on oral hygiene. In other words, the British interviewees were familiar with and would easily answer the question of public national messages, whereas the Danish interviewees seemed to be thinking at a different level more in terms of a specific setting, like advice or information given at the dental chair or in the school or nursery, not at a national
level. It could be questioned whether the message actually is the same in the two countries and the apparent differences only lie in the fact that the Danes are thinking at an individual level whereas the British interviewees answered the question thinking in public health terms. It is likely, however, that a real difference does exist. Among British dental professionals and in the literature written by British authors (Sutcliffe 1989) toothbrushing is stated as having no proven effect on dental decay in itself. As stated in 'The Scientific basis of dental health education' (HEC 1989):

'Regular toothbrushing by itself will not prevent dental decay but a definite benefit will be gained by the use of a fluoride toothpaste'.

The British dental professionals tend to recommend toothbrushing per se for the prevention of periodontal disease, not for dental decay. This is in contrast to what most of the Danish interviewees believed. They wanted to explain to the public the importance of removing plaque as part of the treatment of dental decay. Most of the Danish interviewees considered plaque removal far more important than sugar intake where the opposite was the case for the British interviewees (see later).

The use of other oral hygiene aids was, by most interviewees in both countries, considered a matter for personal professional advice. Some interviewees preferred floss, others toothpicks, but most had no preferences. There was no systematic difference between British and Danish oral hygiene aids recommendations.

It can at this stage tentatively be concluded that the oral hygiene message differs in terms of toothbrushing recommendations but not in terms of other oral hygiene aids. The question is whether this apparent difference is reflected in policy or practice.
b. Comparative Analysis of Oral Hygiene Policy in the UK and Denmark

In view of the fact that analysis of dental health education policy and indeed comparative analyses of dental health education policy or oral hygiene policy has not previously been described in the literature, it is extremely difficult to find a common framework or a theoretical basis to guide the analysis. In order to bring some order to the infinite variety of policy-relevant variables, either a new framework would have to be developed or a framework used in general health - or public policy analysis, could be 'borrowed'. The latter approach has been chosen in the first place. Leichter’s (1979) classification scheme for analysing public policy suggests that public policies can be explained by a combination of (i) situational, (ii) structural, (iii) cultural and (iv) environmental factors (described in 2.2.1). Leichter stresses that only rarely does any one factor operate in isolation and also that these policy-related factors vary according to policy area. The similarities and differences which emerged from the policy-analysis within each country (4.1.1 and 4.1.2) are in summary listed below, followed by an attempt to explain these using Leichter’s framework.

a) Oral hygiene is considered important by interviewees in both countries but a specific oral hygiene government policy in the form of statements or policy documents is considered non-existent in both countries.

b) In Denmark, oral hygiene motivation and instruction is in practice promoted and secured by the Act of Child Dental Care and the guidelines for the execution of the Act. Additionally an apparent nearly uniform attitude and knowledge about the importance of effective plaque
removal is considered secured by undergraduate and postgraduate dental education. The contractual agreement includes a fee which theoretically covers oral hygiene. Interviewees disagree on whether the adult population actually receives oral hygiene instruction.

c) In the UK, oral hygiene is mentioned in several government policy documents but there is no real strategy for implementation although dental health education is mentioned in the new guidelines for the community dental services, and according to some interviewees, included in the fee for examination.

d) The oral hygiene industry plays a similar role in both countries. It does not influence any policies related to dental health apart from regulations related to standards etc. (policies regulating industry, not dental health). However in practice the industry is considered to play a major role in advertising oral hygiene to the public.

e) In both countries the government, the oral hygiene industry and the dental professions appear to be the only interested parties in oral hygiene policy.

f) There is one exception for (e) namely national health education bodies existing and involved in the UK but not in Denmark.

g) Pressure groups are non-existent in both countries.

h) The 'message' on toothbrushing and the understanding of why oral hygiene is important differs in the two countries. In Denmark plaque removal is considered to have a caries-preventing effect, whereas in the UK only the fluoride used in toothpaste is considered to have a
The Impact of Situational Factors on Oral Hygiene Policy

The explanatory value of situational factors in the comparative analyses of oral hygiene policy in UK and Denmark is limited for two reasons. Firstly 'situational' factors are of such a major scale, i.e. wars, economic cycles, natural disasters etc., that if they did have an impact it would first and foremost be on general health policy and any impact on dental, or even more specifically, oral hygiene policy, would merely be an offshoot of the impact on general health policy. Secondly, many major situational factors are similar in Denmark and the UK and should theoretically lead to similar policies. Perhaps the fact that no major situational factor has occurred in one country and not the other can explain the relatively similar policy.

Among the situational factors which undoubtedly have influenced health policies in both countries are the Second World War and a more recent factor - the current recession. The health and education sector in both UK and Denmark are currently feeling the 'cold wind' of the recession in the form of scrutiny of resources and demands for value for money. However these influences can be detected at a more general level, not at something as specific as oral hygiene. Within the framework of the present study it is not possible to explain differences with situational factors any further.

The Impact of Structural Factors

Three main groups of structural factors exist:

1) political structure
2) economic structure and
3) social, demographic and ecological structure.
A detailed analysis of the political structure will doubtless show many differences between the UK and Denmark. However, in major terms, both nations have a rather similar structure namely a non-military regime with a competitive party system, a unitary as opposed to a federal system, a parliamentary, democratic government, a large civil-service bureaucracy with similar legislative/executive relations and budgetary processes. In both nations the health care policy has evolved in a structured political, economic and demographic milieu. Specific content and structure of health policy are forged within the confines of the parliamentary democracy; an informed and articulate public opinion, aggressive interest group activity, political bargaining, and ultimately, legislative debate and enactment. Within this relatively similar structure, however, a difference in the organisation of dental health services has emerged.

In Denmark the Act of Child Dental Care has secured that all children are seen and treated within the Community Dental Services at least annually and have the right to individual and group oral hygiene instruction/motivation. In the UK many children are treated in the general dental services and lately the guidelines state that all 'normal' children are to be treated in the general dental services. In terms of oral hygiene promotion, the Danish organisation seems more favourable but, as pointed out by British experts, also more expensive.
2) The economic structure differs considerably in the two countries. The Danish welfare system seems to have gone a step further than the British in terms of health and social services. The Gross Domestic Product (GDP) is 50% higher in Denmark and moreover health expenditures, in particular dental expenditures as percentage of GDP, are much higher in Denmark than in the UK (Table 4.3). Also the dentist population ratio is about three times higher in Denmark. It is therefore to be expected that the Danish Dental Health Service, since it has relatively, and in real terms, more resources also is more able to afford oral hygiene policy. It is also possible that the average Danish citizen, with a much higher personal taxation, would expect and perceive oral hygiene instruction more as a right than would the average UK citizen.
TABLE 4.3  Dental Expenditures as a Percentage of Health Expenditures and Gross Domestic Product and Dentist Population Ratios, 1974-83

Dental Expenditures as % of Gross Domestic Product

<table>
<thead>
<tr>
<th></th>
<th>1974</th>
<th>1979</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td></td>
<td>0.68((a))</td>
<td>0.60</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.20</td>
<td>0.18</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Total Health Expenditures as % of Gross Domestic Product

<table>
<thead>
<tr>
<th></th>
<th>1974</th>
<th>1979</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>7.10</td>
<td>6.57</td>
<td>6.63</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5.28</td>
<td>5.27</td>
<td>6.18</td>
</tr>
</tbody>
</table>

Dental Expenditures as % of Total Health Expenditures

<table>
<thead>
<tr>
<th></th>
<th>1974</th>
<th>1979</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td></td>
<td>9.95((a))</td>
<td>9.03</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.77</td>
<td>3.47</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Dentists per 100,000 population

<table>
<thead>
<tr>
<th></th>
<th>1974</th>
<th>1979</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>84.0</td>
<td>88.0</td>
<td>101.3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>28.3</td>
<td>30.6</td>
<td>34.4</td>
</tr>
</tbody>
</table>

(\(a\)) = 1980

3) When considering social demographic and ecological structures it should be noted that the UK population is 10 times as big as the Danish population and constitutes a much more heterogeneous group. It must be far more complicated to organise dental health services for 55 million than it is for 5 million. Perhaps the more unified attitudes among Danish interviewees regarding oral hygiene reflect the fact that education and scientific knowledge emerge in Denmark from two dental schools but in the UK from 15 dental schools. It should also be expected that it is a more complicated task to educate and motivate a heterogeneous group of 55 million than a relatively homogeneous group of 5 million.

The Impact of Cultural Factors

Cultural factors can be divided into political culture and general culture.

Political culture may be defined as a set of values, beliefs, expectations and attitudes concerning what government should do, how government should operate, and what the proper relationship is between the citizen and the state.

Political culture shapes public policy in several ways. It helps determine what are to be policy issues and the way in which they are to be dealt. It defines the acceptable role of both government and citizen in the policy process.

It is likely that differences in political culture partly explain the differences identified by the present study in oral hygiene policy. Several UK interviewees stated:

'The government is not expected to regulate in this area'
'The government should not regulate this area'.

One interviewee expressed this attitude very clearly:

'We don't expect government to tell people how to wipe their bottoms - why should they tell people how to brush their teeth?'

None of the Danish interviewees expressed attitudes along these lines. On this basis it would be expected that the Danish government having a more acceptable role in this area, is also more regulative and interfering.

The Impact of Environmental Factors

Environmental factors do influence the development of health policy as shown in previous studies (Leichter 1979). In the dental area however it is more likely that environmental factors influence fluoride policy (see 4.3.3) or sugar policy (4.2.3). On the basis of the framework of the present study it has not been possible to detect any influence of environmental factors on oral hygiene policy in either country.

As expressed in the beginning of this section, variations in the content of policy among nations can rarely be explained by a single factor. Policies result from the interaction of several factors. Leichter's framework for comparative policy analysis, although not specifically developed for oral health policy has, at least, and in the absence of any better framework, given some order to the infinite number of variables interacting with each other.
4.2 SUGAR POLICY

4.2.1 Sugar Policy in Denmark

A. Does Denmark have a 'Sugar Message'?

The majority of the Danish interviewees did not perceive sugar as an important issue for oral health promotion in Denmark. In fact several people stated directly: "sugar does not cause caries", and some modified the statement by saying: "at least not in the majority of the population". Ten or fifteen years ago everybody thought that sugar was the main cause of dental decay. Since then the caries experience at a national level has decreased tremendously without any similar (or proven!) change in sugar intake. Therefore, and because of the now better understanding of the caries process and with plaque increasingly seen as the main cause of dental decay, sugar was no longer an issue of concern, according to most interviewees.

Some interviewees mentioned that there still existed a minority of people with extremely high caries activity to whom sugar intake was important. Such people should naturally be given individual information on sugar intake and advice to cut it down.

One typical response was:

'Sugar should be "handled sensibly". The information we should give to children is not to preach that they should stay away from sugar, that is simply not necessary - only to children with special problems'

and further

'Sugar as a single factor has no relation to health - sugar is not the big enemy'.

Another person said:

'The basic philosophy has to be freedom of choice. We can't and shouldn't try to force people - we should only give them information'.

However, it was thought that people with high sugar intake
would most often also have a number of other problems. For instance the phenomenon 'baby caries' (bottle caries) was nowadays only seen in families with lots of other social problems. In general the majority of interviewees thought that sugar should be consumed 'sensibly' and they were convinced that the public already know this. Several interviewees said, regarding sweets, that various colourings and additives were of much more concern. The representative from the National Nutrition Council said:

'We don’t have any pressure groups against sugar in Denmark but there is a grass root movement against additives and colourings and of course they do include soft drinks and sweets'.

A dental interviewee claimed:

'Parents want their children to have real pure sugar, not artificial sugar. It must not be sticky but we should educate the public to eat sweets in a sensible way. If we say "you must not" or "you should not" it is unrealistic and the public will not follow such advice. On the other hand we shouldn’t say that sugar is wonderful. There ought to be better labelling so that people can decide themselves. But it is a problem with the increasing number of allergies'.

Another example of typical attitudes was:

'In principle kids shouldn’t run around eating sweets all the time, but remember the story of the messenger boy who drank 12 bottles of high-sugar soft drinks every day, - well all dental decay was stopped by using fluoride and improved oral hygiene! We also don't want to give advice on what babies drink in bottles or whether they use dummies or not. It must be a family decision on what is most important. The dental profession have in the past been incredibly moralistic. If one keeps one’s teeth clean then sweets or confectionery or pastries are not harmful - of course when sensibly eaten. In this relation additives and calories, etc. are far worse ... Many studies seem to show that children eat more sweets than ever and dental decay is decreasing'.

As an example of the attitudes towards sugar and sweets in
particular, should be mentioned the way in which one of the major municipal child dental health services celebrated its 75th anniversary in summer 1988. The dental staff had initiated and organised a major 'sweet parade' with all the schoolchildren. Dressed up as various well known 'sweets', the staff, and the children paraded through the town. The Chief Administrative Dental Officer for this municipality explained that the dental profession hereby communicated the message to the public, that sugar should no longer be perceived as the big threat, but as something nice which you could happily eat, particularly for special celebrations.

The interviewer asked a number of the other interviewees about their opinion of such an initiative. Some were a little surprised, but none were shocked.

Apparently sugar was no longer a health issue of any importance. The vast majority of the interviewees stated that if sugar information should be given it should be part of general diet and nutrition education. It was, moreover, claimed by one interviewee:

'It is the public's right to receive information about diet and nutrition'.

However, a small minority had a different opinion. One person stated:

'The public ought to know that sugar is harmful'.

Another person said:

'... dental decay is a sugar-induced disease, it is people's lifestyle and living conditions which cause caries - not a few bacteria'.

One interviewee associated with the Danish Dental Association (DDA) claimed that:

'The Association had had a strong anti-sugar attitude but hadn't wanted to directly offend the Danish Sugar Industry (DDS) who are a
fantastically strong economic and political force'.

It should be noted that no-one else said that the DDA were anti-sugar. The interviewee from the National Preventive Council said:

'Sugar does have some influence but children get less caries because of compensation (fluoride and oral hygiene). There is no pressure from the dental profession or any other groups against sugar as far as I am aware and we are not doing anything here'.

Also the National Board of Health appeared to be passive in relation to sugar and messages in general:

'I am not certain about sugar messages. The Health Board has never been engaged in any campaigns. When the professor of cariology says that sugar is practically of no importance it is difficult for the Health Board to do anything ... There isn't anybody who is interested in sugar in Denmark. Moreover, there isn't a need for national "messages" in Denmark. The information reaches people in one way or another anyway. Maybe the demand for such things (i.e. 'messages') is bigger in a country without decentralisation like we have in Denmark. It is not that we couldn't obtain consensus or agreement on which messages - there simply is no need for that sort. It would become central administrative nonsense - and too general, and anyway would have to be redefined locally in relation to local needs'.

It should be noted, however, that many interviewees agreed that the perception of sugar as unimportant for dental health education was closely linked to the improved dental health status of the population. They would not deny that sugar could be important in other parts of the world with different dental decay activity.

In conclusion it can be stated that Denmark does not seem to have a 'sugar message'. No-one seemed to regret this or to have an interest in formulating any such message.
B. Does Denmark have a Sugar Policy?

There were no doubts, hesitations or confusions regarding the question of a sugar policy in Denmark. There is no sugar policy according to all interviewees (with one exception, described below). In this respect it should be noted that there was no confusion about what was meant by sugar policy. (In contrast to 'oral hygiene policy' which raised questions like 'what do you mean?' or 'what is policy?', etc.) In this context, interviewees clearly understood policy as both: authoritative statements of intent adopted by government or government agents on behalf of the public with the aim of altering for the better, the health and welfare of the population; and what health agencies or other influential parties actually do. However, it can be argued that a non-policy is a policy in itself, as previously discussed (Chapter 2). In this case the non-existent policy reflects the government's and/or other involved parties' interest in not having any documents, laws or regulations regarding sugar intake. The attitudes and activities of the involved parties in this 'non-existent' policy are described below.

A number of 'bodies'/factors were found to have influenced sugar policy in the Danish population. These factors have been divided into four main categories, although it should be recognised that there is an interaction between these categories (discussed in Chapter 5).

a) Policy documents, laws and regulations

Reference has already been made to the frequent claim that intentions and regulations regarding sugar were non-existent. There was one exception to this trend, although it was only mentioned by three of all the interviewees. Sugar-caries has been
recognised as an occupational disease by the National Board for Health Hazards at Work, which has also issued guidelines for its recognition (Sikringsstyrelsen 1986, Petersen 1987, Danish Dental Journal 1990, p.333).

This recognition was, according to one interviewee, introduced as a consequence of a study among chocolate workers which demonstrated an increase in the risk of dental caries as well as periodontal diseases because of a high level of sugar dust in the working environment. If and when dental caries has been recognised as an occupational disease, dental care of workers in bakeries, sugar and chocolate industries must be financed by the insurance company of the employer. The conditions for recognition as an occupational disease have been specified in the Board’s order No. 276 of May 23 1986, para 1G.

Viewed from the outside, this recognition of sugar as the cause of dental occupational hazards seems to be a major sugar policy decision. It was therefore surprising that only three mentioned it.

The one interviewee who claimed to have been instrumental to the introduction of this policy answered the question of whether anyone had tried to hinder this regulation as follows:

'I have never hidden that I want to use my research in a health political relation ... In connection with the formulation of the Act on dental service, some of my research results were presented in Parliament - this is just showing that as a researcher you can get into the political processes. My work in relation to the recognition of dental caries as an occupational disease has to do with the government services or administration which again is different from legislative work'.
Interviewer (A): 

'What did you actually do?'

Interviewee (B):

'The "Sikringsstyrelsen" is a Board under the Social Ministry like the National Board of Health who administers the laws. The story is that some people have discovered that they got dental decay as a result of their work. This knowledge or experience they brought to the Occupational Health and Safety Committee, who tried to solve the problem. I was then contacted to design a study. The results showed that they were right, so I brought these results to the "Sikringsstyrelsen". They have representatives from both the employers' and the employees' associations and also medical consultants, among these a dental consultant who was consulted in this case'.

(A) 'How long did this process take?'

(B) 'From when the Board got to know about it until the regulations were published it took 2 to 3 years. But what you really want is the decision-making process isn't it?'

(A) 'Exactly'.

(B) 'Well the Board have a political committee who act based on an examination of the case. They examine which influence it will have economically on the labour market. The economics is the most important aspect. When I attended the first meetings at the Board I was not confronted with things like: "how terrible people have such a health problem becoming ill from their work". The first question was: "What is it going to cost?" This means what is it going to cost the insurance companies and through these the employers - because they are the ones who have to pay the damages which the Board are administering. In this way the Board has an influence on the cost for the employers' insurance companies. If the Board recognises too much the employers' premium has to be increased - in this way there is a relation between recognition of diseases and cost for the companies. Therefore the labour market's parties have an interest in this question'.

(A) 'So you attended a number of these meetings?'

(B) 'Yes many times - and what I had to hope for was not to be opposed by the Board's own dental consultant. It gives a special situation when
you are sitting at the Board and dental professional disagreements occur'.

(A) 'Were there any attempts to disprove your study results?'

(B) 'Yes - but unsuccessfully in terms of persuading the Board'.

(A) 'Was it stated that your conclusion was not supported by your data?'

(B) 'No, not directly, but the conclusion was after repeated discussion, that the representatives on this basis had to say that there "maybe" was something about it - but only maybe or perhaps'.

(A) 'Were attempts made to say that there wasn't proof enough ... more research needed, etc'.

(B) 'Yes, that is the tactic which is often used - to ask for more examinations - further studies but the counteracting wasn't convincing enough. The Board had prepared this case and their report did not state that there was any professional disagreement on this issue'.

(A) 'I am surprised again'.

(B) 'Yes - I have later had insight into the administration of the regulations for the recognition - and thought this. I have seen things like this:

A person is only given a third of the dental care costs he should have had because he doesn't brush his teeth well enough. We are talking about large sums of money - and the employer has to prove that it is not the working environment which caused the disease - so the burden of proof has been changed. This is why it has been so important to get it recognised - because if it hadn't been, the person who has the disease has to prove that it is his work which has caused the disease'.

(A) 'Do you know how many cases there have been?'

(B) 'Yes - in the 10 years before the recognition, there were about 100 cases. Since the recognition til now - about a year, there have been more cases than during the previous ten years. It shows that there was a real problem'.

The rather lengthy citation of this part of one interview has
been chosen for several reasons. First, it represents the only existing sugar policy in either of the two countries concerned. Moreover it describes the decision-making process and the role of the involved parties. It is clear that it was a political, economic decision more than a health decision as stated by the interviewee. The discussion with the interviewee showed further that dental professionals have the opportunity of influencing decision-making but need political skills and determination. On the surface this policy could be seen as a national health policy decision based on dental scientific research. In reality it was a bargaining process based on the cost to the involved parties. It is interesting to note that since the time of the interview, the regulations have been severely restricted so that it now is far more difficult to get dental caries (sugar-caries is the term used) recognised as an occupational disease (details - The National Board for Health Hazards at Work, 20 January 1989 para.2G.)

Apart from this example of sugar policy only mentioned by three interviewees, no other policies in the form of documents, laws or regulations were mentioned by any of the interviewees.

It is interesting in this respect that the guidelines for the community dental service issued by the National Board of Health state: "Information activities ... including the importance of appropriate diet" in relation to what the services should be doing. Obviously the interviewees do not consider this a sugar-policy although the guidelines definitely were known to the interviewees and show the government's intention of assuring diet-information to all Danish children (note diet-information not sugar information).

b) The dental profession

In theory the dental profession could influence sugar policy
at two levels. They could, as the example of occupational disease has just shown, influence the legislative work and the administration of laws and regulations. They also have the possibility of influencing sugar-policy practice through their daily work and direct contact with the public. It could be expected that the profession's involvement at both levels would depend on their attitudes and their scientific knowledge regarding sugar and dental caries. The results of the interviews showed a wide range of attitudes towards sugar, stretching from the ones claiming that sugar had no relation to dental caries to the ones claiming that sugar was the main cause of dental decay. At neither end of the scale did these beliefs of scientific knowledge lead professionals to get involved in sugar policy at the level of legislative work and administration (again apart from the one example mentioned). The reason that the profession is not involved in sugar policy at this level is not that they in general do not get involved in dental health policy issues. Several of the interviewees had been and still were heavily engaged in other issues. There seem to be several possible explanations: either they do not consider sugar policy of sufficient importance or they consider it an impossible task to waste energy on. On the basis of the interviews the most realistic answer seems to be a combination of these two explanations.

On the one hand the sugar industry was perceived as a powerful force which would be expected to fight strongly against any attempt to restrict or limit sugar consumption and on the other hand sugar was perceived 'as not very important'. It is noteworthy to contrast the complete lack of engagement in sugar policy with the rather emotional and enthusiastic involvement which many
professionals show in policies related to the age groups of patients which should be treated by different services (the general dental practice or the community dental service). It was well known by interviewees that political parties to the right were likely to support a lower age limit for the transfer of patients to general dental practice and the parties to the left more likely to vote for a higher age limit. When the Act on dental health services was last debated in parliament, the dental professionals, both the supporters of the community dental services and the supporters of the general dental practice, were well aware that the way to win would be to persuade the middle party to turn to the left or the right, respectively. Several interviewees had been involved in trying to do so. The dental professional engagement in this debate was obviously not rooted in a deep interest in dental public health but more likely the concern of securing work (= patients) for both services.

At the practice policy level, the professional could have a major influence on sugar consumption by advising and motivating the public directly to limit their sugar intake. It appeared that at this level, the beliefs that the profession held about the role of sugar influenced their activities. The change in beliefs on the role of sugar amongst Danish dental professionals over the last decade, from the majority believing that sugar was the main cause to the majority believing that sugar had little to do with dental decay, was reflected in the termination of most dental health education activities about sugar.

Several interviewees mentioned various activities, e.g. school projects, anti-sugar campaigns, and even attempts (unsuccessful) to change food label regulations and sugar taxation etc. but these
were all activities from the past. During the last ten years the majority of the interviewees agreed, no major activities had taken place to decrease the public's sugar intake or to educate the public about sugar and dental health (again with the one exception described earlier).

The dental profession no longer saw any reason to take such initiatives and therefore had not. When questioned whether any one party or organisation had controlled this development, no dental professional knew for sure, but several were convinced, that the Danish sugar industry had influence one way or another. A number of examples of funding given to dental research or the Danish Dental Association by the sugar industry were given and were well known by many interviewees. It was generally not thought that such funding had influenced sugar policy or the role of sugar in dental health education. The role of the sugar industry and their relation to the dental profession is discussed separately below.

c) The industry

The only real enthusiasm and interest in sugar came from the Danish sugar industry. It should be mentioned here that "The Danish Sugar Industry" is a rather big industry in Denmark although only minor in international terms.

The company director himself was happily engaged in the interview which lasted more than three hours. He appeared to talk in an open, honest and enthusiastic way about the relation between the sugar industry and dentistry and sugar policy in Denmark.

In contrast to all the other interviewees, the person representing the sugar industry appeared keen and enthusiastic and extremely well informed on all the questions related to sugar and health. He appeared to remember in detail every anti-sugar
activity that had happened as well as being rather knowledgable about cariology, periodontology, the past and present theories of aetiology and prevention. In addition he knew, if not in person then by name, most of the dental people who had been involved in research related to dental decay and dental health education as well as a number of key persons from consumer associations and other bodies involved in nutrition.

There seems no doubt that the sugar industry is aware of and following activities which have the potential of influencing sugar consumption. Whether the sugar industry itself is taking any actions or influencing sugar policy is another matter. When asked directly, the director answered that as there was no sugar policy at the moment there was no need to do anything. Apart from a regulation on the amount of sugar in jam and marmalade there exist no laws or regulations related to sugar consumption. However, if any attempts were made to decrease sugar consumption the sugar industry would obviously do everything it possibly could to prevent this happening.

It was felt by the sugar industry that up until a few years ago, there had been a religious agitation against sugar. It came from specific members of the National Nutrition Board and the dental profession. (These specific people were mentioned by name.) This agitation had, according to the sugar industry, produced a negative attitude towards sugar in the public and a demand from the producers of items with a high sugar content to decrease the amount of sugar in many products. The Danish sugar industry had therefore planned to counteract this misleading agitation in several ways.

The primary goal for the sugar industry’s present campaign was to convince the producers of foodstuffs that sugar can and should
be used. They should know that "it is a scientific fact that you don't get fat and don't get dental decay from sugar". The sugar industry wants the producers to believe that sugar increases the quality of foodstuffs. They want the producers to believe and market their products because they contain real natural sugar not despite containing real sugar. The sugar industry also wants to convince the producers of foodstuffs that the consumers are interested. A sugar, consumer-orientated, campaign has therefore been initiated. The campaign was based on the results of a major marketing research survey which, according to the industry, showed that a majority of the public believe that sugar is full of calories and it gives dental decay. According to the analysis of the results of the survey the Danes could be divided into three different groups:

a) the ones who like sugar, eat it and do not think about it
b) the ones who do eat sugar but feel bad about it
c) the ones who do not eat sugar.

The sugar industry's campaign was targeted towards group (b) only, and the aim was to change attitudes so that the public would eat sugar without feeling bad about it.

The various components and details of the campaign will not be described here. It should be noted however, that the campaign appeared rather professional and 'up-to-date' and presumably rather expensive being heavily based on the use of mass-media. The philosophy of advertising sugar as 'real' and 'natural' links it indirectly to health and contrasts it to anything unnatural such as artificial sweeteners and colourings.

The director of the sugar industry emphasised that the campaign was not aimed at increasing sugar intake but at changing attitudes: 'to help people not to feel bad about eating sugar'.
In fact he claimed to promote the same attitude which most of the dental profession had, that sugar in moderation is 'all right'. He was convinced that this advertising was sober and scientifically correct. Altogether it appeared as if no conflict existed between the sugar industry and the dental profession. The latter seemed to have no complaints about advertising and several people stated that they perceived most advertising both with regard to dental products and sugar rather soberly.

Another example of how this is reflected in Danish society will be given. For many years only one television channel has existed in Denmark. Only recently a second channel was created and it has been agreed that on this channel, television advertising will be allowed for the first time in Danish history. However, advertising for tobacco or alcoholic products is not allowed. No restrictions of any kind regarding sugar or sugar-containing products have been suggested. Again only a few interviewees mentioned this and none of the dental experts were excited or in any way offended by it. The director from the sugar industry was rather well informed about restrictions and regulations for the forthcoming television advertising and in fact had been a member of the committee who did the preparatory work for it. He willingly admitted that he was there with the purpose of inhibiting any restrictions on sugar advertising. However, he claimed that this was unnecessary as no such thing was ever suggested!

The director of the Danish sugar industry confirmed what several other interviewees had said: that the sugar industry had financially supported dentistry in various ways for a number of years. However, the director claimed that this was "not in a big way though, only sporadic and only when they had been asked to do
This latter statement was not quite in agreement with all the dental experts' description, or perhaps the size of financial support appears small on the industry's scale but large on the dental profession's scale. In particular one interviewee claimed that the sugar industry about 10 years ago had offered a substantial amount of money to establish a research fund to be shared between the two dental schools and the dental association. The interviewee himself said that he had been involved and in his naivety at that time, demanded that the committee deciding on the distribution of the fund should be impartial, i.e. not include any representation from the sugar industry. On this demand the sugar industry withdrew their financial offer and instead donated a sum of money to the dental association. It appears that a money transaction did take place, since several interviewees (among them three from the dental association), said that the dental association had received a sum of money which they had directed towards the 'Committee for Oral Hygiene'. The actual amount was not remembered but the committee managed to buy and equip a bus. The bus, later known as the 'hygiene bus', has been used for various mobile dental exhibitions and has been driven around the country since then.

In addition to this sum of money, it appears that the sugar industry have offered financial support on various other occasions. Thus two interviewees claimed that salaries for certain key persons involved in dental policy had temporarily been paid by 'sugar money'. Also travel expenditures for several people had been paid by 'sugar money'. However, all these 'donations' were clearly from the past - stories at least ten years old which nearly all interviewees only remembered because they were prompted by the
Money donations of a more recent nature were more scarce. At the moment and possibly over the last 5 to 8 years only one 'source' seems to have received any sizeable amount of money from the sugar industry. The money has been given to fund research in one particular department, namely the department which has produced substantial scientific evidence on the importance of plaque in the aetiology and development of dental decay. It is interesting though that both the interviewees representing the particular department as well as the representative from the sugar industry itself, openly talked about this money (although never the actual amount) and both were convinced that there was nothing wrong in this and any hint that this was corrupt in any way was perceived as completely ridiculous. Both the sugar industry representative and the head of the concerned research department explained to the interviewer independently and spontaneously that this was a question of compromising oneself, and the funding from the sugar industry to the research could in no way be construed as compromising. However they gave an example of what they had decided would be compromising.

The sugar industry had recently brought an action against a sugar-substitutes producer because of the wording of a certain whole-page advertisement. In order to win the court case the sugar industry had been considering the head of the dental research department as a witness - or as an expert to prove that what the advertisement had claimed in relation to sugar and dental decay, was not actually scientifically true. After discussions between the sugar industry and the concerned Professor it had been agreed that whereas receiving money for certain research projects or
salaries for researchers was not compromising - the appearance of the Professor in the court case witnessing for the sugar industry would be.

Thus in summary, it can be said that the sugar industry has funded various activities in the dental field and still does. The directly involved parties did not find this compromising or corrupting and in general, although the majority of interviewees were aware of, or suspected, that money had been given to dentistry, they did not see this as a major influence on the role of sugar in dental policy.

Moreover, no-one had the opinion that the sugar industry had influenced laws or regulations regarding dental health services in Denmark. Only a minority were convinced (usually without any factual information) that the sugar industry had manipulated politics to ensure that a sugar policy had never been formulated. The minority with this opinion explained that the Danish sugar industry dominates the 'Council of Industry'. The present Minister of Industry was selected from the council and obviously shares ideas and opinions with the Council. Since the sugar industry thus had and still has, a central position in the organisation of economic trade in Denmark, they certainly have the possibility of influencing laws and regulations regarding sugar. Whether or not they actually have exercised this power is questionable. They themselves claim that they would, if they had to, but that it has not been necessary so far. Neither the dental profession nor the consumers seem to put any pressure on at the moment and the various attempts from the 70s never led to anything approaching a formulated policy on restrictions on sugar. The only exception in this respect was the previously mentioned recognition of sugar as
the cause of dental occupational hazards. The dental researcher who was involved (one of the interviewees) answered, when asked whether the sugar industry tried to stop him, that they did not really interfere, and also he had attempted to keep it secret until it was finally recognised. He was aware though that the sugar industry claimed that his research was unscientific. However there had never been any open confrontation or conflict.

d) Other factors

All the non-dental interviewees stated that they understood that sugar was no longer a major issue in preventive dentistry and felt that this message was communicated by the dental profession and happily accepted. One interviewee stated:

'the idea of protecting teeth by brushing and the use of fluoride, and still enjoying sweets and other sugar containing items suits the Danish mentality much better than being "ascetic" and denying oneself the pleasure of eating what one likes'.

Another example of passivity regarding sugar actions came from the National Nutrition Board. An existing committee comprising various professionals, including dental professionals, had for many years been working on suggestions for regulations on declarations and labelling of sugar. The working group seemed to get nowhere and it was thought that the interest in the issue was decreasing.

The interviewee from the World Health Organisation (WHO) reported that 10 years ago he had been asked to prepare a draft for a sugar policy. The same request had been put forward recently. He felt that the sugar area was a rather delicate issue. He suggested that the request emerged from the conflict between the sugar industry and the sugar alternative manufacturers. He stated directly:
'It is the alternative sweeteners producers/manufacturers who are pressing for a sugar policy - no-one else is putting any pressure towards a sugar policy, and this is why the sugar industry keeps quiet'.

The interviewee himself, in agreement with several others who believed that sugar had a role in dental caries, would rather recommend better declarations and labelling so that the public could make their own choice.

In conclusion sugar policy is non-existent (apart from dental decay being recognised as an occupational disease) and no-one seems to be interested in working for one. The only existing pressure group appears to be the alternative producers of sweeteners. If any policy is ever to be formulated or implemented, it is more likely to emerge from financial interest than from health reasons.

4.2.2 The Role of Sugar in Oral Health Policy in UK

A. Is There a Sugar Message?

In contrast to the oral hygiene issue, the role of sugar in oral health was definitely a topical issue in the UK. Most respondents had strong emotions and opinions about public sugar messages. It was perceived by most as a controversial and important issue.

To the question of which message the public should be given regarding sugar and oral health, various answers were given, revealing differences between the experts on the role of sugar. Some believed that sugar was the most important factor in the development of caries; others expressed the opinion that sugar was simply a carbohydrate and all carbohydrates were capable of causing caries.

There was a disagreement regarding terminology. The majority preferred the term sugar, particularly in relation to public
messages. Other interviewees used terms like sucrose, glucose, lactose etc. A minor group insisted on using the term sugars thus stressing more than one type of sugar. Another minority preferred the term carbohydrates referring to what they believed was a fact – namely that all carbohydrates are potentially capable of causing caries. This terminological disagreement may seem unimportant. The reason it is not, is discussed in the following section on sugar policy.

The second area of disagreement in relation to sugar messages was the question of whether public recommendations should be about reducing amount and/or frequency of sugar. Most respondents agreed that frequency of sugar intake was most important; others (fewer) believed that total amount of sugar consumption was the most important; whereas others again claimed that frequency and amount of sugar were closely related so that it did not really matter which of them was stressed. Some interviewees said the message to the public should be more comprehensive, be about diet and not only sugar. One person thought that about 80% of the population need not reduce their sugar/carbohydrate intake at all, and only about 20% of the so-called high-risk group needed any information about this issue. Therefore public messages were inappropriate. Some interviewees claimed that sugar messages played a progressively declining role in caries prevention but thought it too early to change the public message yet.

The question of whether to use the term sugar or carbohydrate was often discussed in relation to the term 'banana-caries' – that is dental caries caused by frequent banana eating. One person insisted that bananas could cause dental caries in humans, others were a bit reluctant to recommend bananas as 'definitely safe'
eating. The majority did not believe that bananas could cause dental caries in humans and found it ridiculous and unnecessary to tell the public that caries could be caused by eating bananas. The latter group were aware that caries had been seen and reported to develop in animals fed frequently with bananas, but still thought it impossible in humans. In this context it should be noted that the apparently trivial discussion about 'banana-carries' is not only about bananas but illustrates many of the disagreements between the sugar industry and the dental profession and amongst the profession themselves. This will be discussed in detail later (4.2.3). Some interviewees mentioned that they did not think it necessary or relevant for dental professionals to discuss sugar or diet with patients unless active decay was present. Two people said they were rather uncertain about which sugar message to recommend, thinking that the issue was too complex for public recommendations at the moment. (Tabulation of recommendations compared with Danish recommendations is presented in 4.2.3.)

One example of the expressed confusion and complexity of sugar messages amongst the dental experts was provided by Mr X:

Interviewer (A):

'What, if anything, do you think the public should be advised about dental disease and sugar?'

Interviewee (Mr X) (B):

'Well, I think they should be told very clearly that sugar is the main aetiological factor for dental caries. I don’t think that we should get too concerned between amounts of sugar and frequencies of sugar. I think that gets too complicated'.

(A) 'You don’t think that amount and frequency is important?'

(B) 'It is, but the distinction between the two is less important for the public and I think that
if you eat sugar less frequently you eat less, or if you eat less you eat less frequently - I think there is a relationship between the two.

The same interviewee later:

'I just get a sense of change in the last two years, that there's a number of complex arguments. One was about "caries levels are now very low anyway, therefore doesn't it mean the present levels of sugar-consumption are OK - shouldn't we be concentrating really on those children who are at highest risk with the highest levels of caries - forgetting about the sugar-intake for the population as a whole". That's one complication. Another is that "perhaps all carbohydrates or all starches are potentially cariogenic and therefore, because these starches are present in most meals and snacks, we should be looking at the frequency of eating, rather than frequency of eating sugar". The third complication is that we've got fluoride now anyway which is a very effective preventive measure - so why are we worried too much about sugar. So they will say, "let's leave sugar consumption at the present level, you need to eat about five or six times a day which seems to be OK - that's about the present level of consumption anyway - so better to leave things alone". Now - do I agree with that? I think the answer is - no I don't. One is that I don't think that starches are an important cause of dental caries - they may be a potential cause but I don't think that in the real world they are important. Secondly ... you have to look at the environment in which these people are living - there's no use in just picking out those few in the community who are at high risk to caries and asking them to change their behaviour unless you also ask the community in which they live to also change its behaviour. So I would prefer a population approach to this high risk approach'.

This interviewee expressed what the majority of the dental experts said, namely that they are aware of a rising confusion within the profession on the complexity of this issue. They still think, despite various arguments against it, that the public message should be about reducing sugar intake. This opinion is in contrast to the message from the sugar industry.
The message which the sugar industry would like the public to receive, and which they promote themselves was reported by the Sugar Bureau as:

'... our overall policy objective is obviously to provide information about sugar included in the balanced diet in moderation. Obviously there is no food or drink that anybody should be eating in excess in a manner that is not sensible and within a set of good general dietary practices - so that is our message, that people don't have to cut out food completely or necessarily cut down on their sugar intake if it is eaten as part of a balanced and healthy diet in moderation ... We in no way, try to hide away from the fact that sugar plays a significant contribution in tooth decay, but we recognise that what we are trying to communicate in any of our messages, is, what we hope is the up-to-date scientific arguments, it's not just sugar - it's that all dietary sugars are capable of promoting tooth decay ... There's this, on the one hand very extreme message, that all sorts of people and organisations are putting out and we believe, out-of-date views on sugars and health ... We have something in the region of 3,000 scientific references on database here!' (Author's emphasis)

It is not surprising that the sugar industry prefers the public to receive messages on sugars as part of a balanced and healthy diet - after all their main aim, despite what they are saying (see later), is to sell sugar! If refined sugar is not singled out but discussed as part of a balanced and healthy diet, it is less likely to be focused on as a health risk, and more likely to be bought and eaten. The question is, in the first place, whether the Sugar Bureau is at all a reliable source for sending public messages related to sugar intake - no matter how many scientific references they have. This question and the role of the sugar industry in sugar policy altogether, is discussed in the next section.
At this stage, it will be concluded that there exists disagreement about which messages should be recommended both within the dental profession and between the sugar industry and the majority of the dental profession.

Whereas the industry clearly are promoting their viewpoint, it seems more questionable whether the dental professionals and professional bodies are doing so. For instance, some respondents claimed that the British Dental Association was promoting the anti-sugar message through various activities whereas others claimed that BDA did not do anything in this area, one even said that BDA actually works with the sugar industry. Some interviewees said that the General Dental Council (GDC), promoted the anti-sugar message whereas others claimed GDC did nothing whatsoever about sugar and dental health.

Some interviewees said that the reason the profession did not wave the message loud and clear was the disagreement within the profession as to what the message should actually be.

Also the government was claimed by some to promote the anti-sugar message and by others not to do anything in this area.

A minority thought that HEA and SHEG were promoting the anti-sugar message and no-one seemed to disagree with this. A single person mentioned that community dietitians and the Royal College of Physicians have been supporting the anti-sugar policy through different reports.

B. Does the UK have a Sugar Policy?

To the question of what is the UK-sugar policy, all respondents said without hesitation - the UK does not have a sugar policy - "it is non-existent". One interviewee said:

"That's straight politics - more than 50 MPs are directly linked to or influenced by the
sugar industry'.

In his book 'The Politics of Food' Geoffrey Cannon (1987) discussed Members' of Parliament links with the food industry. He states:

'If the question is asked as narrowly as possible: "How many MPs are paid by the sugar refiners as expert advisors or employees?" the answer is "three" (names and positions given). If the question is widened to "How many MPs are expert advisors to or employed by that section of the food industry which manufactures or uses large amounts of sugars?" the answer is "at least twenty" (names and positions given). If the question is widened to include MPs who have been advisors to or employed by the sugar and associated industries, then another eighteen MPs join the list. If the question is "How many MPs have or have had connections with the sugar and associated industries, including MPs with such interests in their constituencies?" the answer is "at least 64"' (brackets inserted by L Schou).

No-one suggested that any dental body or any other national agency (apart from the sugar industry themselves), had a sugar policy. Thus the non-existent sugar policy was nearly the only matter related to sugar which achieved such a great agreement amongst all respondents. The Sugar Bureau's answer to this question was,

'What do you mean by sugar policy, maybe you can define, maybe I am misunderstanding?'

Interviewer:

'Laws, regulations etc, on sugar intake'.

Sugar Bureau:

'There is no food policy is there! (rhetorical question), so it's not a question of our organisation influencing, there is no policy to influence'.

This last statement was not shared by the remaining interviewees as explained below on the role of industry.

It must be concluded that, at the time of the interviews, a
sugar policy in terms of laws, regulations, restrictions etc. was not perceived to exist in the UK. As explained previously a non-policy is in fact also a policy inasmuch as it reflects the government's choice of not having any policy in this area. The forces shaping this non-policy are discussed under the headings:

a) The sugar industry
b) The dental profession
c) Other pressure groups.

It should be noted prior to the discussion of the 'non-existent' policy that the Department of Health since the time of the interviews, have issued a policy document entitled 'Dietary Sugars and Human Disease' (DH 1989) (described in 4.2.3).

a) The sugar industry

All interviewees were asked if they knew or had any opinion on why a sugar policy is non-existent.

One repeated explanation was that different ministries had different opinions about sugar. Thus from a health point of view the Department of Health might or could have an anti-sugar policy but the Ministry of Agriculture, Fisheries and Food (MAFF) certainly would not agree to that. Some respondents claimed that the government was pressured by the sugar industry not to cut consumption down. Some interviews held the opinion that agricultural policy drives health policy. One person thought that there were enough people who would speak up if the sugar industry held government down.

The opinions about the role of the sugar industry were clearly divided. One group of interviewees, the largest, were strongly opposed to the activities and strategy of the sugar industry and thought that the industry was the main reason that a sugar policy
was non-existent. Another group appeared to be hesitant or not quite sure of what to think, and the last group, the smallest, were positive towards the industry.

The group who were against the industry were convinced that sugar is the major cause of dental decay and therefore sugar consumption should be reduced in order to improve oral health. They perceived the industry as a major obstacle towards most activities directed at the reduction of sugar consumption. Not only was the industry perceived as extremely powerful politically, but also becoming more and more sophisticated and, over recent years, having conducted a rather skilful campaign. The various elements of this campaign were described as follows. First of all it was felt that the industry had introduced, fed and maintained the confusion about terminology in order to take the focus away from sugar (the real cause of decay). The industry emphasises and stresses at every possible occasion that caries is multifactorial (thereby taking the focus away from sugar as the main cause), and that we should talk about carbohydrates not sugar, since 'all carbohydrates have a cariogenic potential'. The industry is mainly targeting its campaign via the Sugar Bureau towards the dental profession but is also thought to influence politics directly through parliament.

An interesting example of how the sugar industry interfered in dental health education campaigns and tried to stop public messages on reduction of sugar or dentally harmful effects of sugar, was given by one interviewee:

Interviewer (A):

'Who are promoting the anti-sugar message?'
Interviewee (B):

'Various dental bodies/societies ... but I think at times there are political constraints. I can give you an example now. In a current health education campaign one of the messages is on sugar and babies, and there have already been complaints from the British Sugar Bureau and from the industry'.

(A) 'When you say industry, who do you mean?'

(B) 'From the British Sugar Bureau, sugar manufacturers and from members of parliament. Mr Y is an MP who has asked questions about this programme before the programme actually started and we know that he used to be the Director General of the British Sugar Bureau before he became a member of parliament.

(A) 'So, these people from the Sugar Bureau and the industry and MPs, do they write to the HEA or where do they direct their complaints?'

(B) 'They write to the HEA, but more importantly they write to ministers and ask questions in the Houses of Parliament ... Mr Y is an MP but he has represented the Sugar Bureau in the past and he still does'.

(A) 'Can or do they actually influence ...

(interrupted)

(B) 'In this case not, but I guess that it makes civil servants cautious and they know that members of parliament will be asking questions and making a fuss - therefore they tend to be rather more cautious than they would otherwise have been'.

MPs' relation to and involvement in the sugar industry has, as already mentioned, been clearly described by Cannon (1987) who stated that 64 MPs have a link to the sugar industry.

Another example of the sugar industry's interference was related to the first publication of 'The Green Book' (The Scientific Basis of Dental Health Education, HEA).

(A) 'When you say the sugar industry have been aggressive could you give some examples?'
(B) ‘When "The Green Book" was first issued, the sugar industry - I think it was the Cocoa, Chocolate and Confectionery Alliance - complained to ministers that they hadn't been consulted about the contents of that book. They explained that they had given the HEA a grant to do some other exercise and that this in some way, gave them the right to vet the HEA's dental material. Well I think at that time the HEA rejected that entirely and said that this was a consensus document from a group of dental experts and had little to do with the sugar industry and refused to compromise in any way. The approach was aggressive'.

These examples and many others, needless to repeat here, clearly showed that the industry has tried to stop materials on sugar and dental caries. It is clear that the industry controls sugar policy in practice by using parliament, MPs or government bodies or health agencies.

It appeared that the industry’s efforts were less often or to a lesser extent, targeted directly at the public in contrast to the Danish industry, although various minor attempts were mentioned (i.e. the production of a pro-sugar video). Since the interviews, some activities have been targeted towards children and school teachers. (Recently, the educational package: Science and Technology for Seasonal Celebrations - sent free to all schools.) Also a television campaign promoting sugar has been running in 1991-92.

The dental profession was seen to be influenced by the sugar industry in various ways. The main instrument is money. Nearly every interviewee was aware of, and had often been personally involved in, incidents where the industry was offering money for research, to conferences or simply to 'wine and dine' important dental professionals. The group of interviewees who were against the sugar industry were strongly opposed to this method and some even called it 'blood-money'. No-one in this group would accept
any money from the industry. During the period of the interviews a conference on diet, nutrition and dental caries was held. To illustrate the different opinions about the role of the sugar industry and the way they influence the dental profession, the conference, or these conferences, as there were actually two being held, will be described in more detail.

The first conference, 'The inaugural conference for a European consensus conference on diet, nutrition and dental caries' was held in Angers, France in July 1988. The second conference was held in York in July 1989. The objectives for the conference in Angers were as stated by the organising committee: 'to outline the state of the art on the role of diet, nutrition and dental caries and to define areas of needed research'. The Angers meeting in 1988 was meant to form the basis of the discussion documents for the Consensus Conference on Diet, Nutrition and Dental Caries in York in 1989. The Organising Committee consisted of three dental professors, one dental senior lecturer and the key person from the Sugar Bureau. This committee was led by one of the professors who was known by most of the opponents of the sugar industry to be 'pro-sugar', claiming bananas cause caries and known to receive money from the sugar industry. He was one of the interviewees and openly admitted this claim with great conviction, that sugar was not harmful from a dental point of view for at least 80% of the population. He further added that he was happy to receive money from the sugar industry or any industry as long as they did not interfere with his research. He assured the interviewer that he had a signed document leaving him absolutely free to do what he wanted with his data. The controversy about sugar and dental health was therefore, from his point of view, out in the open and
the consensus conference was set up to discuss some of these disagreements. The interviewees strongly opposed to the sugar industry, several of whom had been invited to the conference, declined to participate claiming that it would be compromising and whatever was said would be used in the wrong way. Some interviewees appeared happy to have some other excuse for not going and a few did participate claiming that at least they could hear what was being said and also raise their voice if they disagreed. At the conference the participants and their invited spouses were assiduously 'wined and dined'.

As to the sponsoring of the conferences, the opponents were convinced that it was all paid by 'sugar money' whereas the organizing committee claimed that many companies of which the sugar industry was but one, had sponsored the conferences. Leading researchers and authorities from dental science, industry and clinical dentistry were invited and everyone else who was interested could, at their own expense, participate to present their views. A group of well known dental researchers and authorities declined to participate. The conference thus divided the dental profession into at least two groups which could be called the pro- and the anti-sugar people.

The researcher of the present study participated in the second conference at York, invited as a 'delegate' by the Organising Committee. It was attended by representatives from various industries with an obvious interest in sugar, or sugar substitutes, and dental caries and dental research, and also a number of internationally well known experts in the field. The conference was set up to produce a consensus document, and great determination from the Organising Committee as well as hard work from the
participants and typists (who worked overnight) made it possible to produce and finalise a document during the conference which, to some extent, was agreed by the majority of the participants. The consensus document (attached Appendix A) was subsequently published (Caries Research, 24/S1, 1990).

In summary the main disagreements at the conference related to (1) terminology, i.e. should we use the term fermentable carbohydrates, sugar, sugars, all mono- and disaccharides, or refined carbohydrates, and (2) cariogenicity or cariogenic potential. It was obvious that the organisers tried to avoid using the term sugar and instead consistently used carbohydrates and cariogenic potential. It was also evident that the organisers wanted to establish that sugar intake had nothing to do with the decline in dental caries in the Western World and at present there were few, if any, data proving a relation between sugar intake and dental caries at a population level. The conference was divided into four workshops. Each had a 'presenter' whose paper was meant to review the evidence in that area. It was interesting that the workshop on cariogenic potential of foods decided to declare the paper presented in their group (by a British Cocoa and Chocolate Confectionary Association (BCCCA) representative) as a 'personal opinion of the author'.

The conference clearly shows how the industry interferes in the dental scientific work despite their claim of not being the only sponsor. The main channel in this respect is the Sugar Bureau. The Deputy Director General of the Bureau stated their main role and aim as follows:

'We are representing the major sugar manufacturers in this country, Tate and Lyle, British Sugar - they are basically 97% of the UK sugar industry. We have no government
funding, we are funded entirely by them and our role is to provide information to the public on sugar. I guess it’s more of a public affair, rather than public relations because our messages don’t go directly to the consumer, we are really providing information to the opinion-formers, people that are wanting information, whether it is people in the media, whether it is dietitians, school teachers or whatever ... Whilst we have all our funding obviously from the manufacturers, we are not a commercial organisation seeking to make a profit, we are simply here to provide information and we aim at providing the information based on the most up-to-date scientific evidence'.

In conclusion the sugar industry in the UK influence sugar policy in several ways. Industrial representatives exert their influence and protect their interest via parliament, civil servants and health agencies. Furthermore, the Sugar Bureau is established and funded by the industry with the main purpose of influencing opinion-formers, including the media. In particular, they are targeting the dental profession claiming that their main interest is to establish the scientific evidence for the relationship between sugar and dental caries. The relationship between the industry and the dental profession is further described below in the context of the role of the profession in sugar policy.

b) The dental profession

Although the profession held diverging opinions regarding the role of sugar, the majority were convinced that sugar was the main aetiological factor in dental caries. It was often mentioned that the industry influenced both the government and the profession to hinder a policy being formulated, to hinder anti-sugar information reaching the public and to create uncertainty and confusion amongst the profession.

In addition to the two 'sugar meetings' (termed by the organisers: Diet, nutrition and dental caries) a number of other
confrontations were mentioned. The British Paedodontic Society had, at a planning meeting for a conference, debated whether they should accept financial support for the conference from the sugar industry. After a heated discussion, it was agreed not to accept 'sugar money' with the argument that it would "give the wrong signal to the general public".

Several interviewees mentioned that they had had direct offers of financial support for various research projects. Most of the interviewees had rejected such funding straight away with the argument that, "the idea that sugar money could be used freely is naive!"

One respondent reported that he had once engaged in a study supported by the sugar industry. After the data collection stage but before the dental researcher had analysed data, he was refused access to the data. He was, however, convinced that the reason the sugar industry withheld data was that "they showed the wrong thing."

One researcher said he had been approached by the World Sugar Research Organisation and asked to alter the message he gave about sugar and dental health. At the same time he was offered research funding. He refused both to alter his message and to receive money. Another interviewee felt under pressure from fellow dental colleagues, because he was 'unfairly' perceived as pro-sugar. In response to this pressure he 'would make sure (he) was going to the York conference'.

Several interviewees claimed that the sugar conferences had caused confusion within the dental profession.

It was reported that the General Dental Council had, at one time, produced a dental leaflet in co-operation with 'Mars'. After
more than 1,000 copies had been printed the leaflet had to be withdrawn because of 'political pressure' from within the profession.

Finally several interviewees reported that they had been invited every year to lunch by the sugar industry but had rejected the offer.

Several interviewees were actively involved in the 'fight against sugar' often using mass-media. One interviewee was involved in a court case made against him by the Sugar Bureau for having made 'unscientific claims' in a television programme. Whether or not the Sugar Bureau win the case, the fact that they do take such actions makes the professionals more cautious knowing how financially and politically powerful the industry is.

Since all interviewees claimed that a sugar policy was non-existent they were asked whether they wished that to be changed and in which way. Several people said that they did not want government to make any rules or regulations as this was unnecessary. Many thought it was unrealistic.

However some suggestions for changes were put forward: compulsory labelling regulations, sugar-free medicine, (for a progress report on sugar-based medicines see Hobson 1975 and Hobson and Fuller 1987) removal of sugar subsidies, control of advertising, improved dental education with more emphasis on the role of sugar, better information to all primary health workers and more public advertising against sugar. Interviewees seemed to have little hope that any of these suggestions would be put into operation.

Several interviewees claimed that the idea of a sugar policy was unrealistic given the fact that government were too strongly
related to, and influenced by, the powerful sugar industry.

Only a few years prior to these interviews a thesis on sugar policy was published from a department of social policy in London (Sanderson 1984). Only one interviewee appeared to be aware of this comprehensive work. In her thesis, Dr Sanderson (1984) examines the ways in which a sugar policy could be implemented in a systematic way. She states in her introduction:

'It is not the aim of this research to develop any one policy to reduce sugar consumption, but rather to examine a range of possible options. The purpose is to stimulate discussion and provide a possible framework for that process'.

It does not appear as if the dental profession has received this stimulation. Certainly some dental professionals are still debating whether there is enough evidence to suggest that on balance there are sufficient health benefits to be gained from a reduction in sugar consumption.

Other Pressure Groups

When asked if any pressure groups existed, many mentioned the Sugar Bureau as a pro-sugar pressure group. When asked if any anti-sugar pressure groups existed the majority were not aware of any. On prompting about 'The Action on Sugar Group' only a few were aware of it and most thought it of little, if any, importance or influence. However, this group did organise an anti-sugar conference or one-day meeting in London about the same time as the conference in York. This meeting was on a smaller scale and less talked about by the interviewees although a few did participate and one was actually one of the speakers at the meeting. The meeting concentrated on ways in which sugar-consumption could be reduced in the UK. A publication from this meeting was issued and available for sale at the York meeting (Action and Information on Sugars,

In conclusion, a sugar policy was found to be non-existent in the UK. However sugar and dental health was a controversial issue which raised heated debates amongst the profession and the industry.

The majority and certainly the anti-sugar group, were convinced that the reason for not having a sugar policy was the strong influence by the sugar industry.

4.2.3 Sugar Policy in the UK and Denmark

- A comparative analysis

In contrast to the concept of oral hygiene policy, there was no uncertainty related to the concept of sugar policy. It was claimed without hesitation by all interviewees in both countries to be non-existent. Prior to the discussion of why this should be so, a comparative analysis of the 'sugar message' in the two countries is presented.

a) The sugar message

The differences in dental professionals' attitudes towards the role of sugar in caries prevention previously discussed (2.1.13) were confirmed by the present study. Despite some disagreement, the majority of Danish interviewees consider sugar of increasingly less importance, if any, and do not recommend any sugar message. The majority of the British interviewees consider sugar of major importance in caries aetiology and do recommend sugar restrictions, either the total amount, the frequency or both (Table 4.4).
TABLE 4.4 Responses from 19 UK Experts and 38 Danish Experts Regarding Information to the Public on Sugar and Dental Health

'Sugar Message' | UK Yes | UK No | DK Yes | DK No
--- | --- | --- | --- | ---
Reduce frequency of intakes | 10 | 1 | - | -
Reduce amount | 2 | - | - | -
Reduce frequency and amount | 7 | - | 2 | -
Reduce sugar in 'high risk' groups only | 2 | 1 | 3 | -
Sugar causes caries | - | - | 1 | 1
Stay away from sticky, high-concentrate foods | 1 | - | - | -
Take sweets all at once | 1 | - | - | -
Eat in moderation as part of a balanced diet | 2 | - | 9 | -
Message should be about diet | - | - | 3 | -
All carbohydrates cariogenic | 3 | 2 | - | -
Inappropriate | 1 | - | 14 | -
Uncertain | 1 | - | 3 | -
When plaque is controlled, sugar is of little if any, importance | - | - | 6 | -
Responses not mutually exclusive

The attitudes towards sugar were obviously related to the attitudes towards oral hygiene. In Denmark the main emphasis was on oral hygiene, and only if dental plaque, for one reason or another, was not effectively removed did dietary advice become relevant. In the UK, the main emphasis and attention was focused on sugar as the main aetiological factor. In both countries attitudes and knowledge were claimed to be scientifically based. The way in which professional attitudes influenced oral hygiene policy have been analysed separately (4.1.3). The sugar policy in the two countries will be compared here whereas differences and similarities in shaping policies in all four areas and the two countries together is discussed in the final chapter.

b) Sugar policy

For systematic reasons, the classification scheme for analysing policies (Leichter 1979) used in the analysis of oral
hygiene policy (4.1.3) has been chosen for analysing sugar policy as well. It should be noted here that a political framework of the policy-making process in the analysis of all the policy areas will be presented in the final analysis (Chapter 5).

The main similarities and differences which emerged from the analysis were:

i) Sugar as an aetiological factor in caries development was, by the majority of the dental profession, considered of little importance in Denmark but of major importance in the UK.

ii) Sugar restrictions were not recommended at a national level in Denmark, and only seen as relevant to a minor high-risk group. In the UK, national sugar restrictions were recommended by the dental professionals and the health education bodies (HEA and HEBS).

iii) A sugar policy was claimed to be non-existent in both countries. (Several UK policy documents have been published since the time of the interview; see Chapter 5).

iv) The sugar industry plays a different role in the two countries; in the UK the industry was seen as the main reason why sugar policy was non-existent. It was seen to use financial power to put pressure on and influence parliament, civil servants, health education bodies and the dental profession. In Denmark the industry itself claimed to concentrate efforts on the public, attempting to relieve
the public of feeling guilty at eating sugar. The industry had the potential and will to influence any attempts towards an anti-sugar policy but claimed that it hitherto had been unnecessary to use any such power.

v) In Denmark anti-sugar activities were seen as something from the past which, in any case, had no effect on sugar policy. In the UK the debate and activities were on-going and the industry was perceived by many as aggressive and powerful.

vi) Pressure groups other than the industry and the profession, were practically non-existent in both countries.

The Impact of Situational Factors on Sugar Policy

There has been one well known situational factor which influenced sugar policy in both countries: namely, the Second World War. During and after the war, sugar was severely restricted by rationing in both countries. The positive effect on dental health has previously been described (2.1.2). However this rather effective policy was not introduced as a result of pressure from dental professionals or indeed for any health reasons, but was a coercive necessity since sugar was not available. The policy was terminated, rations abolished, as soon as sugar became available again.

It could perhaps have been expected that the current recession would have had some influence, given the financial and political power of the industry in the UK. No interviewee mentioned anything along those lines and it is not possible within the current study
framework to detect any such impact.

The Impact of Structural Factors

Leichter divided structural factors into 3 sections: (a) political structure, (b) economic structure and (c) social, demographic and ecological structure. The latter social, demographic and ecological structure, seem to have little or no impact on sugar policy. It is well known that social and demographic factors are strongly related to caries prevalence and incidence; people with low education attainments and low income and certain ethnic minorities have often been found to have higher caries rates than other groups and this could be expected to be related to a higher sugar intake. However, this has not led to the development of a sugar restricting policy in any of the countries.

The political and economic structure are of far more relevance in this respect. The relatively similar form of political regime and organisational form of government in both countries allows the sugar industry to play a major role which it might not have in other types of structures. The sugar industry is a legitimate pressure group in the policy process obviously hindering government or, more specifically, the Department of Health, in formulating and implementing policies which would decrease the sugar consumption. With at least 64 MPs having some sort of link to the industry it seems obviously difficult to introduce anti-sugar policies. In this bargaining process neither the government nor the profession have had much possibility of making rational decisions against the sugar industry interest. The dental professional attitude towards sugar seems to have had little or no impact on policy although they must have some potential since the industry still uses resources to influence them. It is relevant to note that several sugar policy
activities have taken place since the time of the interviews. One is that a report on dietary sugars and human diseases has been published by the Department of Health (HMSO 1989). It recommends for example:

- that consumption of non-milk extrinsic sugars by the population should be decreased
- reduction in the frequency of sugar snacks
- schools should promote healthy eating patterns both by nutrition education and by providing and encouraging nutritionally sound food choices
- that government should seek the means to reduce the use of sugared liquid medicines.

The report concludes:

'The prevalence of dental caries in the UK is of social, medical and economic importance. The evidence relating dietary sugars to dental caries is very extensive and has been obtained from several types of investigation. Without sugars around plaque-covered tooth surfaces, caries development is very limited. Caries risk can be reduced by non-dietary means, particularly the use of fluoride, but these methods can be expensive and are not completely effective. If the prevalence of dental caries in the UK is to be reduced further, it will be necessary to reduce the amount and frequency of consumption of non-milk extrinsic sugars' (HMSO 1989, p.20).

No clear strategy for how these recommendations should be implemented or evaluated has been published.

The Panel who produced the report had a dental expert (one of the interviewees) who provided all the evidence. It is surprising that the industry did not try to prevent this person, who is known for his expertise and attitudes within the area of sugar and dental health, from being part of the Panel in the first place (or perhaps
they did try without success?). The industry certainly used the media to criticise the report when it was published.

It is unlikely, although possible, that similar power struggles or bargaining processes take place regarding sugar policies in Denmark. With the one exception related to occupational disease, there seemed to be no desire to formulate or implement sugar policies.

Despite the different professional attitudes in the two countries, there are no, and never have been (apart from during the war) actual restrictions on sugar intake in either country. The political and economic structure allowing the industry to be a legitimate pressure group seem to have a larger impact than whether the profession is for or against sugar.

Cultural Factors

The political culture also could have influenced sugar policies. In both countries there are precedents for the governments to regulate the food and drink consumption by using taxation, subsidies etc. It has been argued that such tools are more often used for economic reasons than for health reasons. In relation to sugar policy, the political culture in both countries thus could have allowed regulations in this area. However, when these are non-existent, it is not because it falls outwith existing political norms but more likely a result of the power relations between the involved parties.

Environmental Factors

No environmental factors were mentioned or discussed by any of the interviewees in either country. However the sugar policies identified in both countries by the present study do suggest that political and economic forces, rather than health concerns, shape
sugar policies. It could be suggested that national as well as international agreements, obligations and pressures related to sugar economy have an impact on existing policies. Sugar beets are produced (farmed) and refined in both countries and thus part of both employment and agricultural politics. Sugar cane, however, is mainly grown in third world countries and thus imported. It was not the purpose of the present study to examine agricultural, employment or import/export politics but it should be noted that sugar policy and politics are shaped within a rather complex pattern of government and trade interest far beyond health interests.

4.3 FLUORIDE POLICY

4.3.1 Denmark

In contrast to sugar policy, characterised by sugar consumption not being controlled by any means, the use of fluoride has been controlled by various decisions and regulations. In order the better to understand interviewees' attitudes and involvement in fluoride policy it is appropriate first to describe existing documents and regulations.

Documents and Regulations Related to the Use of Fluoride

The biggest policy issue related to the use of fluoride in Denmark has been the question of fluoridation of the drinking water. This issue was clarified and finalised by a letter from the Minister of the Environment to the Parliamentary Committee for the Environment, 5 January 1977.

In his letter the Minister concludes, after six pages of argument against fluoridation of the drinking water that:

'In the light of the above I consider that the power warranted by section 48 of the Water
Supply Act should not be applied to allow fluoridation of drinking water'.

Officially it was suggested for the first time in a report submitted by a committee set up by the Ministry of the Interior in 1959. It took about twenty years before any decisions were made. However the letter from the Minister in 1977 definitely put a close to the matter and no other documents regarding water fluoridation have been issued since then.

Until recently (see next section on attitudes towards fluoride policy) there has never been any real doubt as to the beneficial effect of fluoride. Policies regarding alternative ways of using fluoride have developed parallel to the debate on fluoridation of the drinking water. In 1964 the Ministry of the Interior issued Order No.22 on Addition of Fluoride Compounds to Food and Cosmetic Preparations etc., above all in order to regulate the production and sale of fluoride toothpaste, but also to make sure that fluorine compounds were not added to other cosmetics and food, including drinking water.

In 1965 and 1969 the National Board of Health issued guidelines on the topical application of fluorine compounds in the prevention of dental caries. The former dealt with painting, polishing, mouthrinising and brushing with fluoride preparations while the latter provides guidance on the prescription of fluoride tablets. Both circulars presuppose knowledge of the content of fluoride in the water supply concerned.

In 1978 these were superseded by a circular on 'fluoride-containing pharmaceutical specialities to be used in the practice of dental health services'. This circular states that:

'dentists, as part of practising dentistry may prescribe fluoride-containing medicaments on the condition that these medicaments have been
marketed in the country as a pharmaceutical speciality'.

The National Board of Health declared at the same time, that in the future, when new fluoride-containing medicaments were marketed as pharmaceutical specialities, they would inform and write guidance on the use of the medicaments concerned. The circular at the same time announced that a total of three different fluoride-containing medicaments had been marketed. Guidance for the use of these was given. The three medicaments were a 0.2% fluoride mouth rinsing solution, a 2% fluoride solution for painting of teeth, and 0.55mg fluoride tablets. Later in the same year, guidance for various other medicaments was published: i.e. fluoride-containing chewing gum and varnish for professional topical application.

From a policy and a practical point of view the importance of these orders and circulars lies within the decisions taken and with the practical effect of the circulars. Several factors are important and will be extracted. Whether a fluoride product is defined as a cosmetic or as a medicament is important for the consumer because cosmetics can be bought over the counter whereas medicaments have to be prescribed by an authorised dentist or doctor. Toothpaste is categorised as a cosmetic whereas all other fluoride-containing products are regarded as medicaments. This means that any activity (advertising, sales, marketing, etc.) related to toothpaste is regulated by laws and regulations on cosmetics. Any activity (advertising, marketing, sale, buying, etc.) related to any other products containing fluoride is regulated by laws and regulations on medicaments. This means in practice that the public have nearly unlimited access to fluoride in the form of toothpaste since they can buy as much toothpaste as
they want. On the other hand any other form of fluoride can only be obtained by visiting a dentist.

Attitudes and Recommendations on the Use of Fluoride

Surprisingly, many of the interviewees did not think that Denmark had a fluoride policy or that any real decisions on fluoride had been made. When asked directly about water fluoridation there was quite a difference in the level of knowledge of details of what had happened. Everybody knew, however, that the drinking water had not been fluoridated anywhere in Denmark, and also everybody, apart from one person, had the opinion that fluoridation of drinking water was a dead issue which no-one had promoted in Denmark for the last decade. The single interviewee who still thought that water fluoridation was appropriate did not actively promote it in any way since he thought it would be impossible because of all the environmental groups. He was certain that one 'green' group in particular would stop any possible initiative immediately.

With regard to recommendations for alternative use of fluoride (other than water fluoridation), there was a rather stunning agreement amongst most interviewees. At the time of the interview, 1988, they thought that the majority of the child and adult population received the optimum amount of fluoride simply through daily brushing with a fluoride toothpaste. The minority of the population constituting about 10-20% who needed additional fluoride could only be identified by a dental professional. The so-called high-risk group in need of additional fluoride are also changing. According to many interviewees, people are not permanently at high-risk. This opinion obviously necessitates regular visits to a dental professional in order to ensure that the high-risk groups
are identified and receiving extra care and information.

One interviewee disagreed with the necessity of professional control:

'I don’t think that it necessarily should be controlled by direct contact between the professional (dentist or dental hygienist) and the public but one can let specially instructed people take over the administration of, for instance, fluoride rinsing. For example, for high risk groups, fluoride rinsing self-care programmes could be organised in workplaces without the presence of a dental professional'.

It should be noted that, although control of fluoride administration is suggested to be 'handed over', it is still only recommended to high-risk groups. According to this interviewee, there are no problems related to identification of high-risk workplaces as these are known to be the chocolate, sugar and baking industries where workers are exposed to sugar and flour above a certain level.

This relatively new philosophy of only a minority needing special care, in this case more fluoride than the amount from toothpaste, was identical with the philosophy expressed with regard to dental health education on sugar and oral hygiene. So-called mass-programmes seem to have gone out of fashion, in the sense that they are considered inappropriate for the current disease pattern. Only a few years ago, fluoride rinsing in schools was extremely popular. Many interviewees claimed that such programmes targeting whole classes, schools or municipalities, have now been withdrawn from many places and are expected to be so all over the country over the next couple of years. Such programmes were considered cost-ineffective as many children who received fluoride did not benefit from it.

Fluoride tablets were hardly ever mentioned by the Danish
interviewees and only when pushed by the interviewer were they talked about. Similar to water fluoridation, fluoride tablets were in general perceived as something from the past. Fluoride drops were never mentioned by any interviewee at all. It appears that the Danish experts do not consider any form of fluoride-supplements recommendable for any age-group. This attitude is based on the beliefs of how fluoride works as well as the perceived need. As mentioned previously (2.1.13) most Danish dental professionals do not believe in the systemic effect of fluoride or if there is one, they believe that it is minimal and overshadowed by the local effect. In contrast to recommending drops or tablets to babies some interviewees expressed concern that the amount of fluoride babies receive from even toothpaste might be too high.

Coming back to the 10-20% of the population who, most interviewees agreed, needed extra fluoride, professionally applied topical fluorides were, in general, seen as the best solution for both children and adults. A few interviewees thought that fluoride chewing gum was equally effective with regard to adults.

In summary it can be concluded that the use of fluoride in Denmark has changed dramatically from being very popular since its initiation in the fifties to hardly being recommended (apart from in toothpaste) in the eighties. As will be clear from the following section, the fluoride policy and attitudes differ considerably from the British. In order to understand these differences, the reasons why policies and attitudes have developed the way they have, will be discussed in the following.

Fluoride Policy

Similar to the structure in 4.1 and 4.2 the factors which were seen to have influenced fluoride policy and fluoride practice have
been divided into four categories:

a) Policy documents, laws, regulations

b) The dental profession

c) Industry

d) Others, pressure groups, environment.

a) Policy documents, laws, regulations

The most important fluoride-policy decision in Denmark was the decision not to fluoridate the water and this issue will therefore be discussed first. In this respect, it has to be remembered that the decision was taken more than ten years ago and the analysis is thus based on interviewees' memory and afterthoughts, together with existing documents. In addition the subject has been a 'dead issue' for nearly as long. It seems that all involved parties accepted the decision at the time and no-one has tried to change it since. One interviewee reported that a survey had been carried out at the time of the decision which showed a negative attitude towards water fluoridation amongst the public.

Another argument was related to pragmatic and economic aspects:

Interviewer (A):

'Which factors, persons or "bodies" influenced the decision not to fluoridate the water?'

Interviewee (B):

'Well there was a fierce debate back in the sixties/seventies, I don't remember the specific details or names but certainly this anti-fluoridationist group ran an aggressive campaign using the media and issuing pamphlets claiming that all diseases were caused by water fluoridation - cancer etc'.

(A) 'Who were they?'

(B) 'All sorts of people - I can't remember exactly'.

(A) 'Was any industry involved?'
(B) 'No - I don't think so'.

(A) 'What about the government?'

(B) 'It never reached the level where legislative work was prepared. At least I don't think so - perhaps I'm wrong'.

(A) 'Were there any arguments against?

(B) 'Well only 50% of the public would benefit from water fluoridation. It wouldn't be rational or practical to try and reach more than these 50% because of the way water is supplied'.

(A) 'So the dental profession were defeated by the anti-fluoridationists but also on practical/economic grounds?'

(B) 'Yes - that's right!'

Currently, all interviewees, apart from one person, considered water fluoridation in Denmark totally inappropriate given the dental disease pattern.

However, before and up to 1977 the vast majority of the dental profession, the researchers as well as the dental association, promoted water fluoridation rather strongly. Many of the interviewees had been directly involved. The dental association claimed that the media campaign they created was one of the largest media events in which they had ever been involved. The President of the association at that time ordered the press department to do everything they possibly could in order that the public would know that the association and thus the dental profession was promoting water fluoridation.

There was an agreement amongst the interviewees that water fluoridation had been stopped by some non-dental experts. Various names of anti-fluoridationists were mentioned. These were names of doctors or chemists who were employed as civil servants in the Ministry of Environment. It appears that the decision was taken for political reasons rather than dental health reasons.
A typical explanation of how the decision was taken was:

Interviewer (A):

'Why was the decision - "No" to water fluoridation - taken?'

Interviewee (B):

'The reason that it became a "no", I remember very well, the political discussions there were at that time, because it was close to becoming a "yes", but the medical (not dental) profession defeated it, not from a professional viewpoint, but from a political viewpoint it was thought that it disturbed personal freedom - it was clearly a political discussion of the use of fluoride'.

(A) 'I have heard from other interviewees that it was the Board of Environment and particularly, one person Mr Y from the Board who persuaded the Minister of Environment to take the decision - what do you think of that?'

(B) 'That's correct - but it had been turned around in the Danish Medical Association and they were against. I think that the Minister of Environment in the beginning was for water fluoridation but medical representatives got it defeated - and it was a question of professional and political power relations between the dental and medical professional associations. I won't exclude that the Minister of Environment is listening more to the medical profession than the dental profession'.

(A) 'Is it correct to say that the dental profession fought for water fluoridation but lost the battle?'

(B) 'Yes - absolutely. The determining factor was political, that the individual should have the possibility to renounce his right to treatment'.

When asked about their opinion of existing regulations related to the use of fluoride, most interviewees were at first a little surprised. This was obviously something they did not normally think of and some had to be reminded of what they were. However, thus prompted, the majority found those regulations quite appropriate. Various reasons were given. Some said "you can do
what you want" or "they are flexible", or "satisfyingly unrestricted" or others claimed that they ensured "sufficient safety". Some interviewees said that these regulations had no influence on the use of fluoride whatsoever. In summary it seems that the dental profession have, and prefer to have, the control of the use of fluoride (apart from fluoride used in toothpaste). The only regulative change over the last decade that was mentioned, was related to change in the amount of fluoride in toothpaste. This was caused by an EEC regulation which no-one seemed to pay much attention to. The toothpaste industry had at the time increased the fluoride amount in toothpaste from 1000ppm to 1500ppm but had since then, on the recommendation of dental researchers, again decreased the amount to 1000ppm.

The role of the government in fluoride policy has been rather limited. Although the decision not to fluoridate was taken by a Minister the debate never reached parliament. The regulations regarding all other use of fluorides have been issued by the National Board of Health and have never reached the level of public or parliamentary debate. The decision on water fluoridation together with existing regulations, has thus had the effect that with the exception of fluoride toothpaste, use of fluoride as an alternative to water fluoridation is basically controlled by the dental professional.

b) The dental profession

The dental profession's attitudes and activities in relation to existing national policies have already been described. Due to these regulations and the decision not to fluoridate the water the use of fluoride is in practice determined by the profession which, as already explained, has a reluctant attitude.
There seem to be several reasons that fluoride tablets have never been popular. The restrictive regulations had the potential of reducing the consumer demand. The profession, who could have promoted the use of tablets, never really did. The main reason given was that its use would always be biased in the sense that only 'better off' families would be able to sustain such a scheme and they would look after their children's teeth anyway. The families whose children really needed extra fluoride would not be able to check that the children consistently had a tablet every day. Because of this bias, but also for practical reasons, most municipal dental services had opted for major rinsing programmes carried out at schools in school hours. Later, in the late seventies and early eighties, when the new theories of how fluoride works were adopted, tablets were believed to have only little effect if any at all. Currently nobody recommended their use.

In general there was a negative attitude towards fluoride tablets and several horror-stories were told. In one municipality a particular chief dental officer had twenty years ago built up a systematic, well controlled tablet scheme. After some years it was discovered that a high number of children were diagnosed as having dental fluorosis. The chief dental officer himself knew personally a school teacher with six children who all had severe dental fluorosis. He said that still now in 1988 he could not drive through that municipality without feeling extremely guilty. Several other interviewees mentioned how frightened they had been to see an increasing amount of fluorosis and therefore were reluctant to recommend not only tablets but also other forms of fluoride unless well controlled by a dentist in a surgery.

Thus it seems as if the use of fluoride has not developed
according to an official formulated policy but rather developed according to the dentists' beliefs. Furthermore it has become more and more restricted and, apart from fluoride in toothpaste, is now totally controlled by dentists in surgeries.

The agreement as to why fluoride practice had developed in such a way, was striking. Most interviewees were nearly word for word saying the same: "research has shown" ... "together with the dental disease pattern ..." Many believed that these nearly uniform attitudes to the use of fluoride had arisen because of the well organised undergraduate and postgraduate dental education with close contact to an enthusiastic group of fluoride researchers who had put great effort into spreading their knowledge. One person said:

'There is no control of the use of fluoride in Denmark - but Danish dentists have been educated to take research very seriously. If research hadn't shown the effect of fluoride rinsing - it would never have been introduced. It is meaningless to say that dental researchers have no influence'.

Another typical statement was:

'Dentist X and Dentist Y's research have had the effect that fluoride tablets practically aren't being used'.

Also typical was this statement:

'We have a well-organised postgraduate education - The systematic postgraduate education demanded that all chief dental officers participated in these community dental health courses'.

The interviewer had difficulty believing that a few researchers in this way had been able to persuade a whole profession to a certain understanding and use of fluoride - to a certain extent contradictory to fluoride understanding in other countries and therefore often asked whether interviewees really
meant that a few researchers had had this apparently tremendous influence. The answers were often that it was not only these researchers but also the well-organised education, and the 'reality' which dentists were observing in terms of effect on dental health.

A few different answers were also given:

'The employment (of dentists) and income stagnates with preventive methods - these things hang together - let me give you an example: health education campaigns receive funding from the dental association when we have employment problems - information to the public on oral hygiene, periodontal problems etc. benefits the public but also improves the unemployment situation because the public have to visit a dentist to learn about oral hygiene. Things hang together in this way. You see, the dental association was extremely keen to have the water fluoridation "kept on file" so that posterity could see that they had actually fought hard to introduce water fluoridation despite the fact that they didn't win the battle and also, in this case, were not really only fighting for themselves'.

This viewpoint, that oral health policies, whether oral hygiene, fluoride or any other oral health-related policy, develop not only in relation to scientific knowledge or well organised education but also for non-altruistic reasons such as political professional reasons like professional employment, was also suggested by another interviewee.

Interviewer (A):

'How do you explain this nearly uniform attitude to the use of fluoride in Denmark?'

Interviewee (B):

'Well - have you also talked to the community dental service?'

(A) 'Yes - a number of chief dental officers. They certainly seem to have rather similar attitudes'.


(B) ' - but what about the ordinary dental officers - have you asked them?'

(A) 'No'.

(B) ' - or some older ones?'

(A) 'Some were quite old - yes'.

(B) 'But what you really mean is that there exists a homogenous group of dentists who have let themselves be influenced by a prophet - or a special fluoride elite who has been able to change and form attitudes?'

(A) 'Yes, it is my impression from many interviews that a small group of researchers through very active teaching, courses, seminars, etc. have managed to persuade the profession to arrive at such a uniform attitude and policy'.

(B) 'The tradition with fluoride research goes far back. The fluoride research has had a special prosperity during the last 6-8 years. I see that in a different way. It has nothing to do with fluoride. I have experienced this whole debate on fluoride - theories on caries aetiology mechanism - ... really is about boosting a professional area concurrently with the dental decay situation having changed dramatically - and much faster than expected - both in children and adults. This has meant that the profession has had to change signals to maintain the "status quo" and the dental associations have changed signals also in the negotiation of fee-for-item where they now ask for fees for preventive work - because they have now lost ground on the treatment side - and research-wise in the dental schools there has been a risk of losing ground if signals were not changed. All these "new" fluoride mechanisms etc. this whole story is to me "the emperor's new coat" - we always knew that fluoride works and that the emperor has got a new coat on the fluoride question right now - has had the effect that the profession is arriving at a uniform attitude - there is consensus because the political and professional political aspects are seen more than the health aspects. Many dentists are interested in practice today to use fluoride therapy in their surgeries because they have lost ground. They have changed the old therapeutic fees for preventive fees and therefore they ... advocate fluoride in a different way than in the past. For the
practical effect of fluoride - it doesn’t really matter whether fluoride works one way or another - one doesn’t need to know the exact aetiological mechanisms to prevent disease - it is the old story of cholera and the Thames - one can prevent disease without knowing about cholera simply by changes or improvements in water supplies'.

This particular citation is deliberately long and the English translation appears primitive and has been translated deliberately in this way word for word from the tape in order to allow the reader to make his/her own judgment of what the interviewee actually means. However, it appears that this interviewee thinks that the profession’s changed and now rather uniformed attitudes towards the use of fluoride have not developed for any health reasons or as a result of new scientific knowledge, but have been arrived at for political reasons. Without wanting to support this particular interviewee’s attitude, at this stage (a political theoretical discussion on the development of fluoride - as well as oral hygiene, sugar and dental visits policies is given in Chapter 5), it should be noted that coinciding with the changed use of fluoride from support of water fluoridation, fluoride rinsing tablets etc. to restricted recommendations by dentists, is the changed working situation for dentists; unemployment amongst dentists has increased and the intake of new dental students has decreased.

In summary the dental profession’s influence on fluoride policy in Denmark has gone from a strong but failed support of water fluoridation during the sixties and seventies, from support of fluoride-rinsing and distribution of tablets, to a nearly uniform attitude of restricted use of fluoride to high-risk groups only - and these high risk groups to be identified by dentists.
The majority of interviewees explain this development by widespread and well-organised information and education about fluoride research combined with a dramatic fall in caries. A few interviewees argue that this change has been driven by dental-political forces primarily to secure work for dentists.

c) Industry

There was large agreement that no industry had influenced the water fluoridation decision. Most interviewees asked why they should have influence since they could not see the industry having any interest in that question. Toothpaste, they thought, would sell independently of water fluoridation and the market for any other flouride-products in Denmark was too small for that kind of intervention.

Whereas no-one thought that the industry had influenced legislation on fluoride, many interviewees were convinced that the industry had a great share in the honour for the improvement in dental health caused by the now widespread use of fluoride toothpaste. Through direct advertising towards the public as well as promotion through the dental profession it was thought that the industry had created positive attitudes amongst the public towards fluoride toothpaste as well as a market where almost all of the available toothpaste contains fluoride.

d) Others, pressure groups etc.

Most interviewees claimed that pressure groups - so-called anti-fluoridationists - had had a tremendous influence on fluoride policy in Denmark, namely by inhibiting water fluoridation. However this influence was only related to before and up to the decision of no fluoridation in 1977. Since then, according to all interviewees, no pressure groups have influenced fluoride policy in
practice.

4.3.2 The Role of Fluoride in Dental Health Education and in Dental Health Policy in the United Kingdom

The role of fluoride will be dealt with in three parts. The first part will merely describe the existing fluoride policy in the UK as reflected in policy documents, laws and regulations. In the second part the attitudes and recommendations for use of fluoride as the experts revealed them during the interviews will be discussed. The third part will focus on why the policy has developed as it has and how decisions were taken.

Policy Documents, Laws and Regulations Related to the Use of Fluoride

The most notable legislation in relation to fluoride is the Water (Fluoridation) Act 1985. This was introduced by the government following judgment in a lengthy court case in Scotland involving a petition against the Strathclyde Regional Council’s intention to add fluoride to the water supplies of Glasgow and surrounding areas. The judgment stated that whilst fluoridation constituted a safe and effective means of reducing dental decay, it was ultra vires in Scotland (beyond the power of water boards to introduce fluoride into drinking water). The Act restored the power of water authorities in Scotland to add fluoride to the water supply on the recommendation of the appropriate Health Boards. For the avoidance of doubt as to existing legal powers, similar provisions were made for England and Wales. In England the Act provides that a District Health Authority may apply to a statutory water undertaking for fluoridation in its area after conducting certain publicity and consultation procedures. Water undertakings continue to have discretion as to whether or not to agree. A final decision about fluoridation thus remains a local matter.

A number of documents supporting water fluoridation were
published both before and after the introduction of the Water (Fluoridation) Act of 1985.

The report of the Committee on Child Health Services, "Fit for the Future" (HMSO 1976) recommended that:

'... immediate steps should be taken to introduce fluoridation on a national scale, if necessary with new legislation'.

The Royal Commission of the NHS chaired by Sir Alex Merrison (HMSO 1979) recommended that:

'the government should introduce legislation to compel water authorities to fluoridate water supplies at the request of health authorities'.

The report of the dental strategy review group 'Towards Better Dental Health' (DHSS 1981) also recommended that:

'... fluoridation should be introduced on a national scale, if necessary with new legislation making it the duty of water authorities to add fluoride to the drinking water at the request of health authorities ... It is further recognised that in some areas of the country water fluoridation is not a feasible proposition because of the multiplicity of small sources of water supply. In these areas we recommend a policy for fluoride supplements in the form of tablets or drops'.

In the government's programme for improving primary health care 'Promoting Better Health' (DHSS 1987) it is stated (p.26):

'4.6 Adding fluoride to water supplies is a safe and effective way of reducing dental decay and the need for fillings. The benefits of fluoridation, which extend into adult life, are greatest for children, particularly those in deprived areas where dental health does not always receive a high priority from parents and the development of other preventive measures may be poor. Opinion polls have confirmed that fluoridation is welcomed by the majority of the public; it was supported by virtually all organisations which gave evidence during consultation on the Discussion Document.

4.7 The fluoridation of water supplies is a matter for local decision, although for a number of years the Government has assisted Health
Authorities with the costs of such schemes. The Government welcomes the current fluoridation initiatives by Health Authorities in England, and notes that a number of additional schemes are under consideration, especially in the conurbations in the Midlands and the North of England where the incidence of dental disease is significantly higher than in the rest of the country. The Government intends to increase the amount of money it makes available to Health Authorities to fund new schemes. It also intends to meet a higher percentage of the total cost and to extend payments to cover the major costs of replacement of out-dated plant and equipment.'

The guidelines for 'The Future Role of the Community Dental Service' from the Department of Health (February 1989) states:

'The District Dental Officer will continue to have a particular responsibility for advising the District Health Authority on the benefits and practicability of water fluoridation for the area, and for promoting the health authority policy on this matter where this is appropriate'.

It is interesting to notice that the similar guidelines from the Scottish Home and Health Department have omitted any mention of water fluoridation (this will be discussed in the analysis of interviewees' responses).

In conclusion the government's policy has clearly been in support of water fluoridation. This has been expressed in a number of documents as well as in the Water (Fluoridation) Act of 1985. In fact government support goes right back to the fifties, where three demonstration trials showing the beneficial effect of water fluoridation were initiated by the government. Since the Act, several Health Authorities have introduced water fluoridation in England whereas none of the Health Boards in Scotland are fluoridating.

The marketing, importing, sales, etc. of other fluoride products are regulated by the Medicines Act of 1968 and also by
certain European Council directives. The Medicines Act required product licences of medicinal products. In interpreting the Act, the term "medicinal product" is taken to mean, among other things, a substance or article which is administered to human beings for the purpose of diagnosing, treating or preventing disease. The Licensing Authority responsible for granting licences and certificates for clinical trials is a body consisting of specified Health and Agriculture Ministers and a Medicines Commission to advise the Licensing Authority on matters relating to the Execution of the Act or the exercise of powers conferred by it. Section 4 of the Act provides for the establishment of appropriate committees to give advice on safety, quality and efficacy of medicinal products and to promote the collection and investigation of information relating to adverse reactions for the purpose of enabling such advice to be given.

The statutory committees relevant to fluoride products are the Committee on Safety of Medicines (CSM), the Committee on Review of Medicines (CRM) and the Committee on Dental and Surgical Materials (CDSM). This latter was established by Statutory Instrument No. 1473 in 1975 and materials used in dental practice currently come within its purview.

The Medicines Act distinguishes three different categories of medicinal products. The first category, to which fluoride dentifrices containing no more than 1500ppm of fluoridation belong, consists of those products which can be sold or supplied with reasonable safety otherwise than by, or under the supervision of, a pharmacist. These products are on the general sale list and can be sold in supermarkets, grocers, etc. The second category consists of products not on general sale and which can be sold or supplied
only by pharmacists. This includes fluoride tablets and mouthrinses. The third category, prescription-only medicines, can be sold or supplied only under a prescription written by a doctor or a dentist. Fluoride supplements were first categorised as 'prescription-only medicines' but after the introduction of the Medicines Amendment Order of 1978, this was changed so that fluoride supplements could become part of school programmes.

Does the UK have a Fluoride Message?

To the question of which recommendations the public should receive regarding the use of fluoride, most respondents strongly recommended water fluoridation. Some respondents claimed that there were areas in the UK where caries prevalence, combined with practical and economic aspects, no longer justified water fluoridation. One expression of this viewpoint was:

Interviewee (B):

'I would probably agree with the present White Paper which is that in areas of high need, water fluoridation should be given very careful consideration. I wouldn’t see water fluoridation in 1989 as a universal preventive measure in the UK'.

Interviewer (A):

'What are the reasons or what characterises the area where you don’t see water fluoridation?'

(B) 'Two - one is areas where caries is now very low and I would particularly say parts of the south east and south west of England, and secondly in those areas where the water supply is rather fragmented and small'.

(A) 'So for economic reasons?'

(B) 'For economic reasons - yes - because even where caries are low we can introduce water fluoridation which would reduce caries even further - but the amount you would reduce it would be rather small and may not be clinically meaningful. So I think that would be the two
major issues. I think thirdly, we have to keep the problem of enamel mottling under close review.

A fluoride-containing dentifrice was generally recommended to be used by everyone. Several interviewees added that precautions had to be taken that young children used only a pea sized amount of toothpaste, in order not to swallow too much. With regard to the use of fluoride supplements and professionally applied fluoride, various different recommendations were given (see Table 4.5).

**TABLE 4.5** 19 UK and 38 Danish Interviewees' Recommendations for the Use of Fluoride

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>UK</th>
<th>DK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoride tablets/drops to all children</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Fluoride tablets/drops or rinses to 'high-risk' groups only</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Fluoride tablets/drops not to be recommended at all (mainly because of practical problems)</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Professionally applied fluoride to selected individuals</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Fluoride chewing gum for high risk patients</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Fluoride rinses not to be recommended</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Fluoride rinses recommended to 'high-risk' groups only</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Fluoride rinses in work-places</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Age of commencement of fluoride tablets/drops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>from birth</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>at 6 months of age</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Dentifrice containing fluoride</td>
<td>all</td>
<td>all</td>
</tr>
<tr>
<td>Water fluoridation recommended</td>
<td>10</td>
<td>1*</td>
</tr>
<tr>
<td>Water fluoridation no longer justified</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Fluoride programmes all terminated or in the process of being stopped</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>May be dangerous to withdraw fluoride</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Plaque control makes fluoride unnecessary</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Answers not mutually exclusive
* (but known to be unrealistic)

The opinions ranged from recommendations of daily fluoride tablets/drops to the whole population right from birth to no use of fluoride tablets/drops at all. In between were recommendations to high-risk groups only and only to be commenced at six months of age. No-one recommended any other types of fluoride schemes such
as milk or salt fluoridation. The ones who recommended professionally applied fluoride measures stated that these should only be used by high-risk individuals.

The concern regarding fluoride supplements was not related to effectiveness. Most interviewees agreed that supplements do reduce caries prevalence if they are taken daily. The problems are, according to many interviewees, that the ones who can adhere to a strict regime of daily intake of fluoride tablets/drops most likely are the families who may not need them. They may already be brushing twice a day with a fluoride-containing dentifrice, have a relatively restricted sugar intake and visit a dentist regularly. The people who really would be in need of tablets/drops are the ones who are not brushing regularly and who have a high sugar intake. If they have such unfavourable dental health behaviours, they are unlikely to be able and willing to adapt a strict tablets/drops regime. In this respect it should be remembered that the recommended doses differ for different age groups so that a family with, for instance three young children, might have to have three different dosage schemes.

In addition to the practical problems of tablets/drops many interviewees expressed concern related to the problem of dental fluorosis. It was stressed, however, that although milder forms of dental fluorosis may be increasing, it was not thought of as a public dental health problem. Several interviewees mentioned that enamel mottling should be kept under close review as expressed by Mr X:

Interviewer (A):

'... and is it your impression just now, that quite a few parents have experienced mottling (on their children's teeth)'.

Interviewee (B):

'The evidence for the UK is not terribly good on mottling. My impression is that its prevalence is increasing'.

(A) 'How shall we monitor it?'

(B) 'I think that it is critical that it should be monitored very carefully by regular epidemiological surveys by district dental officers ... It doesn't show alarming problems - it shows higher levels of diffuse mottling in fluoridated districts than in non-fluoridated districts. I think it indicates that it's higher than it used to be but certainly I wouldn't say there is any cause for alarm. It just calls for monitoring it and keeping account, watching the situation'.

The attitudes and recommendations regarding fluoride were related to the beliefs of how fluoride works. In contrast to the Danish interviewees, who all believed that fluoride mainly worked through a local effect and if there was a systemic effect this was minimal, the British interviewees' opinions differed. Some thought the systemic effect was by far the most important; others thought the topical effect more powerful than the systemic; and others again that there was 'undoubtedly both a systemic and a topical effect'. A few people were not aware of this debate and others claimed that the 'pendulum swing' away from systemic to topical effect maybe had gone too far. In any case most interviewees claimed that water fluoridation was effective whether the effect of fluoride was systemic or local and also that if tablets were recommended to be sucked or chewed rather than swallowed, it did not matter whether it was a local or systemic effect.

The Interviewees' Attitudes and Knowledge Related to Fluoride Policy

Does the UK have a fluoride policy?

When asked about existing fluoride policy in the UK most interviewees immediately and readily referred to the Water
(Fluoridation) Act 1985. Most were familiar with the background, the long court case and the outcome. However, when asked about any other fluoride policy or laws or regulations, or simply means of controlling the use of fluoride, most respondents were hesitant and the answers rather diffuse.

Several people claimed that no other fluoride policy existed. When asked about regulations for sale and marketing of fluoride supplements for instance, several respondents were aware of the existence of such regulations but explained that these were not 'fluoride policy' but regulations in the interest of safety, or that they regulated industry not dental health. Another interviewee claimed that regulations regarding fluoride-containing products were health policy and not fluoride policy. In any case, most interviewees gave little importance to these regulations and very few knew the details. Some interviewees mentioned the need for a licence but could not remember exactly why licences were necessary. Some people were aware of different categories of medicinal product but could not tell to which category the various fluoride products belonged.

To the question of whether any person could buy any type of fluoride product, some people said they were not quite sure, others said yes and others again said no. One person was convinced that the public could not buy any without prescription.

After some discussion initiated by the interviewer regarding regulation of fluoride products, a few interviewees added that there was, 'by the way', some EEC regulation controlling the amount of fluoride in dentifrice. It was thought that the maximum amount of fluoride ion was 1500ppm.

It thus appears that, according to the study population, the
existing fluoride policy in the UK consists of the Water Act and no other declared policy exists. Some respondents were aware of the Medicine Act but appeared to pay little importance to it and certainly did not regard the Medicine Act as 'fluoride policy'.

On the basis of the analysis of the interviews and the review of existing documents and literature, the forces shaping British fluoride policy have been identified as deriving from three sources namely, (a) the government, (b) the dental profession and (c) various pressure groups.

a) The government

The British government clearly has a formulated fluoride policy in support of water fluoridation as reflected in a number of policy papers (previously cited) and by enacting the Water (Fluoridation) Act of 1985. Despite various problems and the risk of anti-fluoridationists' actions, the government have continued to be supportive in statements in various papers and also by offering assistance of up to 60% of capital costs. It should be noted, however, that national fluoridation is not coerced by government. The legislation is supportive in the sense that it allows fluoridation but leaves the final decision to be taken locally by health and water authorities.

There was one particular problem during the interviews which clearly demonstrated government's continuous support of fluoridation, namely the question of indemnity. Fluoridation in several places in England was said to be held up because of the water authority’s demand of total indemnity. This demand arose probably as a result of the process of privatising water authorities. Most interviewees thought that the water authorities were being 'unreasonable' or even 'greedy'. They predicted
correctly though that the government's support for fluoridation was strong enough to find a solution. Indemnity has been given since the time of the interviews. In this respect there appears to be some differences between Central Government and the Scottish Office. During the period from the judgment on water fluoridation in 1983 until 1991, no supportive documents were issued by the Scottish Office. Indeed, in the guidelines on the future role of the community dental services in Scotland it appeared that the recommendations on fluoridation which were stated in the similar document for England and Wales, had been removed. Also the Scottish Office's 'Guidance on fluoridation of public water supplies' was delayed compared to England and was not issued until June 1991. However, this circular gives guidance to Health Boards on the implementation of schemes to fluoridate public water supplies and also information on the statutory indemnity which the Secretary of State would offer a water authority entering into an agreement with a health board for the purposes of fluoridation. A corresponding circular issued on the same day by the Scottish Office Environment Department to water authorities asks them to give all possible co-operation to health boards.

Although most Scottish and English interviewees were aware of this 'silence' in the Scottish Office, no-one was able or willing to explain it. Some English interviewees said it was not their business. One person was willing to talk about it:

Interviewee (B):

'In England the authorities have had these guidelines for over a year. They lay out the mechanism for consultation and funding, how to
go about making agreement for the water authority and so on. In Scotland, that hasn't been published. The health authorities are still waiting, they are not doing anything at all, not promoting it, they're doing nothing at all'.

Interviewer (A):

'Do you know why that is?'

(B) 'Officially because the indemnity issue hasn't been resolved in England and Wales'.

(A) 'So - that's officially what we are waiting for?'

(B) 'Yes - officially'.

(A) 'Do you know what the unofficial reason is?'

(B) 'I wonder whether there is some policy, some informal policy within the department in Scotland, which is not in favour. I don't know - that's a guess'.

(A) 'But you would think that Scotland was an obvious place to start having fluoridation'.

(B) 'Apart from N Ireland it has the highest level of caries, it also has the biggest populations with single water supplies. Strathclyde would be a very cost effective preventive scheme'.

(A) 'But then altogether when there's no fluoridation paper here, there are no signs whatsoever of fluoridation anywhere in Scotland - would you, or any other community dental expert, or perhaps the British Fluoridation Society enquire into that?'

(B) 'I have done. Regularly I have asked informally when I meet people in Scotland, what's happening and I just get embarrassed silence'.

(A) 'Nobody has told you?'

(B) 'Not formally. I have been told about the indemnity and the problem with indemnity, but nobody has told me anything other than that'.

(A) 'I am sorry to push this a bit. I want once more to ask you if you quite honestly can say that you don't know why nothing is happening is Scotland?'

(B) 'No I honestly don't know. I can only guess.'
My guess is that one of the ministers isn't in favour of fluoridation - I mean, nobody has told me that, you just have to look at things the way they are happening, the way civil servants are uncomfortable when you ask the question and you say - yes - that sounds to me as though ministers are not in favour. I mean normally they would be more forthcoming'.

(A) 'Would it be embarrassing for an academic to let you know, if they knew?'

(B) 'One would have thought not'.

(A) 'I am not going to mention any names or anything - but I would like to find out. It is very strange to me that people won't talk about it. I would never say that you had said or knew etc. but write something like ...'some interviewees said ...' I am surprised that ...

(B) 'The only academics to talk to me here over the last two years are ...' (names excluded by the author)

(A) '... and they haven't said anything?'

(B) 'Mr X said: "We are waiting for guidance"'.

(A) 'The guidelines for the Community Dental Services came out with nothing - fluoridation was specially taken out'.

(B) 'Yes - well I only found that out recently from an academic colleague'.

(A) 'I don't understand'.

(B) 'Even if I knew that Mr Y, the minister, was actually not in favour, what should I or anyone else do at this stage, what should the Fluoridation Society do - They could start making a fuss in the newspaper, campaigning and so on, but then they would irritate the ministers in England who are actually doing their best to promote water fluoridation, so ...'

(B) '... I think, to make a fuss in Scotland before progress has been made in areas where progress is wanted, would not particularly be the right way to go about it'.

- 342 -
This deliberately long citation shows in itself and also verifies what emerged from other interviews:

1) Government is in favour of water fluoridation but not to the extent of being coercive.

2) The Scottish Office have not until the time of the interviews (and until 1991) shown any support or made any public statements.

3) Some dental professionals are in support of fluoridation but cannot or will not push the issue and cannot or will not openly discuss it.

It can be stated that guidelines from the Scottish Office were eventually published in 1991 and several health boards are now in the process of preparing negotiations for fluoridation, although it has not yet been agreed or implemented anywhere in Scotland.

b) The dental profession

Despite the diversity of attitudes and opinions on 'how fluoride works' and recommendations regarding the use of fluorides, the majority of interviewees representing the dental profession supported fluoridation. A pressure group 'The Fluoridation Society' has been formed and organised by dental professionals. In districts where fluoridation has been implemented it has primarily been dental professionals who have organised it. It is also dental experts who are advising the government on fluoridation and in fact, one of the interviewees was acting as a government adviser on this issue. The whole idea of fluoridation was, according to many interviewees, brought about by dentists back in the early fifties, after inspiration from the USA.

Despite government's undoubted support of water fluoridation several interviewees questioned its implementation in the future.
One person said:

'Water fluoridation will slowly move off the professional agenda'.

Others claimed that it would become more difficult when water boards were being privatised. Several people said they were rather pessimistic with regard to the future. Another person said:

'It is very difficult to make the dental profession enthusiastic about water fluoridation issues nowadays'.

Apparently the interest among some professionals was decreasing. The suggested reasons for this were, "maybe because dental decay has decreased", or "maybe a little bit of self-interest".

As most interviewees considered fluoridation the only fluoride policy issue, the discussion of development of other fluoride products was rather limited. The vast majority found current legislation and regulation related to fluoride quite satisfactory and did not suggest any changes. No-one appeared to be involved in forming or changing any policy in this area. The only problem mentioned was the fact that doctors under the NHS can prescribe fluoride tablets/drops whereas dentists cannot. However no-one did anything to try to solve this problem.

**Pressure Groups**

The British interviewees' answers to the question of pressure groups were that 'yes - anti-fluoridationists exist but they are small in numbers'. Typical answers were: "We dismiss anti-fluoridationists as cranks", or "they are considered unscientific". Several interviewees emphasised that fluoridation was a very emotive issue both from the pro- and anti-fluoridationists' side. One person said "Commonsense and critical analysis goes out of the window". Although the emotions had culminated around the time of
the Strathclyde court case, several interviewees still felt rather strongly about it. There is no doubt that anti-fluoridationists exist and that they have influenced fluoride policy in the UK. The case of Mrs Catherine McColl versus Strathclyde Regional Council - is a clear example of how influential a citizen can be. Shortly after the Strathclyde Regional Council agreed to co-operate with local health boards by fluoridating water supplies, Mrs McColl, an elderly citizen of Glasgow, applied for an interdict to restrain the council from implementing its decision. This was allowed pending court hearings. In brief, Mrs McColl's submission was that fluoridation was unsafe, ineffective and illegal. The hearings, held in the Court of Session, Edinburgh, commenced on 23 September 1980 and continued (after a few breaks) until 26 July 1982. The court sat on 201 days making it the longest and costliest case in Scottish legal history.

The judge sustained the petitioner's plea in law that fluoridation for the purpose of reducing the incidence of dental caries was ultra vires the respondent, and granted the interdict on this point and on this point alone. All her other pleas were rejected. The judge completely vindicated the safety and efficacy of fluoridation.

The implications of Mrs McColl's action are striking. Theoretically, Strathclyde Regional Council's water supplies could have been fluoridated since 1978. Children from this region have, since 1978 to date, one of the highest caries prevalences in the UK. Recent updates and reviews of effectiveness of fluoridation world-wide (Rugg-Gunn and Murray 1990) show caries reductions of 40-50% and 50-60% for the deciduous and permanent dentitions, respectively. The costs, both in terms of pain and discomfort for
the concerned children and their parents, and in terms of resources, manpower and money for treatment of caries lesions, are obviously considerable.

Mrs McColl can only be held responsible for holding up fluoridation from 1978 to the water fluoridation Act of 1985. Whether she, or any other anti-fluoridationist has been involved in the further delay in Scotland from 1985 until now, cannot be revealed within the framework of the present study. Unless the problem of indemnity is the only reason for the delay, some anti-fluoridationists must have influenced the policy. It was beyond the aim of the present study to analyse the strategy and organisation of anti-fluoridationists. No study known to the author has been published revealing their tactics or strategies but perhaps if promotion of fluoridation is to be improved, a study of that would be relevant.

Thus, apart for the anti-fluoridationists and the Fluoridation Society previously mentioned, no other pressure groups pro- or anti- were identified. Several dental associations and societies as well as health education bodies, have, in policy documents or elsewhere, stated their recommendation for fluoridation (for instance, the previously mentioned 'Green Book). However none of these were said to be acting as pressure groups.

4.3.3 Fluoride Policy in UK and Denmark - A Comparative Analysis

The conceptual problems related to oral hygiene policy did not surface in the discussion of fluoride policy or at least not to the same extent. British interviewees claimed that the promotion of water fluoridation was the profession's as well as the government's policy whereas the Danish interviewees thought, in general, that a policy as such did not exist but that in practice water
fluoridation was rejected 10 years previously and any other form of fluoride use was mainly recommended for high-risk groups. Daily use of fluoride toothpaste was recommended by all interviewees in both countries.

As illustrated in Table 4.5 the 'fluoride message' differed considerably between the Danish and the British interviewees and also amongst the British interviewees. The Danish interviewees held rather uniform attitudes, basically restricting all forms of fluoride apart from fluoride in toothpaste, to high-risk groups only, and nearly totally condemned fluoride tablets and drops as well as mass programmes in general. Over the last 10 years most mass programmes had been terminated or were at the time of the interviews in the process of being terminated. In contrast to this the attitudes of the British experts ranged from recommendations of coercive water fluoridation nationally and tablet/drops schemes to all children of all ages, to more restricted recommendations of water fluoridation only in certain areas with high caries prevalence and tablets/drops only to certain age groups or certain high-risk groups. It should be remembered that Britain is a much bigger country with a population 10 times as big as Denmark.

In brief all interviewees in both countries consider fluoride an important factor in the development of dental caries. However, beliefs on the mechanisms of fluoride, how fluoride actually influences caries development, differ between the countries and amongst British interviewees. Furthermore, fluoride policies and practice differ considerably between the two countries. The main differences and similarities which emerged from the analysis are in summary outlined below, followed by an attempt to explain these using Leichter's framework.
(a) The British government has since the 1950s strongly supported water fluoridation. The Water (Fluoridation) Act of 1985 gives health authorities the power to decide whether or not to apply for fluoridation of water supplies in their area. Various policy documents and circulars recommend fluoridation and set out the procedure to be followed. The government further offer water authorities statutory indemnity.

(b) The question of water fluoridation has never formally reached the Danish government. The Danish government has never supported fluoridation, on the contrary a letter from the Minister of Environment rejected fluoridation in 1977.

(c) Fluoride-containing toothpaste is freely available ('over the counter') in both countries.

(d) Alternative use of fluorides, tablets, drops, fluoride mouth rinses, etc. are regulated by the 'Medicines Act' in the UK and by circulars from the National Board of Health in Denmark.

(e) Apart from industrial advertising of products, no industrial influence of policies or legislative work could be detected.

(f) In practice the professional attitudes towards use of fluorides were uniform and rather restricted in Denmark but rather diversified
and less restricted in the UK.

(g) A definite anti-fluoridationist influence was detected in the UK whereas anti-fluoridationists appeared only to have been active during the debate in the seventies in Denmark. It was beyond the present framework to study further the strategy and tactics of anti-fluoridationists.

(h) Lately a fee for topical fluoride application has been introduced as part of the General Dental Service’s payment schemes in both countries.

Although in the following, the impact of Leichter’s suggested situational, structural, cultural and environmental factors are discussed as if these operated in singular or discrete fashion, it should be kept in mind that the policy context actually involves the interplay of many factors. Furthermore these policy-related factors have greater or lesser influence according to the policy area. For systematic reasons the same framework (Leichter’s) is used for all four concerned policy-areas (oral hygiene, sugar, fluoride and dental visits). In the final chapter (Chapter 5), all four areas will be discussed together.

The Impact of Situational Factors on Fluoride Policy

Among the many situational factors suggested by Leichter, several could be argued to have had an impact on fluoride policy.

One such factor is technological change such as new inventions. The use of fluoride is one of the most important discoveries in the history of dentistry. It is generally agreed that a main cause of the observed dramatic decline in dental caries
in the Western world has been the use of fluoride in toothpaste. However the discovery merely introduced the use of fluoride, it did not determine the way in which fluoride policy developed. Fluoride was introduced via America to both the UK and Denmark by dental professionals about the same time in the late forties to early fifties.

With regard to another situational factor, the economic cycle, the current recession could theoretically have had an impact but perhaps in different ways in the two countries. The recession has brought with it the demand and consciousness of 'value for money', cost-effectiveness, cost-efficiency, etc. into all sectors of society the health sector. It could be anticipated that, including water fluoridation, known to be the most cost-effective means for caries reduction in areas with high caries prevalence, could be more easily implemented under such economic circumstances. In Britain it is likely that the strong support in recent years from government is driven by such economic forces. In Denmark the decision not to fluoridate was taken before the recession began (1977), and in fact during an economic up-swing. At that time the relatively expensive dental health service was being developed and expanded. In the 80s and early 90s, a decision to fluoridate would be rational and not in line with the incremental decision-making otherwise adopted in the Danish health service. It would also be in sharp contrast to the dental professional attitudes and recommendations. Perhaps also, the Danish profession's attitudes towards the use of fluoride could cynically, as suggested by one interviewee, also be at least partly explained by the impact of the recession on the profession itself. The adapted policy maximizes the need for the public's regular contact with dental
professionals, and thus secures work.

A similar cynical way of thinking could apply to the British dental profession, albeit with a different policy outcome. With effect from September 1990 a new contract for general dental practitioners was introduced which changed the fee-for-item payment system to a capitation payment system for the dental care of children. In theory the practitioners should, for economic and selfish reasons, be more interested in dental preventive means such as fluoridation which will give the dentists less work for the same payment. If dentists are operating with such motives a much stronger general support for fluoridation could be expected to come from the profession in the future.

No other situational factor appears to have influenced fluoride policy.

Structural Factors

The political structure also seems to have influenced fluoride policy. The political structure of a democratic parliamentary government together with judicial rights of citizens in the UK had the impact of, in the first place holding up water fluoridation definitely in Strathclyde region, but very likely also in other regions until the enactment of the Water (Fluoridation) Act in 1985. The political structure has also allowed the existence and impact of pressure groups - in this case anti-fluoridationists. It is likely that policy constraints have exerted an influence, albeit with the opposite effect, in both countries. The present British government's prior policy commitments to water fluoridation (the Act of 1985) might have maintained the government's support even through difficulties such as the privatised water authorities' demand for indemnity. The Danish government might have been
constrained by the early policy commitment not to fluoridate.

It can also be argued that the economic structure has had an impact. The national distribution of wealth and income has meant that a bigger proportion of the GNP has been spent in the health sector in Denmark than in the UK. The Danish system can 'afford' a relatively expensive dental health care system (this is certainly what British interviewees claim but Danish interviewees reject) whereas the British system would opt for the cost-effective solution of water fluoridation.

The social, demographic and economic structure also seem to have had an impact. In both countries social factors are claimed to be the main reason that fluoride tablet/drops schemes are only of limited effect. Families with low socio-economic status are usually the ones who would be in need of additional fluoride but who would have difficulties administering such schemes.

The degree of urbanisation and the natural water resources/supplies allow water fluoridation to be feasible economically in the UK whereas in Denmark only 50% would be covered.

The Impact of Cultural Factors

The political culture concerning the role of the individual and the state appears to have had some influence. The ethics of fluoridation has often raised the question of freedom of the individual. One of the British Fluoridation Society's leaflets (Harris 1989) raised the question 'Whose Freedom?' and states:

'In considering the ethics of fluoridation one might legitimately reverse the question and ask if fellow citizens are entitled to impose, not only a disadvantage on the community at large, but impose actual deaths and the risk of death on children for the sake of the minor diminution in the range of choices available'.

It is interesting to contrast the political culture's
influence on water fluoridation on oral hygiene policies in the two countries. The Danes happily accept regulations on oral hygiene whereas water fluoridation is rejected at least partly because it would interfere with 'individual freedom'. In Britain the government would not regulate on such things as oral hygiene (discussed previously in 4.1.3) but do regulate on water fluoridation.

It was not possible to detect any general cultural or religious influence on the development of fluoride policy.

The Impact of Environmental Factors

There has been some discussion as to whether fluoridation is an environmental question or not. The pro-fluoridation argument is that fluoride occurs naturally and fluoridation is only a question of adjusting the level of fluoride and thus is not an environmental issue. The anti-fluoridationists argue that it is an environmental question and use this argument along with several others (health etc. previously discussed). However no 'green party' has yet declared themselves against fluoridation. In Denmark it was the Minister of the Environment who rejected fluoridation in 1977 and many interviewees claimed that whereas they were unsure how environmentally conscious the general public were in the 70s, they were certain that if anyone suggested water fluoridation in the late 80s, the general public would reject it on environmental grounds.

With regard to policy diffusion it is clear that the idea of using fluoride in caries prevention originally came to Europe from the United States. The decision to fluoridate the water, however, met with absolute resistance in Denmark and also with some resistance in the UK.
In summary, situational, structural, cultural and environmental factors have all contributed to the formation of fluoride policies in UK and Denmark.

4.4 DENTAL VISITS POLICY

4.4.1 Denmark

A. Does Denmark have a 'Visit to the Dentist' Message?

According to most interviewees, the concept of 'regular visits' had changed during the last five years. Previously the recommendation was 'visit a dentist every six months'. At the time of the interview all interviewees agreed (apart from one) that "visits should now be according to individual need", i.e. some people would have to visit a dentist every three or four months whereas others would only have to go every 10 - 12 months. The actual interval should be agreed between the individual and his or her dentist and is likely to change during a person's lifespan.

The agreement on this issue was quite amazing (Table 4.6). Even the non-dental interviewees stated spontaneously:

'There can't be any doubt of this question - all the dental professionals from private practices as well as the community service seem to agree'.


TABLE 4.6 'Dental Visits' Recommendations from 19 UK Experts and 38 Danish Experts

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>UK</th>
<th>DK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency according to need</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Not according to need</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Encourage regularity</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Adults every 6 months, children every 4 months</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Children every 6 months (from 2 years old)</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Adults once a year</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>According to need, although regularity should be</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>established in childhood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure (difficult question)</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Everybody twice a year</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Adults once every other year, children once a year</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Contact with dental health services important</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>(outreaching CDS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Answers not mutually exclusive

The need-orientated dental visiting pattern is also allowed for in the new law on dentistry as well as in the contractual agreement negotiated between the Dental Association and the National Health Insurance and several interviewees stated that this concept had been the basis for all negotiations up to the last contractual agreements.

Having said that visits to the dentist should be according to need it should be noticed that no interviewee thought that the interval between each visit should be more than a year in any case. From an outside point of view the recommendation is still at least once per year which in comparison with other countries, definitely could be called 'regular visits'!

However several interviewees said that this new concept of visiting frequency according to need had proved difficult to convey to the public, particularly to parents. They had been used to their children being seen every six months and seemed to worry about extending the interval between each visit. Despite this
initial reluctance among parents, the dental profession and all the other interviewees were convinced that visits according to need was the way it would and should be in the future. Some interviewees pointed out, however, that a systematic and regular (every six months) visiting pattern had to be well established as it is in Denmark before a 'need-orientated' visiting pattern can be introduced.

Other interviewees emphasised the importance of contact with the dental services. The dental profession should ensure contact with the population with intervals according to individual needs, but not necessarily in a dental surgery. Contact could, for instance, take place in the workplace. An example of this viewpoint will be quoted:

'It is important that the public have a regular dental health care behaviour - that means that they should have contact with the dental health services - it doesn't necessarily mean intervals of 6-7 or 9 months. The most important thing is the contact with the dental health service and that the interval between each contact is relevant to the individual - that is need-oriented health care. It is wrong to tell people that if only they visit a dentist every 6 or 7 months then everything is OK because that is to give a false sense of security. It is important to stress that more is needed than just the contact with the dentist. In principle it is wrong when dental associations or dentists run campaigns saying - 'see your dentist every 6 months - then everything is OK'. The contact should be with a dental health care system - it could be another type of system. The best health care system is characterised by being outreaching, i.e. reaching people who do not by themselves contact the health care service. It could, for instance, be in workplaces. The most important thing is to ensure that everybody is reached'.

It is obvious that the person just quoted represents the community dental service, not the general dental practice. Although representatives from both sectors agreed on the 'need-
oriented health care' concept, differences on the emphasis and indeed the implementation of this concept existed. Interviewees from the community dental service stressed that in order to reach the 'rest group', i.e. the minority who still suffer from high incidence of dental decay, it was necessary to experiment and study the effect of new models, new ways. As one chief administrative dental officer expressed it:

'It is much more important to reach the ones who do not visit a dentist or who are so-called "irregulars" than to secure that already "regulars" go every 5 or 6 months. We need to study new ways, new models to reach people'.

Interviewer:

'Have you planned or thought of any initiatives yourself?'

Interviewee:

'I would like to integrate the dental health services with the general health service locally. I will do that to promote primary prevention. If we want to progress we have to focus on the causes of dental diseases, and we can only reach these factors if we work more broadly with doctors and nurses and other health care workers, together with those who have insight in people's living standards and conditions of life'.

Many pointed out that the old traditional dental services had been successful in reaching the majority of the population, but obviously were not able to reach the high-risk group.

They further expressed a strong criticism of the general dental practitioners who they thought only practised secondary prevention, i.e. prevention focusing on the teeth or the plaque, and not primary prevention which would focus on people, lifestyle and living conditions.

In conclusion then, the question as to which message the public in Denmark should have regarding visits to the dentist is
simple. Everybody should visit or have contact with the dental service according to need although at least once per year. What is not simple and not agreed upon, is the question of why this policy has developed. This is discussed in the following.

B. Controlling Mechanisms for Visits to a Dentist

Does Denmark have a visit to a dentist policy?

The question of whether Denmark has a visit to a dentist policy is complex and cannot be answered with a straightforward yes or no.

It is well documented that a rather high proportion of the Danish population visits a dentist regularly. Indeed, the whole of the child population between 0-17 years of age and more than 90% of people up to 50 years of age visit a dentist regularly (Sundhedsstyrelsen National Health Board 1987, Kirkegaard et al. 1987).

By law (see 2.7.5 and Appendix II) all municipalities have been required since 1971 to 'establish dental clinics and appoint dentists and auxiliary personnel to the extent necessary to ensure that free preventive and therapeutic dental care was available to all children of school age'. Although participation in the service is voluntary, withdrawal can only be done by parents in writing. (In the UK it is the other way around, parents have to consent in writing if they want their children to participate in the community dental service or the general dental service.) The admission to the child dental service in Denmark is thus automatic and does not need notification from anybody. Further, the service is 'outreaching' in the sense that children who are not going to school in a particular municipality (i.e. taught at home, living in an institution etc.) have to be included as long as they live in
the municipality.

The 'youth group' (16-18 year olds) have posed a special problem because of the transferral from the public to the private (partly reimbursed) system. During their participation in the community dental service they have automatically been regular attenders. In order not to 'lose' this group during the transfer and to maintain 'lifelong motivation', various transfer schemes have been established (previously described 2.1.11). In relation to the new Act on Dental Health Care (1986) the contractual agreement between the Danish Dental Association and the National Health Insurance states that 'the 18 to 30 year olds will no longer be called up at regular intervals by the National Health Insurance' (as they were until that time). The dentists themselves were from then on responsible for calling in all patients whatever age.

These different and changing arrangements for the youth group reflect not only the problem of changing from public to private dental care service, but also the fact that the youth group, despite the intentions of the Community Dental Service (CDS), are not lifelong-motivated. It seems as if regular attendance at the dentist is 100% effective when the attenders are automatically 'taken' to the dentist (as in the CDS), but not quite as effective when it is left to the patient to seek dental care.

However, the intention of the 'dental visits policy' in Denmark has been to ensure that the whole population become regular attenders. The concept of 'regular attendance' changed during the eighties so that the interval between each dental visit no longer is recommended to be fixed, but differs between individuals and also with time for each individual according to need.

The reason that 'visit to a dentist policy' was stated as
being a complex issue at the onset of this chapter is not that visits to a dentist or frequency of visits form an area of disagreement in themselves; quite the contrary. Laws and regulations and all involved parties have emphasised the importance of regular attendance and more lately 'need-oriented attendance'.

The real conflict lies within the question of which type of dentist the public should visit and under which circumstances. The conflict between the two sectors of dental services, the community dental services and general dental practice, has increased considerably over the last decade.

**Professional conflict and political influence**

This conflict climaxed in relation to the renewal of the law on dentistry (1986) and the latest contractual agreement regarding general dental practice. The key points of argument were the question of the 16-18 year olds and the elderly, the handicapped and other minority groups who, until then had not had regular contact with the dental service. As a consequence of this conflict the two sectors did 'split up' and a new dental association was formed in 1987. Until then nearly all dentists had been members of the Danish Dental Association. The conflict resulted in the situation where most community dental officers are now members of the 'Dentists New National Association' and most general dental practitioners are members of the old association still named 'The Danish Dental Association'. The two associations are constantly fighting as to how many members each has, primarily to claim the right to negotiate (salaries etc.) on behalf of the members. The disagreement was so strong that the question ended in a court case.

It is interesting to note how representatives from the two sectors describe themselves and each other. The following two
quotes from supporters of the CDS and the GDS respectively clearly illustrate the factors emphasised by the two sectors. The CDS supporter emphasises that the CDS is outreaching, preventive, integrated whereas the GDS is unco-ordinated and not integrated with other health activities. The GDS supporter emphasises economic factors. The CDS supporter typically stated:

'The CDS is prioritising outreaching prevention and therapeutic-goal-oriented child-youth-handicapped and elderly considered dental health care. It is integrated in other health and social activities within the community and in close co-work with involved social and health workers. In contrast, the general dental practice - so-called adult dental health care is collected in an arbitrary fashion - not co-ordinated and not integrated with any other health activities. They have no outreaching work and therefore do not have real responsibility towards the adult population as a whole. They (GDS) are oriented towards the individual and cannot conduct primary prevention or approach aetiological connections. All they can do is secondary prevention, i.e. focus on the tooth and the plaque on the teeth. The dental health care need has decreased and the GDS is therefore compensating by introducing preventive fees. They did this because they could not maintain the same turnover without. The use of 'tooth cleaning fees' has increased primarily ... but perhaps they can also now see the rationality of prevention!'

A civil servant involved and experienced in negotiating fees for general dental practice stated:

'Forgetting all shame, the adult health care system, not only dental health but also regarding general health, is one of the best there exists - even if we look at it globally'.

Interviewer:

'Is that your personal opinion or the whole negotiating committee's opinion?'

Interviewee:

'That's difficult to say because the committee members represent different political parties and each thus has health/political programmes
which contrast with what I am just saying. For instance, the chairman of the committee is a Social Democrat and their health/political programme says that all health workers should be employed, i.e. on a salary not on a fee-per item based income - and that’s the best. And of course he will agree with his party political programme. Nevertheless I think he will say that if we cannot realise the political programme then this is the world’s best system’.

Interviewer:

'What system do you mean exactly?’

Interviewee:

'The agreement system - that you have private dentists, independent businessmen who themselves have responsibility for establishing the business economy etc. combined with an agreement with the public authorities who therefore control the system by controlling the fees. This system secures that you get the health politics and health policy you want - and it further secures that you get your service as economically rational as possible. You get it cheapest and best’.

Interviewee:

'You can measure it against, for example, the child dental care system which has been good, beyond any doubt good, but "my dear, has it cost money!" If you want to be rational about it and forget ideologies and political ideas about salaried or non-salaried staff, then the adult dental care system is the best, the most economic. The ones who are negotiating are those who have the legislative and economic responsibility with those who have the professional responsibility - those who have to treat the patients. Thereby you get the professional input in a rational economy. But it hasn’t been narrow-minded because in this process you have included the National Health Board, the Health Ministry, the Treasury, the Municipalities National Association - all these are in reality involved in the process’ (author’s note = have representatives on the negotiating committee).

Interviewer:

'When you say that it is the world’s best dental health care system, do you also mean that it gives the best dental health?’
Interviewee:

'I don't know how you would measure that ... However, the system has "content-wise" been changed at the last agreement. That was an expression that it was time to change direction. What happened really was that about half of the available economy was moved from therapeutic to preventive care. Characteristic of the system is that you have a fixed amount of money available and quite apart from being forward-looking and all the rest, you have to solve the dental health problem. There are still people who have to have teeth extracted and that sort of old-fashioned treatment. It is always within a limited amount of money, but for this sum the adult dental care system is the best in the world'.

These two different but not quite opposing viewpoints have been quoted at length for several reasons. Firstly they illustrated typical viewpoints and opinions about the two dental health care systems. Spokesmen for the CDS emphasise, as already mentioned, factors such as being outreaching and integrated in other health activities, whereas spokesmen for the GDS primarily emphasise that it is 'best value for money'. Another reason for elaborating this issue is the fact that a similar conflict between the two sectors does not appear to exist, or at least not to the same degree in the UK (see 4.4.2).

The conflict between the two sectors in Denmark became public and involved strong political lobbying in relation to the new law on Municipal Dental Health Service (1987) which superseded the Act on Children's Dental Health Service, first passed by Parliament in 1971. The key conflict area was, as mentioned, the care of the 16-18 year olds. It was stated by many interviewees that all the existing political parties in parliament had been 'lobbied', both formally and informally. There had been a clear division with regard to who were 'lobbied' by whom. All the parties to the right of centre and the centre were formally in writing and informally
approached by the 'old' dental association, primarily representing GDS with the purpose of ensuring the care of the 16-18 year olds within GDS. Similarly, all the parties to the left and including the middle were approached by the 'new' dental association with the purpose of ensuring the care of the 16-18 year olds within the CDS. Although most interviewees agreed that the intentions of the law and of the contractual agreements relating to general dental practice were related to prevention and ensuring regular (need-orientated) visits and care of the whole population, it seems from an outside point of view, to have much more to do with who is taking care of which patients. Thus it looks more like a question of ensuring work for the different groups of dentists than of ensuring care for the population. Both parties involved in the conflict would claim that the other party was fighting for their own professional interest (ensuring work for dentists) whereas they themselves were fighting for the interests of the patients. It is interesting that no non-dental parties (interviewees) doubted the interest of the patients.

It appears to be well established, that it is "good for you" to visit a dentist. The only questions or conflicts lie within the questions of which type of service best ensures that the whole population is in contact with the service regularly. With regard to the 16-18 year olds the conflict ended with a compromise where these young people can choose whether they want to visit a general dental practitioner or a dentist employed in the community dental service. Several of the Chief Administrative Dental Officers were unhappy with this solution claiming that it did not ensure continuous dental care and criticised the fact that no action plan had been agreed to ensure such continuity.
Most interviewees were enthusiastically talking about the conflicts surrounding the new law and had strong opinions about it. When asked about why people should see a dentist frequently and why most of the population actually does, and what has led to this situation, they often became silent and thoughtful. It appears that dental visits have become a norm in Danish society. Several interviewees mentioned that it is now unacceptable to have 'bad teeth' and people with visibly missing, badly decayed teeth or even with malocclusions are hardly ever seen in public life.

Another interesting factor in relation to dental visits should be mentioned. The question of 'over-treatment' or 'unnecessary treatment', often mentioned in the press and amongst dental professionals in the UK, has not been covered by the Danish press and not been an issue of any proportion amongst Danish dental professionals. In Denmark there has been debate on 'when to drill', but not with the same overtone of 'dentists drilling for gold' or unnecessary treatment as in the UK.

In fact, it appears that the public, the civil servants, the politicians and the profession itself automatically connect visits to the dentist with good care of teeth.

Just as it appeared to be natural to visit a dentist, it was natural that the dentists had been the main promoters of this policy.

Economy

Another controlling or influencing factor, the economy or resources was mentioned by many. Both national and private economy had, according to most interviewees, influenced the development of the visiting pattern. The optimistic late sixties with an expanding health service in general and a focus on social
equalities, made it possible to pass the Act on Children’s Dental Health Service, which among other things, had the effect that all children came in regular contact with the service. It became not only a habit, but a norm which is difficult to shake or change. It appears as if cost is not any longer a barrier for most Danes. In an analysis of dental visits among the adult Danish population, it was concluded that the strongest influencing factor was the number of remaining teeth. The highest proportion of 'irregular visitors' was amongst the edentulous. Without claiming any causal relationship it can be noted that dental health in general has improved considerably over the same period where the proportion of regular attenders has increased.

When dental health has improved as it has, there is concern that there will be less conservative work for the dentists. If each dentist wishes to work the same number of hours they will have to see a larger number of patients. When at the same time the number of dentists has increased, it does not seem surprising that dentists begin to 'fight for patients'. One interviewee claimed:

'the only reason that general dental practitioners suddenly show a great interest in fighting for fees for preventive work is that they have little else to do. When there is a decreasing amount of restorative work they will have to turn to something else!'

However, whether the Danish dentists have promoted 'regular visits' for their own sake or for the sake of the patients, or both, they certainly have been successful. The political and economic situation during these years of developing the dental services has been important. Several interviewees claimed that it would never have been possible to build a similar dental service starting from scratch in 1988, simply because 'the political will is not there anymore'. The fact that dental health was known to be
generally bad in the late sixties facilitated the passing of the law of 1971.

'It is much harder to get resources in a time when dental health generally is good as it is known to be in 1988'.

During the times where the community dental services were expanding and good dental habits were formed (like regular visits) a majority of the population had dental problems or knew of dental problems. Nowadays dental problems are much less common and it is far more difficult to obtain resources for dental health activities whether in the community, at a university or for research. However, the habit of regular visits has been formed and might prove difficult to change. The population might demand the regular service as the parents, according to several interviewees, already did on behalf of their children.

Industrial Influence

In relation to fluoride, sugar and oral hygiene policy the role of the industry was discussed. With respect to visits to the dentist it seems that no industry has had any influence on the development. The most common reply from the interviewees was "Why should they?"

It could have been possible that major producers of dental equipment or dental materials would have had an interest in frequent visits. Admittedly most larger dental producers are not Danish and therefore no-one has had the possibility or interest in influencing this policy.

Scientific Knowledge

There were different opinions of whether research or scientific knowledge had influenced dental visiting patterns. One interviewee stated:
'Dental visits must be based on need. There is no scientific proof of how long intervals between visits should be. Dental visits in Denmark have been influenced by the Act on Child Dental Care and not by any research or scientific knowledge.'

Several other respondents immediately associated this question with Professor Sheiham's article in The Lancet: 'Is there a scientific basis for dental examinations every six months?' (Sheiham 1977A).

Basically this article shows that there is no scientific basis for dental examinations every six months, which the interviewees who mentioned the article agreed with. Whereas many British dentists were extremely upset about the article and wrote lots of critical letters, editorials, etc., the Danish dentists did not appear to be upset at all. They never claimed that the six monthly visits were scientifically based, but merely said that that was what they recommended from clinical and practical experience. When they now are recommending individually need-based intervals they are saying that the decision of intervals between visits should be decided by the patient and the dentist, based on the patient's realistic skills and behaviour and the dentist's professional clinical judgment. The dental profession are thus not directly claiming that it is for scientific reasons. They are indirectly, however. When they recommend a certain interval it is because they believe they can control or intervene in the dental decay process by various means, i.e. apply topical fluoride, or plaque removal. Most dentists seem to believe that these interventions are scientifically based. Thus they are not claiming the interval to be scientifically based in the sense that we have surveys showing one interval superior to the other, but scientifically based in the sense that the intervention the individual dentist chooses is based
on scientific knowledge of the effect of that particular intervention.

**Pressure Groups**

Apart from the dental profession itself, there did not appear to be any pressure groups involved in the issue of frequency of dental attendance. The interests of the patients or the consumers were focused on the quality and price of what they received at the dental visit, rather than the visit itself or the frequency of it. This was reflected in the development of a new and comprehensive complaint system which, according to several civil servants (the interviewees who mentioned it), gave the public insight and access to cases of complaints about dentists. Although interesting, the issue of complaints is beyond the framework of this study.

**Conclusion**

In conclusion, regular dental attendance for children in Denmark developed according to a well-defined policy laid out in the Act of Child Dental Health Care of 1971. This Act required municipalities to establish dental clinics and ensure regular dental attendance for all children of school age. The implementation of the Act was in order to ease the economic burden incrementally so that not all children had to be included from the onset, but a new age group each year was incorporated in the scheme. Fifteen years after the enactment in the mid-eighties, not only schoolchildren but also pre-schoolchildren were included in the regular attendance scheme. At the time of the interviews the concept of regular attendance had changed so that 'regular' no longer meant the same fixed interval for everybody. A need-based oriented dental health care scheme was recommended and allowed for in the new Act of Municipal Dental Health Care (superseding the
previous Child Dental Health Care Act).

Dental health care attendance differed considerably for adults. No such well defined policy existed. No central or local public authority has taken or been given responsibility for adult dental attendance. National health education programmes have never been carried out and adult dental attendance has merely been recommended by dentists and through a few minor campaigns organised by the dental association. The payment system, a fee per item system negotiated between public authorities and the dental association have partly reimbursed and allowed regular attendance. In order to reduce the number of 'drop-outs' in the transfer from child to adult dental health care, various recall and specially reduced payment schemes have been introduced for the youth group. With the introduction of the new Act of Municipal Dental Health Care in 1987 all such schemes were dismissed and recalls and promotion of regular or need-based attendance are in the sole hands of and responsibility of the individual and the dentist.

Among the many factors which have influenced practice can be mentioned:

- resources,
- national and private economy,
- norms legislation and regulations,
- contractual agreements, recall-systems,
- competition between the general dental practice/community dental service,
- dental manpower/unemployment and postgraduate education and vocational training.

All these factors will be discussed in detail in comparing the results from the UK.

4.4.2 United Kingdom

Does the UK have a 'Visit to the Dentist' Message?

The British interviewees expressed various different opinions on this question. A major group felt that the public should visit
a dentist according to need and the individual need should be determined by the clinician’s (the practising dentist’s) professional judgment or by the dentist and the patient together. However other interviewees recommended regularity and several stated fixed intervals like 'all adults should visit a dentist every six months and all children every four months' (Table 4.6).

A few interviewees thought it was a difficult question and one directly said:

'... to be honest, I am not sure, I don’t know'.

Other answers were:

'Children every six months, from two years of age, and adults once a year',

some respondents said:

'we have to have a flexible approach - you can’t have general rules',

whereas others said:

'it is crucial for positive attitudes that we encourage regularity'.

One interviewee stated:

'The individual advice - if the patient asks how often should I go - I would say, ask your dentist, it will vary from patient to patient. If I was writing a leaflet, that is what I would say. But if the minister said "I want to have an advert, on the side of a bus going through a major city about dental attendance, what should I write on the advert?" Should I write you know there is a variation on how often we need ... considering the available space on the side of a bus? No, you have to say something simple which would be - see your dentist once a year - have you had a check-up recently/in the last year - that sort of a message ... I don’t feel terribly strong about this issue'.

This person, although not feeling strongly about it, makes the distinction about dental attendance messages on practical grounds.

Another person made the distinction between what is written in
'official' dental health education literature such as posters, pamphlets and leaflets and what the dentist recommended in her surgery, claiming that there must be consistency and easy advice in written materials whereas the practising dentist could allow for longer and varying intervals judging each individual's capacity of keeping such appointments.

In summary, 'visits to a dentist' is, in itself, not a controversial issue. All interviewees automatically implied that, of course, dental visits should be recommended. Although recommendations differed between interviewees, nobody seemed to have terribly strong feelings about this issue, apart from one person who thought that current intervals were far too short and that many people could and should have much longer intervals than currently practised and recommended by dental professionals. However the nationally distributed 'green book', "The Scientific Basis of Dental Health Education" (HEC 1989) states:

'... for all of these reasons, an examination at least once a year is recommended for everyone so that the health of the whole mouth can be monitored and appropriate dental health advice provided. However children may need to be seen more frequently during the active stages of dental development, as may individuals prone to oral disease'.

Controlling Factors for Frequency of 'Visits to a Dentist'

Although most respondents initially felt surprised by the question of what or who controlled visits to a dentist, a number of different factors were suggested. When, in the following, reading the results of the interviews on this issue it should be kept in mind that the interviews took place before the introduction of the current capitation scheme. It was thought that the organisation of the dental health services, in particular the payment system to a certain degree, influenced the frequency of dental visits. For
instance the regulations on how frequently a dentist can recall a patient and still claim a NHS reimbursement fee could potentially influence the frequency the dentist would recommend. Apart from one interviewee, everyone was satisfied with existing regulations where reimbursement can be claimed twice a year per adult patient and three times a year per child. However the newly introduced examination fee for patients (previously no charge) was considered most unfortunate by most. It was thought that this could influence patients in a negative direction so that they would visit a dentist less often. Indeed the British Dental Association had fought hard to discourage the government introducing the examination fee but without any success. Despite high coverage by the press, television and radio, the examination fee had become a fact. No one mentioned any schemes set up to evaluate the effect of the fee on frequency of dental visits.

Another factor related to the organisation of the dental services which was mentioned, was the limited amount of information available regarding dental visits and dental health status. If more information was available it would be possible to target initiatives specifically towards irregular or non-attenders. Only little was known about who they were or where they were. Most efforts related to dental visits concentrated on barriers, i.e. why do people not visit a dentist. Initiatives from the dental profession were concentrated on improving the dental team’s communications and marketing skills in order to be able to 'sell' the service better.

Some interviewees claimed that chief administrative dental officers potentially could influence the frequency of dental visits. It is worth commenting that most administrative dental
officers were educated to be clinicians and often lacking proper
education in administration, planning, evaluation, etc. Both the
past and the present dental curriculum contains very little of such
subjects.

Obviously 'visits to a dentist' is to some degree dependent on
available resources, the dentist's, the patient's and the
government's. During the eighties available resources have
decreased; the public have less money available to spend, the
dentists are claiming that times are harder and the government are
trying to cut down expenditures on the National Health Service,
including dental health services.

The government stated in their programme for providing primary
health care (DHSS 1987):

'... the government proposes therefore ... to
launch further initiatives to promote dental
awareness and regular attendance at the
dentist'.

Shortly after the publication of this White Paper, a fixed sum
of money was given to two different programmes in specific areas of
England.

In summary, it appears as if, on the one hand, all
interviewees, the government and the professional dental bodies
express a positive attitude towards regular attendance and would
like to see a larger proportion of the public becoming regular
dental attenders. On the other hand, there appear to be few
incentives and no laws or regulations at a national level to
promote regular attendance.

In this relation it has to be mentioned that the recent
guidelines from the Health Department and the Scottish Home and
Health Department regarding the future role of the Community Dental
Services, do include attempts to reach the non- or irregular
attenders. However, these were at the time of the interviews in the process of being implemented and have not yet been evaluated.

Does the UK have a 'Dental Visits' Policy?

The interviewees' opinions regarding a 'visit to the dentist' policy in the UK, stretched from those claiming it was non-existent to those agreeing or disagreeing with current policy. The ones who agreed with the current situation gave the following arguments:

'The government has a clear policy to encourage irregular attenders to become regular attenders as expressed in the White Paper. The government won't and should not make people do things'.

'People should have money in their pockets and choose what to do rather than paying it all in tax'.

'The system is not wrong - the problem is that only 40% choose to go regularly and that is not the fault of the government'.

'Prevention is a personal matter'.

The interviewees who disagreed with current policy or who thought a 'visit to a dentist' policy was non-existent suggested a number of ways in which dental visits could be promoted. The legislation and regulations regarding the payment system could be changed to govern dental visits. Increased funding could be made available for various dental health education initiatives. General education in schools, dental education and other health professionals, education could be improved. Access to dental care could be improved. All the dental bodies and associations could put more effort into promoting dental visits. One interviewee stressed the need for co-ordination of dental health education.

Although the capitation scheme had not yet been introduced at the time of the interviews, it was mentioned by many as a possible way of influencing dental attendance. One interviewee stated:
Interviewer (X):

'Do you think that current regulations/legislation promote dental attendance?'

Interviewee (Y):

'The regulations in the NHS say how often the NHS will pay for an examination - that's three times a year for children. A child can go for ten courses of treatment per year if the dentist thinks it's necessary, but the NHS will only pay the dentist for three examinations'.

Interviewer (X):

'Is there any way attendance could be promoted?'

(Y):

'The capitation system, to some extent, encourages attendance - if the child doesn't attend after a year the fees stop. So there is actually built into that system an encouragement for the dentist to bring the child back at least once a year.'

(X):

'So to my question on whether visits are promoted currently - your answer is that you would much rather see a capitation scheme and that would do this?'

(Y):

'Well, I am not saying I'd much rather have a capitation scheme because there may be downsides in capitation, there may be disadvantages. It may be that the child goes to the dentist and the dentist doesn't do anything when the child gets there. The capitation regulations clearly encourage attendance, but they may also encourage other things which are not desirable, like taking children's teeth out, or not doing anything for the child - neglect!'

The potential advantages of the capitation scheme regarding promotion of attendance but also the disadvantages like the risk of neglect stated by this interviewee have often since then been expressed in the dental press, particularly the problem of neglect. Many dentists are claiming that the negotiated fee for capitation
is so low that dentists are likely to neglect patients or refuse admittance of patients with high caries activity. However, neglect was not one of the findings in the capitation trial.

The interviewees' discussions of the capitation scheme also pointed to another problem related to attendance:

'The hypothesis is that dentists will develop more sophisticated recall systems than if they are paid fee per item. We don't actually know which children go to the dentist in this country. In some places they hardly know whether the child's been or not. The capitation system would start to improve that because you would actually have some information of those children who are actually registered with a general practitioner. So the chief dental officer or district dental officer would then know by a process of subtraction, those children who are not attending a dentist and therefore could target, at least in theory, the Community Dental Service more precisely to those children. At the moment he doesn't really know'.

This interviewee raises two different issues. One is the well-known problem of recall systems which potentially may be improved by the capitation scheme. The other is the problem of information regarding the rather large proportion (compared to Denmark) of the child population who do not attend a dentist or only when they have dental problems. It is true (as mentioned previously) that health authorities hitherto have had only rather limited information regarding the irregular or non-attendees. Concurrent with the introduction of the capitation scheme, the Department of Health and the Scottish Home and Health Department have in their latest guidelines for the Community Dental Services (1989) recommended a change in the provision of child dental care and child dental attendance. It is stated:

'It is desirable that wherever possible the general dental services should provide care for the whole family, developing a pattern of dental attendance in children that can continue
into adult life. It is therefore no longer appropriate that the community dental service should carry out routine dental screening of schoolchildren and offer as a matter of routine to provide treatment for all those who are found to have dental disease. Such arrangements can mean that some children who could otherwise become regular attenders in general practice use the community dental service with the risk that they may fail to continue to attend a dentist on leaving school.'

and further:

'A patient found to be in need of dental treatment should normally be referred to the general dental service'

and further:

'There will, however, be instances where the community dental service needs to provide treatment service because this goal is not yet feasible - for example, in some localities where there may be no ready available general dental practitioner for adults and children with special needs, or in some instances the child may not have attended for treatment despite a referral. In these cases the community dental service should continue to offer a treatment service'.

(Author's note: The wording in the guidelines from the Scottish Home and Health Department was slightly different from that of the Department of Health cited here. However the content was the same.)

Both the Department of Health and the Scottish Home and Health Department further state, in the same document, that it is essential that arrangements are agreed for monitoring the effectiveness of the referral system.

'For example, where a child is in need of treatment and the child does not already attend a dentist, the community dental service could collaborate with local practitioners to find out whether or not treatment is then sought. Alternatively, surveys of parents could be carried out to discover the take-up rates of treatment after screening'.
These rather lengthy extracts from the guidelines of the future role of the community dental service have deliberately been included. Despite the fact that the recommended changes were only in their infancy at the time of the interviews, many interviewees mentioned them and, together with the forthcoming capitation scheme, saw a potential for improvement of attendance rates. If these new schemes operate as intended and are effective, attendance rates could be increased as a result of financial incentives for the general dental practitioners to improve recall systems and better information available to health authorities to enable them to target irregular and non-attenders.

It was generally thought, however, that most ways of improving dental visits would cost money and that the likelihood of funding for this purpose being made available was limited.

The Role of the Industry

In relation to fluoride, sugar and oral hygiene policy the role of the industry was discussed. With respect to dental visits it appeared from the interviews that no industry had been involved in forming or influencing policy. It was thought that most toothpaste companies would support regular visits through advertising and marketing their product. This was confirmed in the interviews with representatives from the industry.

Pressure Groups

The only pressure group related to this issue, apart from dental professionals, was the National Consumer Council (NCC). Their main concern in this area was to ensure access to dental care and to reduce charges. The NCC had issued a press release expressing their views on the examination fee. The NCC thought that the fee might discourage more people from seeing a dentist
regularly. The examination fee was, as now known, introduced despite NCC's complaints.

Scientific Knowledge

It seems that the development of a dental visiting pattern in the UK has been steered by various practical, economic and political reasons. In an ideal world it could have been expected that scientific knowledge about the influence of dental visits on oral health would have influenced the policy. The discussions on the scientific basis for dental examinations in the UK were prompted by an article in The Lancet in 1977 by Professor Aubrey Sheiham. The article basically showed that there was no scientific evidence for six monthly examinations (see 2.1.4). At the time of the publication and for a few years thereafter, the general press and the media and particularly the dental press, focused on this issue and numerous opposing opinions were expressed. The issue appears to have more or less disappeared in the late eighties and, during the interviews, only a few people referred to it. On the other hand no-one claimed or gave any scientific reasons for their dental visits recommendations.

It could be relevant to mention that the questioning of the scientific evidence for six monthly examinations was one of the first published critical appraisals of any dental public health practice. Since then many reports and papers have focused on the value and effectiveness of many aspects of dental health care, for example, focusing on unnecessary dental treatment. It does not seem, however, in the UK there has been any particular interest in how frequent dental visits should be. The phrase most often used (in departmental reports, White Papers, and dental health education literature) is 'regular attendance' which theoretically could mean
anything from every six months to every 5 or 10 years.

Conclusion

In conclusion then, the factors which have influenced policies regarding dental visits in the UK are:

- available resources
- national and private economy
- organisations and regulations regarding the dental health services, particularly the payment system
- recall systems
- pre- and postgraduate education of dentists as well as other health and educational professionals
- dental health education.

These factors will be discussed in comparison with the results from Denmark.

4.4.3 Dental Visits Policy in UK and Denmark: A Comparative Analysis

There were no conceptual problems related to dental visits' policy. All interviewees readily understood the concept without any further questioning. The discussions were therefore not concentrating on whether there was or should be a policy in this area (as the discussion on sugar and oral hygiene) but rather on what frequency should be recommended and which type of dentist the patients should visit.

A. Dental Visits Message

As can be seen from Table 4.6 the recommendations regarding dental visits differed between the British and the Danish interviewees and also between the British interviewees themselves. The Danes had an amazing agreement on this issue, nearly unanimously stating that visits should be according to individual needs. A minority added to this that although the need-criterion
was the most important, then some regularity should be established in childhood. Only one Dane stated a clearly defined interval, namely adults every other year and children once a year.

This unanimity among the Danes was in strong contrast to the answers from the British interviewees. About a third of the British respondents agreed with the Danes, recommending frequency according to need, whereas the remainder ranged in their recommendations from a stated disagreement with the need-criteria, to simply encouraging regularity, to stating various fixed intervals such as adults every six months, children every four months (see Table 4.6). A few people were unsure and thought it a difficult question.

Whereas interviewees in both countries claimed that their 'messages' regarding sugar, fluoride and oral hygiene were scientifically based, this was not exactly the case for dental visits messages. Most Danes admitted that there was no scientific base for any particular frequency of dental visits. The British interviewees disagreed on this issue. Many referred to 'the green book', 'The Scientific Basis of Dental Health Education' which states:

'Regular dental attendance:

Studies on the control of periodontal disease have emphasised the importance of regular professional cleaning in addition to daily plaque removal. It is the dentist's responsibility to ensure that this is carried out effectively at intervals depending on the needs of individual patients, to monitor the health of the mouth and to provide dental health advice. Once decay is established and a definite cavity is present, it cannot be remineralized, but the tooth can be restored. Whilst many people may need fillings only infrequently, the importance of early detection and treatment makes regular attendance advisable.'
It should be noted that three editions of 'The Scientific Basis of Dental Health Education' have been published. The first did not contain any messages on dental attendance and when it was added to the second and third editions, this was after much debate. Some dental professionals claim that there really is no scientific basis for regular attendance and therefore it should not be included in 'the Green Book'.

However, no-one really disputed dental attendance as such. The disagreement surrounds the question of how often visits should be recommended.

It is interesting and relevant briefly to discuss the philosophy behind the concept of regular dental attendance. From a public health point of view, the arguments for regular attendance and 'check-ups' are 'to detect disease early and prevent disease from developing or progressing any further, that means in reality that regular check-ups only are effective if this is what dentists are actually doing, which depends both on dentists' capability and their willingness or attitudes towards prevention. One interviewee (an administrative dental officer) stated:

'We have so much real work to do, relief of pain, tooth extractions etc. that we have no time for check-ups'.

Dental attendance and what happens at dental visits and the effectiveness of these are thus closely related to a number of interacting factors; the dental health status of the patients, their norms, attitudes and behaviour, as well as the number of dentists and other dental personnel and their norms and attitudes. When regular attendance has become such a well entrenched norm, particularly in Denmark but also in the UK, it is surprising that so relatively few questions have been raised regarding the
effectiveness of what is to all parties a costly scheme. Indeed, no major public health study of the cost-effectiveness of regular dental attendance is known to the author. Moreover, 'check-ups' are far from the norm in any other area of health care. People do not go for check-ups to their general practitioner and when 'check-up' schemes like, for example, breast cancer screening are suggested, they are only introduced as 'trials' and always under great scrutiny as to their cost-effectiveness.

Perhaps, now in the nineties, where the political and mass media focus is heavily on health care, cost-effectiveness demands will arise for hard evidence concerning regular dental attendance.

The forces shaping existing dental visits policy in the two countries are discussed below.

B. Dental Visits Policy

For systematic reasons, the classification scheme (Leichter 1979) used for oral hygiene-, sugar- and fluoride policies has been chosen for analysing dental visits policy as well.

The main similarities and differences which emerged from the analysis were, in summary:

1. Dental visits recommendations had in Denmark changed from regular, six monthly or annually to the nearly unanimous concept of 'need-based' dental attendance based on the assumption that regular attendance had already been established as a norm amongst the majority of the population

2. Dental visits recommendations in the UK varied considerably from strict intervals of differing length to need-based attendance (Table 4.4)
3. Regular dental attendance for children had in Denmark developed according to a well-defined policy expressed in the Act of Child Dental Health Care 1971.

4. Although regular attendance is recommended in various documents as previously described, no laws or regulations exist in the UK to ensure regular attendance.

5. Research in this area has had little attention in Denmark, but for some aspects increased during the eighties in the UK. The focus has been on patient barriers to dental health care, rather than cost-effectiveness of regular dental care.

6. A much larger proportion of the Danish than the British population are regular attenders.

The Impact of Situational Factors on Dental Visits Policy

Most of the situational factors suggested by Leichter seem to have relatively limited explanatory value on the question of dental visits policy. No violent events, natural disasters or major political events appear to have had any influence on dental visits policy or practice. Not even economic cycles or, for instance, the current recession appear to have had any visible impact on dental attendance rates. Among the explanatory situational factors suggested by Leichter is also technological change which at least in theory could have had some impact. Dental technology and methodology used in dental practice have developed and improved tremendously over the last forty to fifty years. It could be expected that dental visits in the eighties would be a much less
painful experience due to the much improved technology and that the population for this reason would be less reluctant to visit a dentist. However, different dental attendance patterns have developed in the UK and Denmark, despite the fact that dental technological developments have been much the same. The latest national adult dental survey (Todd and Lader 1991) showed that over half the dentate adults who only attended the dentist when they had a problem stated fear as the most important barrier. Even among regular attenders, 39% definitely agreed with and picked out as most important a statement reflecting fear. No other situational factors appear to have any potential explanatory power.

The Impact of Structural Factors

Of Leichter’s three main groups of structural factors, the political structure does not appear to be of much explanatory value, in major terms being rather similar in the countries concerned. However, with this relatively similar structure, a marked difference in the organisation of child dental health care has emerged.

In Denmark the Act of Child Dental Health Care 1971 secured that all children were seen by a dentist regularly, at least annually. Many interviewees claimed that a law like that could never have been introduced in the economic recession of the late eighties. It was only possible at that time (1971) because the political 'will' was there. The political and public focus was already on eliminating social and health inequalities and regular dental attendance was perceived as being a means for achieving that. The resources were thought to be available during the economic upswing at that time.

In the UK no laws or regulations have secured regular dental
attendance and although similar dental health services (that is a free dental service for children and a partly reimbursed dental service for adults) have been available, a smaller proportion of the British population have become regular attenders (see 2.1.4).

As mentioned earlier (2.1.4) one of the original objectives of the NHS was to establish a service which would allow the whole population to attend dentists regularly for inspection. It was already apparent in 1944 that at least two barriers stood in the way of achieving this objective. First, there were insufficient dentists and second, the level of dental awareness of the population was low. The strategy to overcome these two problems and accomplish the objective appeared simple: to ensure a planned increase in the demand for and supply of dental services as resources became available, so that eventually both would approximate to the need. Two mechanisms were suggested to implement this strategy. The first was to stimulate demand by transferring the cost of treatment from the individual to the community, and the second was to increase supply by transferring the cost of dental education from the student to public funds, while increasing the capacity of the dental schools (Holloway and Lennon 1980, Lennon 1976).

Forty years have passed since then and policy has changed. Supply is thought to be more than adequate and dental schools are being closed. Child dental care and care for special groups is still free of charge. However, the objective of regular attendance for the whole population has not been met. In broad terms only about 50% of the population are regular attenders.

In terms of achieving the objective of regular attendance, the Danish strategy of enforcing by law has been more successful. It
should be noted here that it also has been more expensive and in this respect Leichter's economic structure seems to be the main explanatory force. In Denmark the GDP is 50% higher than in the UK and the average health services spending as a percentage of GDP is higher (Table 4.2).

The social and demographic structure also appears to explain some of the differences. The UK population is 10 times as big as the Danish population and constitutes a much more heterogeneous group with more heterogeneous norms. The dentist population ratio is 3 to 4 times higher in Denmark than in the UK and the problem of geographical spread of dentists (few in rural areas) is less prominent in Denmark (see 2.1.7 and 2.1.8).

The Impact of Cultural Factors

Cultural factors can, as previously mentioned and defined, be divided into political and general culture.

It seems as if the political cultural difference partly can explain the found differences in dental attendance policy.

Several UK interviewees made statements such as:

"The government has a clear policy to encourage irregular attenders to become regular attenders as expressed in the White Paper. The government won't and should not make people do things' and

'People should have money in their pockets and choose what to do rather than paying it all in tax'

and

'The system is not wrong - the problem is that only 40% choose to go regularly and that is not the fault of the government'.

None of the Danish interviewees expressed any such attitudes and in reality the government have made Danish children regular
attenders. The approach has been to create an environment which is facilitating rather than the British making it 'your choice'. Keeping the oral hygiene policy and its political cultural impact in mind, it appears that also dental visit policy is an area where the Danish government have and are expected to have a more regulatory and interfering role than the British government.

Just as especially 'shaped' teeth or extractions of incisors have been part of various African cultures, it appears that rather high dental awareness and dental appearance have become part of and norm in the Danish culture. It further seems to be related to regular dental attendance. Either dental awareness is not as high in the UK or it is not to the same extent related to dental attendance.

The Impact of Environmental Factors

On the basis of the present study it was not possible to detect any influence of environmental factors on dental visits policy in either country.
CHAPTER 5  FINAL DISCUSSION AND CONCLUSION

5.1 THEORETICAL CONSIDERATIONS

The above analyses of policies in the areas of sugar, fluoride, oral hygiene and dental visits in the UK and Denmark focused to a large extent on aspects of policies concerned with what the policies were and who the policy-makers were. This final discussion concentrates on how policies came about. In other words, rather than concentrating on structures, people and content, the focus is on the process of policy-making.

The results showed there to be little agreement regarding the concepts of 'policy' and 'policy-makers' between the countries as well as between the four areas. The process of policy-making can be explained according to various distinct schools, each reflecting a particular philosophy. The three main approaches - rationalism, incrementalism and mixed scanning - were described in 2.2.3.

In a thorough review of the dynamics of British health policy, Harrison, Hunter and Pollitt (1990) describe most of the work and literature on health policy as conveying a broadly similar picture which they term the 'shared version'. This in summary contains nine major features:

1. Health care politics are characterised as, in a broad sense, incrementalist. This means that changes in health service outputs (for example from an emphasis on acute hospital medicine to community-based forms of care) tend to be slow, and/or of narrow scope, rather than systematic or radical.

2. The policy process is usually one of 'partisan mutual adjustment' (PMA), in which no one actor or institution can impose change, though several may be able to veto it.

3. Within this PMA process, the medical profession continues to wield enormous influence at least in the 'defensive' sense of being able to frustrate those who wish to alter its training, conditions of service or patterns of practice.
4. The position of the lay health authority member is often weak relative to both clinicians and senior managers.

5. The position of 'consumer' organisations is usually even weaker. Decisions concerning resource allocations, service priorities and the evaluation of effectiveness and efficiency remain fairly inaccessible to consumer groups.

6. The 'centre' (i.e. the 'health departments') possesses little direct operational control over the implementation of most national policies. It does, however, exercise considerable influence principally through (a) its control over the global sum of resources going into the NHS; (b) the allocation of this total between health authorities; (c) specific approval of large capital schemes and (d) the increasing practice (in England and Wales but less so in Scotland) of 'earmarking' revenue funds for particular purposes.

7. The role of health authority managers within this system of partisan mutual adjustment has usually been reactive. The emphasis has been on 'fire-fighting', diplomacy, conflict-avoidance and consensus-seeking, including maintenance of some notion of 'fair shares' in allocative disputes.

8. The policy inertia resulting from the distribution of power between the health departments, health authorities and the medical profession is further exacerbated by the extreme occupational complexity of the health service as a whole.

9. The whole complex and slow-moving edifice has been underpinned by an extremely durable political consensus. This consensus has existed both internally and externally. It has existed internally in the sense that no subsequent government has directly challenged the basic deal struck between the then Labour government and the medical profession during the 'founding' period of 1946-8. Nor have either government or NHS managers tried to mount any major, frontal criticism of the 'medical model' of ill-health.

In discussing this 'shared version', these authors stress one significant qualification to its usefulness: that is that it seems to fit some issues much better than others. It is argued that the poor applicability of the incremental politics model to certain
issues is connected with larger features of the power relations in health care, features which are best explained by the macro-level theories directly addressing the roots of power and influence.

A second limitation of the incrementalist model, closely connected with the first and of great relevance to the policy issues presented here, is that it does not explain why some issues arrive on decision agendas and others never reach them. To answer this question it is necessary to go to a deeper level of analysis, to examine the distribution of power and influence. In doing so two faces of power are of relevance. The first face concerns the power to win the arguments concerning issues on the agenda and to get things done. The second face concerns the more subtle business of preventing some issues from reaching the formal agenda in the first place.

The ideas of the first and second faces of power come from the political theory literature, which traditionally is hardly ever drawn upon or referred to in the dental literature.

It was not the purpose of this study to link political theories to the four specific policy issues. The objectives were to describe what the policies were and who the policy-makers were. In addition, the impact of various influential factors was examined using Leichter’s comparative analysis framework. The fulfilment of these objectives has increased the knowledge about dental policies and dental policy-making, but also raised important questions closely related to the distribution of power and influence, such as:

1. why did fluoride policy enter the political agenda in both countries but with opposite outcomes?
2. why has sugar policy been prevented from reaching the agenda in the first place, in both countries?

The trends identified in the previous analysis can in my opinion best be accounted for in terms of two of the political theories considered in section 2.2.4, namely:

- neo-pluralism; and
- neo-elitism.

Neo-pluralism

According to classic pluralists, power stems from possession of a variety of resources such as money, authority and expertise, and it is fairly widely distributed in society. Decision-making and influence on policies is exerted through a bargaining process between the involved parties. Unlike classic pluralists, neo-pluralists do not see this process as necessarily being equally open to all interests who trouble to organise themselves. On the contrary, neo-pluralists see the policy-bargaining process as often rather lopsided where, in particular big business are in a privileged position with more power than other interested parties. The state is seen as having an interest of its own and supported by a powerful bureaucratic apparatus. Yet there are still many issues where democratic processes can predominate and where new groups and interests may enter the arena and command some influence.

According to neo-pluralists, sugar and fluoride policies can thus be explained as results of such bargaining processes. Sugar has not really reached the policy agenda in either country because of the powerful sugar industry whose interests are best protected by avoiding any restrictions on sugar consumption. The reason for the different strategy in terms of targeting of efforts on the part
of the sugar industry can also be explained.

In Denmark the main opponents are not the dental profession, as they show little interest in reducing sugar consumption, but the proportion of the public who have the 'misconception' of feeling guilty about eating sugar. In the UK the main opponents are the dental and other health professionals. The sugar industry in the UK has established the sugar bureau whose sole activity is to 'inform', write and influence opinion-makers in various ways as described in 4.2. In this power game, the dental and other health professionals' resources have been their expertise and authority which have had little influence compared with the industry's main resource: money. The issue of sugar policy is another example of how difficult it is for government to regulate corporate power even when in some sense they want to. The Department of Health have published several reports (COMA 1989, COMA 1991) recommending a reduction of sugar intake, but without planned strategies for implementation and evaluation. The chosen way to achieve sugar intake reduction is through education (not compulsory) and not through any regulations which could directly restrict demand and supply.

The issue of fluoride policy can, according to neo-pluralists, be seen as an example where bargaining processes have predominated and where new groups and interests, namely the anti-fluoridationists and lately to a lesser extent the privatised water authorities, have had some influence. In this case there is no big business which could have dominated the process in either country. It does not, however, explain why it is still being promoted in the UK as described in 4.3 but has disappeared from the agenda in Denmark.
Neo-elitism

According to this theory, power is not equally distributed but concentrated in the hands of the so-called elite (see 2.2.4). The medical and dental profession is seen as a state-licensed elite who routinely are consulted on numerous issues. No organisation representing patients enjoys anything like this degree of influence.

Being an elite the dental professions theoretically have great influence on policy issues. It could be argued that because the main interest of the profession lies in the protection of its members rather than the promotion of healthy dental public policies, no sugar policy has developed in either country. The same argumentation could also explain the, in the UK, only slowly progressing water fluoridation and, in Denmark, the rejection of water fluoridation.

Following this line of thought the way to promote policies benefiting dental public health would be to make such policies attractive to the dentists themselves also. An example of an attempt to do this is the newly introduced capitation scheme. If it works as intended, it is now in the dentists' own interest that children do not develop dental disease in the first place. Dentists working under the capitation scheme might, for this reason, be more interested and use more power to influence decision-making to introduce water fluoridation.

It is often tempting to believe that public affairs are driven by some form of insider-dealing. The problem is to get access to insight in such dealings. However with the increasing focus on health issues and health services, it is possible that 'secret' bargaining processes and hidden motivations may be easier to
disclose in the future.

As outlined in 2.2 the literature on policy, policy-making and indeed the policy process is showing controversy and little agreement. The above description of theoretical considerations regarding the policy process was not an attempt to narrow any of these concepts - that would be an impossible task - but rather to illustrate one of the ways or alternative theoretical tools available for policy analysis.

The objectives of this study were to examine sugar, fluoride, oral hygiene and dental visits policies in Denmark and the United Kingdom. The four issues were chosen for being the generally accepted main influencing factors on oral health. Originally the intention was to study these policies in Denmark and Scotland. These countries were chosen firstly for their similarities in terms of size of population, technological and social development and relatively similar dental service organisation. Secondly, they were chosen to increase the depth of analysis due to the author's pre-existing knowledge and expertise regarding dental issues in these two countries. However, due to practical problems (see Methods) the UK became the main focus of the analysis although Scotland was singled out when appropriate.

The results describe for each of the four policy areas what the policies were, who the policy-makers were, emphasising similarities and differences between the two countries and analyses by using Leichter's comparative framework the impact of a number of potential influencing factors.

The major differences related to the four topics, sugar, fluoride, oral hygiene and visits to a dentist, can briefly be outlined as follows:
In Britain there seemed to be a much larger emphasis on sugar and dental caries and despite the current disagreement within the dental profession itself, and between the profession and the sugar industry, concern was related to getting a sugar message across to the public. This was in strong contrast to the situation in Denmark where sugar was given little attention and its relevance to dental caries seemed to be constantly diminishing. No-one seemed to be concerned with advising or reaching the public in order to reduce sugar intake. Only the Danish sugar industry appeared to be active in reaching the public. During the time of the interviews the sugar industry was in the middle of a campaign which had the purpose of making people eat (or drink) real 'natural' sugar without feeling guilty about it. No dental organisation or dental professional expressed any dissatisfaction about this campaign. In fact several claimed it was "rather sober advertising".

When sugar was considered of little importance to dental health in Denmark, this was related to the great importance attached to oral hygiene. Almost all interviewees found oral hygiene in itself of utmost importance but also stressed the importance of explaining to each individual why oral hygiene was so important for oral health. Many interviewees as well as recent literature could be cited for saying: "a clean tooth does not decay".

This again was in strong contrast to the UK, where sugar according to most interviewees played a key role in caries prevention and where oral hygiene traditionally and "of course" always had been part of dental health education but no-one currently appeared to feel particularly strongly about it. Probably the most common attitudes lay along the lines of:
'We have no proven effect of toothbrushing in itself but as most people will use a toothpaste containing fluoride they benefit from the use of fluoride'.

This viewpoint was clearly reflected in the sugar policy document from the Committee on Medical Aspects of Food Policy (Department of Health 1989).

'Apart from reducing consumption of sugars the three other practical methods for caries prevention are plaque control, fluoride, and fissure sealants. Fluoride has been shown to be the most effective agent for caries prevention and is at its most efficient when incorporated in water supplies and toothpaste. Its use is considered the most important reason for the decline in the prevalence of dental caries in Northern Europe, North America and Australia. Plaque control (without the use of fluoride) is the least effective method. Fissure sealants are effective but demand skilled application, costly in manpower' (pp. 19-20).

However, there was no regulations or control of sugar consumption in any way in any of the countries.

The key policy issue related to fluoride had in both countries been the question of water fluoridation. In Denmark a ministerial decision established that water fluoridation was illegal whereas a parliamentary decision in 1983 in the UK confirmed the legality of water fluoridation. Despite this, there exists no water fluoridation in Scotland today and only about 10% of the UK population drinks fluoridated water.

With regard to other ways of using fluoride, the Danes appeared to be more limited in their recommendations, recommending professionally applied fluoride and only for patients in high risk groups. Although there was some disagreement between the British interviewees, the recommendations were towards greater use of fluoride. Thus both fluoride tablets and drops and fluoride rinses were recommended by some interviewees to all children and all
adults, and by others only to various restricted high risk groups.

There was no disagreement as to the importance of dental visits. Both British and Danish interviewees recommended dental visits as good and important for the whole population in order to maintain good oral health. However, the attitudes towards the frequency of dental visits differed. The Danish interviewees nearly unanimously recommended frequent dental visits 'according to need', whereas the British interviewees disagreed amongst themselves, some clearly stating 'recommendable intervals' such as every six months, others recommending different intervals or 'according to need' like the Danish interviewees.

A brief summary of the main differences within each of the four concerned areas is provided in 4.1.3, 4.2.3, 4.3.3 and 4.4.3.

In order to try to explain why these differences exist, the explanatory value of various situational, structural, cultural and environmental factors were examined according to Leichter's comparative framework. Although this framework was not developed specifically for oral health policies, it appeared to be rather powerful. In particular the situational and structural factors were of high explanatory value.

The Impact of Situational Factors

Situational factors were divided by Leichter into the following groups:

(a) violent events
(b) economic cycles
(c) natural disasters
(d) political events and conditions
(e) technological change
(f) the policy agenda.
There was one violent event which had influenced sugar policy in a major way in both countries: namely, the Second World War. During and after the war, sugar was rationed in both countries. The generally agreed and positive effect on dental public health of this policy has previously been described (2.7.2). It should be stressed, however, that this rather effective policy was not introduced as a result of pressure from dental professionals, or indeed for any health reasons, but as a coercive necessity since sugar was not available. The policy was terminated, rationing abolished, as soon as sugar became available again. No effect of the war could be detected on policies related to fluoride, oral hygiene or dental visits - for obvious reasons, as fluoride was not yet 'discovered' and no other policies were introduced as a result of the war or any other violent event.

The second group of situational factors, economic cycles, appeared to have an impact in all four policy areas. The current recession has brought with it the demand and consciousness of 'value for money', cost-effectiveness, cost-efficiency, etc. in the health sector. It could be expected that water fluoridation, known to be the most cost-effective means for caries reduction in areas with high caries prevalence, could be more easily implemented under such economic circumstances. In Britain it is likely that the strong support in recent years from the government is driven by such economic forces. In Denmark the decision not to fluoridate was taken before the recession began (1977) and in fact during an economic upswing. At that time the relatively expensive dental health service was being developed and expanded. In the 1980s and 90s a decision to fluoridate would be in sharp contrast to dental professional attitudes and recommendations. Perhaps Danish
professionals' attitudes towards the use of fluoride altogether could cynically, as suggested by one interviewee, also be at least partly explained by the impact of the recession on the profession itself. The adopted policy, of total professional control of the use of fluoride, maximises the need for the public's regular contact with dental professionals and thus secures work.

A similar cynical way of thinking could apply to the British dental profession, albeit with a different policy outcome. With effect from September 1990 a new contract for general dental practitioners was introduced which changed the fee-for-item payment system to a capitation system for the dental care of children. In theory the practitioners should now, for economic and selfish reasons, be more interested in preventive means such as fluoridation which will give the dentists less work for the same payment. If dentists are operating with such motives, much stronger support for fluoridation could be expected to come from the profession in the future.

The development of the dental visits and oral hygiene policies for children in Denmark could be largely attributed to the implementation of the Child Dental Health Care Act of 1977. Most interviewees stated that an Act like that could only have been introduced at that time, because of the economic upswing and would never have been enacted if it had been suggested during the recession in the late eighties.

The next group of situational factors which was suggested to have had an impact on the concerned policy areas was technological change. The discovery and use of fluoride could be seen as a 'new invention'. The caries preventive effect of fluoride has been considered one of the most important discoveries in the history of
dental health. One of the globally agreed main explanatory factors for the observed dramatic decline in dental caries in the Western world has been the use of fluoride. However, the discovery merely introduced the use of fluoride, it did not determine the way in which fluoride policy developed.

With regard to other aspects of technology change, dental technology and methodology used in dental practice in general have developed and improved tremendously over the last forty to fifty years. In particular, methods to make dental treatment less painful have been developed. It could be expected that the population for this reason would be less reluctant to visit a dentist. However, different dental attendance patterns have developed in the UK and Denmark, despite the fact that dental technological developments have been much the same. The latest adult dental survey in the UK (Todd and Lader 1991) showed that over half the dentate adult population who only attended a dentist when they had a problem, stated fear as the most important barrier. Even among regular attenders, 39% definitely agreed with and picked out as most important a statement reflecting fear.

The last group of situational factors, the policy agenda, could also be argued to have had an impact on the development of oral-health promoting policies. It is possible that the attention given to these policies has been diminished because of competition with other policy issues. In recent years most of the attention in the health education/health promotion field has been focused on the problems of people who have AIDS or are HIV positive. Obviously dental health and dental policies appear to be of minor importance when 'competing' with the life-threatening problem of AIDS. Funding for all health education has been adversely affected by the
programmes aimed at reducing the prevalence of HIV in the population. Currently, the only way to control AIDS on a population basis is through health promotion. Whilst this has raised the status of Health Promotion per se, the funds for much of the AIDS programme have been taken from other health education budgets. It could also be argued that dental policy issues are given less attention on the policy agenda because of the main focus being given to AIDS.

The Impact of Structural Factors

Structural factors also appeared to have had a major impact. The explanatory value of these factors is discussed in relation to political, economic, and social, demographic and ecological structures.

All of these had an impact on policies in the four areas concerned as explained in the following.

1. Political structure

A detailed analysis of the political structure in the UK and Denmark will doubtless show many differences. However, in major terms both nations have a rather similar political structure (described 4.1.3) where health policies are forged within the confines of a parliamentary democracy: an informed and articulate public opinion; aggressive interest group activity; political bargaining; and ultimately, legislative debate and enactment. Exactly such a political structure could however allow for different as well as similar policies to develop and perhaps, in outcome terms, the economic structure would be more determining.

The political structure of a democratic parliamentary government in the UK had the impact of, in the first place, holding up water fluoridation until the enactment of the Water
(Fluoridation) Act in 1985. The political structure has also allowed the existence and impact of pressure groups, in this case anti-fluoridationists.

The Mrs McColl court case (previously described 4.3.2) was an illustrative example of the powerful impact of public opinion, and aggressive interest group activity. Granted legal aid she (and her supporters) caused the court to sit for 201 days, making it the longest and costliest case in Scottish legal history. Moreover she, in effect, upheld water fluoridation in Scotland for at least five years until the verdict in 1983. It is not possible on the basis of this study to explain why water fluoridation still has not been implemented anywhere in Scotland. It is tempting, however, to suggest that anti-fluoridationists are still active in a less visible way but perhaps at a higher political level than Mrs McColl.

Water fluoridation is obviously a political issue which has been influenced by political structural factors. It could be argued that fluoridation policies have been influenced by policy constraints, albeit with opposite effects in the two countries. The present British government's prior policy commitments to water fluoridation (the Act of 1985) might have maintained the government's support even through difficulties, such as the private water authorities' demand for total indemnity. The Danish government on the other hand might have been constrained by the early commitment not to fluoridate.

The relatively similar political structure and the mixed economy in both countries have allowed the sugar industry to play a major role which it might not have had in other types of structure. The sugar industry has acted as a pressure group in the policy
process, obviously hindering government or, more specifically, the Department of Health, in formulating and implementing policies which would decrease sugar consumption. In this bargaining process, neither the government nor the profession have had much possibility of making rational decisions against the sugar industry interest. The dental professional attitude towards sugar seems to have had little or no impact, although they must have had some potential since the industry still uses resources to influence them. Although the Department of Health in various policy documents has recommended a reduction in sugar consumption, no clear strategy for implementation or evaluation of these policies has been developed.

It is unlikely, although possible, that similar power struggles or bargaining processes have taken place regarding sugar policies in Denmark. With the one exception related to occupational disease, there has been no desire to formulate or implement sugar policies in the last decade. It is likely that the sugar industry in Denmark exerted its power earlier when the dental profession still saw sugar as a dental health threat. The political and economic structure allowing the industry to be a legitimate pressure group seemed to be more important in formulating policies than whether the profession was for or against sugar.

2. The economic structure

The economic structure has influenced oral health policies in several ways. The national distribution of wealth and income has meant that a larger proportion of the GNP has been spent in the health sector in Denmark than in the UK. The personal taxation is much higher and in general the Danish welfare system seems to have
gone a step further than the British in terms of 'free' (paid through personal taxation) services. In Denmark the GDP is 50% higher than in the UK and average education spending as a percentage of GDP is twice as high. Defence spending on the other hand as a percentage of government spending is half as much in Denmark as in the UK.

In this overall spending pattern, it is to be expected that the Danish health services could better afford oral health preventive and promoting policies.

In Denmark the Act of Dental Health Care secured that all children are seen by a dentist and, if necessary, receive dietary and oral hygiene advice regularly and at least annually. Many interviewees claimed that a costly law like that could never have been introduced in the economic recession of the late eighties. In the UK no laws or regulations have secured regular dental attendance or oral hygiene or dietary advice, partly for reasons already explained and probably also because of the economic burden of such measures. Although regular dental attendance is recommended in the UK, a smaller proportion of the British population have become regular attenders (2.1.4).

The economic structure has also influenced fluoride policy. Again the Danish dental health care system can 'afford' the relatively expensive solution of individual dentist-recommended use, whereas the British system has chosen the cost-effective solution of water fluoridation (though also for the reasons mentioned earlier).

Dental manpower has also been influenced by spending patterns in the two countries. The dentist population ratio is 3 to 4 times higher in Denmark than in the UK. Despite this difference, dental
education has been cut drastically in both countries. Supply is thought to be more than adequate and in the UK dental schools are currently being closed.

Sugar policy has, as already explained under political structural factors, been influenced by economic factors. It should be noted here that economic power appears to be much more influential in determining sugar policy than authoritative power or expert power as possessed by the dental profession. Altogether economic factors have strongly influenced policies in all four concerned areas.

3. The social and demographic structures

The social and demographic structures have also had some impact. First of all it has to be remembered that the UK is ten times as big as Denmark both in terms of population and in geographical area. It was originally planned to compare Scotland and Denmark which would have been a more even comparison in these terms. For reasons previously discussed (Chapter 3, Materials and Methods), this was not always possible.

As Denmark is smaller and has a much more homogeneous population than the UK, it seems reasonable to assume that communication is easier and also that consensus might more easily be reached. It was thus not surprising to find that communication amongst Danish dental professionals appeared to be better than amongst British professionals and, further, that agreement on the concerned four topics existed to a large extent amongst the Danish interviewees, whereas disagreement and much more diversified opinions existed amongst the British interviewees. Moreover as there are only two dental schools in Denmark, whereas there are 15 in the UK, one would expect a wider range of views in the UK.
Another major difference between the UK and Denmark is, as previously mentioned, the dentist population ratio. In Denmark there is a dentist/patient ratio of 1 per 900 whereas in Scotland the ratio is 1 per 3,300, in England slightly more; but in any case there are at least three times as many dentists per population in Denmark as in the UK. It is possible that the Danes’ focus on individual instruction and dental visits is influenced by the higher number of dentists per population.

Finally, the degree of urbanisation and the organisation of water supplies allow water fluoridation to be economically feasible in the UK, whereas in Denmark only 50% would be covered.

The Impact of Cultural Factors

It appeared that both political and general cultural factors had influenced the policy areas concerned.

The political culture could at least to a certain extent explain the differences found in dental visits and oral hygiene policies. In both of these areas the Danish government have a more acceptable role and were expected to interfere and regulate as they did. This was in contrast to the British government which was not expected to interfere or make people either brush their teeth or visit the dentist. It further appeared that a rather high dental awareness and dental appearance had become part of the norm in the Danish culture.

The political culture could also have influenced sugar policies. In both countries there are precedents for the governments to regulate the food and drink consumption by using taxation, subsidies, etc. In relation to sugar policy, the political culture thus could have allowed regulations in this area. However, when these are non-existent, it is not because it falls
outwith existing political cultural norms but more likely as a result of the power relations between the involved parties.

It is interesting to contrast the political and general cultural influence on water fluoridation and oral hygiene policies in the two countries. In Denmark the government is expected to regulate in areas like oral hygiene whereas water fluoridation was rejected at least partly because it interfered with 'individual freedom'. According to the interviewees there is no such expectation on the government in Britain. Government do not regulate on personal matters such as oral hygiene but are expected to and do regulate on water fluoridation.

Finally, religious factors seem to influence dental attendance if not directly then indirectly. The ethnic minorities in Britain (hardly existing in Denmark) are known to have poorer dental attendance than the rest of the population. However, very little is known of why dental behaviour differs and this is an area that might show some policy impact but which was not examined in the study.

The Impact of Environmental Factors

Environmental factors as defined by Leichter seem to have only limited influence on the policies concerned. It may be a question of terminology and categorisation, as it could be argued that some of the factors discussed under the headings of social or political structure could equally well have been discussed as social environmental or political environmental factors. As these have already been discussed, they will not be repeated here.

Sugar policy could theoretically be an environmental issue, as sugar beet and sugar cane are grown where other crops might have been planted. However, such a viewpoint does not seem to have
reached the agenda in any of the countries.

Water fluoridation, in contrast, has definitely been considered an environmental issue. The pro-fluoridation argument is that fluoride occurs naturally and fluoridation is merely a question of adjusting the level of fluoride and thus not an environmental issue. The anti-fluoridationists argue that it is an environmental issue and use it as an argument for stopping fluoridation. However, no 'green party' has yet declared itself against fluoridation.

Conclusion

As expressed previously, variations in the content of policies among nations can rarely be explained by a single factor: policies result from the interaction of several factors. Leichter's framework for comparative policy analysis, although not specifically developed for oral health policies, has at least given some order to the indefinite number of variables interacting with each other.

The results showed that situational, structural, cultural and environmental factors all in various combinations had contributed to the development of all four policy issues in both countries.

The main points which emerged from the study regarding the four issues were:

1. Oral hygiene was seen as important to oral health in both countries. However, in Denmark this was reflected in a well defined government policy and a strategy for implementation was laid out. In the UK less importance was attached to oral hygiene and government regulations were not considered appropriate in
2. A sugar policy was non-existent in both countries. This was accepted and in agreement with Danish dental professionals, but was an issue of controversy and disagreement in the UK.

3. Policies in respect of fluoride were expected and existed in both countries. In Denmark it was agreed not to fluoridate the water, whereas in the UK the policy defined and supported by the government and the dental professionals was to fluoridate the water. However, the final decision was given to local authorities, resulting in an extremely slow implementation.

4. Policies in the area of dental visits had in both countries been aimed at regular attendance for the whole population. In Denmark this had successfully been implemented and achieved for the child population, whereas in the UK only about half of the population have become regular attenders.

When considering the prospect for the future, the following recommendations can be made:

1. There is a need for a coherent, comprehensive and explicit oral health promotion policy at national level in both countries. In particular a strategy for implementation and evaluation of the effectiveness of such policies should be clearly and explicitly formulated.
2. Dental professionals have the potential of powerful influence of oral health policies. To ensure that oral health policies become health promoting policies, it is essential that dental professionals:

(a) are aware of this power

(b) are interested in and want to promote oral health

(c) have the necessary knowledge and skills not only 'dental' but also regarding factors influencing the policy making process.

For this reason it is of vital importance that oral health promotion and oral health policies are included in under- as well as postgraduate curricula.
APPENDIX I

Children's Oral Health Care Act


para. 1.1

Municipalities are required to establish dental clinics and employ dentists as well as auxiliary personnel to the extent necessary to ensure free (gratis) preventive and curative oral health care to all children under compulsory education.

para. 1.2

The municipal oral health care shall be administered according to the rules specified in the Administration of Social and Certain Health Affairs Act.

para. 2.1

The County Council is authorised when exceptional circumstances so dictate, to approve that a municipality fulfil its obligation to establish the comprehensive oral health care according to para 1.1. through arrangements with private dental practitioners and utilisation of their clinics.

para. 2.2

The approval by the County Council according to para. 2.1. presupposes that both the preventive and curative oral health care will be executed as satisfactorily and adequately as in municipalities having municipal oral health care according to para.1. A municipality concerned shall submit to the County Council a plan for the municipal control according to the directives laid down by the Minister of the Interior after negotiation
with the National Association of Municipalities, the Copenhagen and Frederiksberg Municipal Councils, and the National Association of County Councils in Denmark. The County Council shall annually before 1 October submit a report on the control of the children's oral health care in municipalities concerned.

para. 2.3
The Minister of the Interior after recommendation by the National Bureau of Health is authorised to order a County Council to cancel an approval according to para. 2.1. if the preconditions necessary do not exist.

para. 2.4
With reference to the time period following the end of 1981 a proposal for the amendment of the present article shall be introduced to the Folketinget (Parliament) at the latest in the parliamentary year 1980-81.

para. 3
Repealed.

para. 4
The Minister of the Interior after negotiations with the National Association of Municipalities, the Copenhagen and Frederiksberg Municipal Councils, and the National Association of County Councils is authorised to establish rules and directives concerning the extent, the content and the requirements of the children's oral health care covered by the present Act.

para. 5
The National Board of Health is authorised to lay down instructions for the establishment and operation of the
municipal dental clinics.

para. 6
Municipal councils and county councils are obliged to submit information according to directives laid down by the National Board of Health regarding the implementation and the activities in pursuance of the present Act.

para. 7.1
The present Act comes into force on 1 August 1972.

para. 7.2
Until 1 August 1973 the obligation according to para. 1 covers only children in their first school year and children under private tuition at similar age level. Until 1 August 1974 the obligation covers children in their first and second school year and children under private tuition at similar age levels and so on until the oral health care includes all children under compulsory education.

para. 7.3
As of August 1981 the obligation according to para. 1 includes one year of pre-school children (below the age of compulsory education). Hereafter a new year of pre-school children shall be included each year until all pre-school children are covered by the comprehensive oral health care system given in this Act.

para. 8
Proposal for the amendment of this Act shall be introduced to the Folketinget at the latest in the parliamentary year 1985-86.
para. 9

The Act is not valid for the Faroe Islands and Greenland. Through a royal decree the Act can come into force for the Faroe Islands with the deviations dictated by the special conditions prevailing in the Faroe Island.
APPENDIX II

Key Developments in Evaluation, 1980–89

1982  Annual ministerial reviews of RHAs, with parallel RHA reviews of DHAs (no Scottish equivalent)

1982  Introduction of 'Rayner scrutinies' to the NHS

1983  First national performance indicator package produced by DHSS (no Scottish equivalent)

1984  DHA reviews of units

1984  Association of Surgeons and Association of Anaesthetists set up Confidential Enquiry into Perioperative Deaths (CEPOD)

1984  College of Health (consumer group) publishes first issue of Hospital Waiting Lists

1985  Royal College of General Practitioners publishes What sort of doctor? Assessing quality of care in general practice

1985  Improved packages of performance indicators (PIs) issued by DHSS (still no PIs in Scotland)

1986  Annual performance reviews of regions by NHS Management Board

1987  Individual performance review (IPR) and performance-related pay (PRP) introduced for general managers

1987  CEPOD report published (Buck et al. 1987)

1987  Government publishes White Paper on primary care Promoting Better Health, including proposals for incentives for good practice and support for peer review experiments (DHSS et al 1987)

1989  White Paper Working for patients includes proposals for medical audit (peer review) among both consultants and GPs. Also responsibility for the external audit of both health authorities and FPCs is to be transferred from the DoH/Welsh Office to the Audit Commission. In Scotland, however, the SHHD remains responsible

From: Harrison, Hunter and Pollitt (1990)
APPENDIX III

Questionnaire Guide for Semi-structured Interviews

A total of six different questionnaire guides were formulated, one for each of the following 'categories' of interviewees representing:

1. Dental Associations
2. Dental Academic Experts
3. Government civil servants, advisors etc/consumer association
4. Oral hygiene industry
5. Sugar industry

The questionnaire for each category contained four main issues:

Fluoride
Sugar
Oral hygiene
Visits to the dentist.

The four issues were asked in different order - dependent on the category of interviewee, beginning with the most relevant to each interviewee. The questionnaire was not strictly followed as each interview was open-ended and flexible and rather dependent on each interviewee’s knowledge and experience.
INTERVIEW QUESTIONS - Denmark, February 1988

FLUORIDE

Category: The Health Ministry

1. Which decisions have been taken with regard to national fluoride policy in Denmark?
2. Which bodies/persons were involved in the decision-making?
3. Do you think the industry was involved?
4. In which way?
5. Who did the government consult, or get advice from?
6. Have the 'producers' of fluoride-containing products been involved in any decision-making?
7. Have the scientific 'fluoride experts' been consulted - (yourself) and at what stage? agenda setting?
8. Are you satisfied with existing legislation regarding use of fluoride?
9. Have you any wishes for changes in the use of fluoride in Denmark?
10. If so: How could they be obtained?
11. Are there any obstacles - which?
12. Does the present legislation leave space for changes in the use of fluoride if changes in disease patterns or new scientific knowledge would require that?
13. Could the use of fluoride be more or less controlled by legislation?
14. If more or less, can you explain how?
15. Which other, but legislation, bodies/factors are controlling the use of fluoride?
16. Which 'groups' have an interest in fluoride policy?
17. Do you know if Danish fluoride policy differs from Scottish fluoride policy?
18. If yes, in which way is it different?
19. Can you explain why these differences exist?
20. Which 'use of fluoride recommendations' would you give the public? (children, adults, old people)
21. Are these the recommendations the public get? If not, why not?

22. Where were the ideas of fluoride policy initiated? (Pressure from politicians? dental professions?)

23. Why did legislation take the form it did?

ORAL HYGIENE

Category: The Health Ministry

1. What should the public be advised about oral hygiene?

2. Is the government promoting this viewpoint? How?

3. Which decisions have been taken? (laws and regulations)

4. Who were involved (consulted, advising) in these decisions?

5. Does government liaise with the toothpaste industry?

6. If so, how did this liaison come about?

7. Has DDA tried to advise/lobby the government on oral hygiene policy?

8. Who else has tried to advise/lobby government on oral hygiene policy?

9. Why have decisions taken the form they did?

VISITS TO THE DENTIST

Category: The Health Ministry

1. How often should the public visit the dentist? From your point of view?

2. Does current legislation promote government's 'visits to the dentist' recommendation?

3. How?

4. How was decision reached?

5. Which bodies/institutions/persons were involved?

6. What are the obstacles for improved legislation - reimbursement?

7. What does government do to promote visits to the dentist?
8. Who does government liaise with to promote visits to the dentist?

9. How was funding raised for DDA's current national campaign?

**SUGAR**

*Category: The Health Ministry*

1. What, if anything, should the public be advised about dental diseases and sugar intake? from your point of view?

2. Is government promoting this viewpoint? (laws and regulations, advertising, labelling). How?

3. Has sugar intake been discussed in government?

4. Have any decisions been taken?

5. If so, who influenced these decisions?

6. Who has been consulted by the government with regard to any aspects of sugar policy?

7. Has anyone tried to advise/lobby the government on sugar policy?

8. Has any pressure group contacted government with regard to sugar policy?

**EXAMPLE OF INTERVIEW QUESTIONS – UK, Spring 1989**

**FLUORIDE**

*Category: Government, Civil Servants, Consumer Association*

1. Which decisions have been taken with regard to fluoride policy in UK/Scotland?

2. Which bodies/persons were involved in the decision-making?

3. Do you think the industry was involved?

4. In which way?

5. Who did the government consult, or get advice from?

6. Have the 'producers' of fluoride-containing products been involved in any decision-making?

7. Have the scientific 'fluoride experts' been consulted? (yourself?)
8. Are you satisfied with existing legislation regarding use of fluoride?

9. Have you any wishes for changes in the use of fluoride in UK/Scotland?

10. If so: How could they be obtained?

11. Are there any obstacles - which?

12. Does the present legislation leave space for changes in the use of fluoride if changes in disease patterns or new scientific knowledge would require that?

13. Could the use of fluoride be more or less controlled by legislation?

14. If more or less, can you explain how?

15. Which other, but legislation, bodies/factors are controlling the use of fluoride?

16. Which 'groups' have an interest in fluoride policy?

17. Do you know if UK/Scottish fluoride policy differs from Danish fluoride policy?

18. If yes, in which way is it different?

19. Can you explain why these differences exist?

20. Which 'use of fluoride recommendations' would you give the public? (children, adults, old people)

21. Are these the recommendations the public get? If not, why not?

VISITS TO THE DENTIST

Category: Government, Civil Servants, Consumer Association

1. How often should the public visit the dentist? From your point of view? From government's point of view?

2. Does current legislation promote government's 'visits to the dentist' recommendation?

3. How?

4. How was decision reached?

5. Which bodies/institutions/persons were involved?

6. Who is satisfied with legislation? (Reimbursement schemes?)
7. What are the obstacles for improved legislation - reimbursement?

8. Who does what to promote visits to the dentist?

9. Who liaises with whom to promote visits to the dentist?

10. How is funding raised for national campaigns? Is it supported by government?

**SUGAR**

*Category: Government, Civil Servants, Consumer Association*

1. What, if anything, should the public be advised about dental diseases and sugar intake? from your point of view? and from government's point of view?

2. Is government promoting this viewpoint? How?

3. Has sugar intake been discussed in government, industry? Is it part of your work in any way?

4. Have any decisions been taken? (Legislative)

5. If so, who influenced these decisions?

6. Does government liaise with the sugar industry or sugar substitute industry?

7. If so, how did the liaison come about?

8. Who has been consulted by the government with regard to any aspects of sugar policy?

9. Who has tried to advise/lobby the government on sugar policy?

10. Has any pressure group contacted government with regard to sugar policy?

**ORAL HYGIENE**

*Category: Government, Civil Servants, Consumer Association*

1. What should the public be advised about oral hygiene? from your point of view? from government's point of view?

2. Is government promoting this viewpoint? How?

3. Which decisions have been taken? Legislative?

4. Who were involved (consulted, advising) in these decisions?

5. Who liaises with the toothpaste industry?
6. How did this liaison come about?
7. Does current legislation reflect or promote industry's viewpoint on oral hygiene?
8. Who has the government consulted in this respect? (oral hygiene)
9. Who has tried to advise/lobby the government on oral hygiene policy?

VISITS TO THE DENTIST

Category: Dental Associations

1. How often should the public visit the dentist? From your point of view? From BDA/GDC/BDHF's point of view?
2. Does current legislation promote BDA/GDC/BDHF's 'visits to the dentist' recommendation?
3. How?
4. How was decision reached?
5. Which bodies/institutions/persons were involved?
6. Is BDA./GDC/BDHF satisfied with legislation? (Reimbursement schemes)
7. What are the obstacles for improved legislation - reimbursement?
8. What does BDA.GDC/BDHF do to promote visits to the dentist?
9. Who do BDA.GDC liaise with to promote visits to the dentist?
10. How is funding raised for national campaigns?

ORAL HYGIENE

Category: Dental Associations

1. What should the public be advised about oral hygiene? From your point of view? From DDA's point of view?
2. Is BDA/GDC/BDHF promoting this viewpoint? How?
3. Which policies/decisions have been taken? (Legislative)
4. Who were involved, (consulted, advising) in these decisions?
5. Does BDA/GDC/BDHF liaise with the toothpaste industry?

6. If so, how did this liaison come about?

7. Does current legislation reflect or promote BDA/GDC/BDHF’s viewpoint on oral hygiene?

8. Has the government consulted BDA/GDC/BDHF in this respect?

9. Has DDA tried to advise/lobby the government on oral hygiene policy?

SUGAR

Category: Dental Associations

1. What, if anything, should the public be advised about dental diseases and sugar intake? From your point of view? From BDA/GDC/BDHF’s point of view?

2. Is BDA/GDC/BDHF promoting this viewpoint? How?

3. Has sugar intake been discussed in BDA/GDC/BDHF? Is it part of BDA/GDC/BDHF’s work in any way?

4. Have any decisions been taken?

5. If so, who influenced these decisions?

6. Does BDA/GDC/BDHF liaise with the sugar industry or sugar substitute industry?

7. If so, how did the liaison come about?

8. Has BDA/GDC/BDHF been consulted by the government with regard to any aspects of sugar policy?

9. Has BDA/GDC/BDHF tried to advise/lobby the government on sugar policy?

10. Has any pressure group contacted BDA/GDC/BDHF with regard to sugar policy?

FLUORIDE

Category: Dental Associations

1. Which decisions have been taken with regard to fluoride policy in UK?

2. Which bodies/persons were involved in the decision-making?
3. Do you think the industry was involved?

4. In which way?

5. Who did the government consult, or get advice from?

6. Have the 'producers' of fluoride-containing products been involved in any decision-making?

7. Have the scientific 'fluoride experts' been consulted? - (yourself?)

8. Are you satisfied with existing legislation regarding use of fluoride?

9. Have you any wishes for changes in the use of fluoride in UK/Scotland?

10. If so, how could they be obtained?

11. Are there any obstacles - which?

12. Does the present legislation leave space for changes in the use of fluoride if changes in disease patterns or new scientific knowledge would require that?

13. Could the use of fluoride be more or less controlled by legislation?

14. If more or less, can you explain how?

15. Which other, but legislation, bodies/factors are controlling the use of fluoride?

16. Which 'groups' have an interest in fluoride policy?

17. Do you know if UK/Scottish fluoride policy differs from Danish fluoride policy?

18. If yes, in which way is it different?

19. Can you explain why these differences exist?

20. Which 'use of fluoride recommendations' would you give the public? (children, adults, old people)

21. Are these the recommendations the public get? If not, why not?
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