



Mid-Western Health Board

children's

**DENTAL HEALTH
in County Clare, 1991.**



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*Mid-Western Health Board
Dental Services Section
1991*

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SUMMARY

In 1990 an epidemiological survey of children's dental health in County Clare was undertaken. The main aims of the survey were to assess the oral health status of children in County Clare in 1990 and compare it with that of children in the Mid-Western Health Board in 1984 and to provide information for the planning and monitoring of Oral Health Services for children in County Clare. The subsidiary aims were the assessment of the effectiveness of water fluoridation in County Clare and an assessment of attitudes, knowledge and practices relating to oral health amongst parents of 8-year-old children.

A representative sample of 810 children aged 5, 8 and 12 years were selected for examination from 22 schools. The sample was stratified by sex and fluoridation status. All children were examined by two trained and calibrated dentists. Among the parameters measured were caries, periodontal disease, dentofacial anomalies, treatment needs, enamel opacities, fluorosis, trauma and fissure sealants.

The main findings of the survey were that:

- Caries levels appear to have declined when compared with data from the Mid-Western Health Board as a whole collected in 1984. However, one quarter to one-third of children still suffer from high levels of caries. The treatment of caries is at a level which is less than satisfactory particularly in 8-year-old children. Also, fissure sealants are not being used to their full potential for the prevention of caries.
- Most parents know that the consumption of sugar containing snacks on a regular basis is harmful to the teeth, however, many of their children still consume such snacks twice a day or more.
- Plaque control among children is poor, as evidenced by the high proportion with bleeding gums or with calculus on their teeth. Yet, most children reportedly brush their teeth at least once a day thus indicating an ineffective tooth brushing technique by children.

These factors indicate the potential merit of deploying dental hygienists and dental health educators for the provision of preventive services in the County Clare area. The deployment of such staff would allow the existing dentists in the area more time to complete the backlog of restorative work required. It is recommended that this action be undertaken as a pilot scheme in which the effectiveness and efficiency of the strategy could be measured.

Another finding of the survey was that water fluoridation is continuing to result in reduced caries levels and is likely also to be having an indirect effect on children in non-fluoridated areas via foods manufactured or processed with fluoridated water.

Finally, parents of 8-year-old children surveyed, find the services most acceptable and fear of pain is not a deterrent to attendance at the dentist by their children. However, they find that dental services are not readily available and their access to them could be improved.

INTRODUCTION

In 1984, a national survey of children's dental health was carried out in Ireland (O'Mullane et al, 1986). The results of the survey revealed a large decline in the prevalence of dental caries in Irish children since the early 1960's. This decline was attributed in the main to both the fluoridation of Irish water supplies which commenced in 1966 and the introduction of fluoride toothpastes throughout Ireland since the early 1970's. Not only has the prevalence of dental caries decreased in Ireland in the last twenty years but our knowledge of the prevention of the disease has increased dramatically. Currently, the Department of Health in Ireland encourages its Health Boards to adopt a preventive approach when planning dental services. (Joint Working Party Report, 1979, Leyden report, 1988, Health the Wider Dimensions, 1988).

In a recent report on dental services the Mid-Western Health Board (1988) outlined plans and made recommendations with regard to increasing the effectiveness and efficiency of dental services in the Mid-Western area. A commitment to a preventive approach was clear in the report. Following the publication of the Mid-Western Health Board report a situation analysis of the dental services in the Clare community care area of that Health Board was carried out (O'Keeffe, 1989). This was seen as a preliminary step to the improvement of the dental services in the area. One of the first recommendations following the situation analysis was to conduct a survey of the oral health and treatment needs of the child population in County Clare. The survey was seen as a means of obtaining baseline information for the area against which any future improvements in the effectiveness of the dental service could be measured. This recommendation was in line with the Department of Health's statement on health policy (Health the Wider Dimension, 1988) in which it was written that "the foundation for successful health planning will be the objective measurement of health needs in the community and the matching of policy actions". The report also acknowledged the necessity for measurement of health needs of local populations, "local surveys have the advantage of allowing the identification of local needs and thus detailed planning for the delivery of services".

The recommendation to conduct a survey of Children's Dental Health in County Clare received the support of Mr Martin Duffy, Programme Manager, Community Care, Mid-Western Health Board. Subsequently, the Oral Health Services Research Unit at University College, Cork was requested to draw up a detailed protocol for the study in conjunction with Dr John O'Keeffe, Principal Dental Officer, County Clare Community Care Area, Mid-Western Health Board.

Aims of the Study

- To assess the oral health status of County Clare children in 1990 and to compare it with that of children examined in the Mid-Western Health Board in 1984.
- To provide information for the planning and monitoring of Oral Health Services.
- To assess the effectiveness of water fluoridation in County Clare.
- To assess attitudes and knowledge relating to Oral Health among parents of children in second class (8 year olds).

Material and Methods

The survey was planned by Dr John O'Keefe, Principal Dental Officer, County Clare Community Care Area, Mid-Western Health Board, with the assistance of Dr Helen Whelton and Professor Denis O'Mullane, Oral Health Services Research Unit, University College, Cork. The survey was supported by Mr Martin Duffy, Programme Manager, Community Care, Mid-Western Health Board and was funded by the Mid-Western Health Board. The field work was conducted by Dr Imelda Counihan and Dr Colman Counihan in May and June, 1990. The examiners were trained both in Cork and in Clare in the various indices used.

The following parameters were measured in the study:

- **Developmental defects of enamel**
- **Dentofacial anomalies**
- **Orthodontic Treatment Need**
- **Trauma to permanent incisors**
- **Periodontal disease**
- **Caries**
- **Fissure Sealants**
- **Treatment Needs**

A questionnaire was designed to ascertain from parents of 8-year-old children their oral health knowledge and practices and the perceived availability, accessibility and acceptability of dental services in respect of their children.

Except in the case of developmental defects of enamel and fissure sealants all indices used were those used in the National Survey of Children's Dental Health (O'Mullane et

al, 1986) most of which are recommended by WHO (World Health Organisation, 1987). The developmental defects of enamel (DDE Index) which was employed in this survey was developed subsequent to the National Survey of Children's Dental Health (NSCDH) and it is easier to use than the index used in the earlier study. It is, however, directly comparable with the index used in the NSCDH. Fissure sealants were recorded on a quadrant basis in the NSCDH, however, in the County Clare study it was decided to record them on a tooth basis to provide more detailed information.

The diagnosis of approximal caries in epidemiological surveys is difficult due to the lack of radiographic information. The conduct of the County Clare study provided the opportunity to use a new diagnostic method to overcome this problem. The system employs light transmitted from a 200 lux Halogen bulb via a fibre optic cable, and concentrated in a 0.5 mm beam by means of a transilluminating tip which can be placed in close contact with the approximal area of the tooth. For teeth that have sound approximal areas the light passes straight through the tooth and no change in its refraction is seen. However, when there is caries in the region, the transmission of light is interrupted and caries is seen as a darkened area in the tooth. Equipment for the use of this diagnostic method called fibre optic transillumination (FOTI) was provided by the Oral Health Services Research Unit for the duration of the study. Caries diagnosed by FOTI was coded separately to caries diagnosed by the conventional WHO methodology. This allowed the data to be analysed both with and without the inclusion of caries diagnosed by FOTI, thus enabling comparison with other studies not utilising FOTI.

Sampling

A list of all of the schools in County Clare with a breakdown of numbers of children according to school class was obtained by Mr John O'Keefe, Principal Dental Officer. Using this list the statistician for the study, Mr G. Keane was able to choose a proportionate random clustered sample of children in County Clare. The sample was stratified by age, sex and fluoridation status. Information on fluoridation status was also provided by Dr John O'Keefe.

Survey Team

- Mr John O'Keefe, Principal Dental Officer, Co. Clare, MWHB
- Mr Martin Duffy, Programme Manager, Community Care, MWHB
- Professor Denis O'Mullane, Survey Director, UCC

- Dr Helen Whelton, Survey Field Director, UCC
- Dr Colman Counihan, Dental Examiner, MWHB
- Dr Imelda Counihan, Dental Examiner, MWHB
- Ms Geraldine Darcy, Dental Recording Assistant, MWHB
- Ms Margaret Phillips, Dental Recording Assistant, MWHB
- Mr Ray Daly, Data Analysis, UCC
- Ms Fiona O'Sullivan, Secretarial Assistant, UCC
- Dr John Clarkson, Trainer, Department of Health, Dublin/IADR, Washington
- Mr Gerry Keane, Statistician, Dublin
- Ms Theresa O'Mahony, Co-ordinator, UCC.

Fieldwork

Prior to the conduct of the fieldwork all schools selected for the sample were contacted by the Principal Dental Officer. All of the selected schools agreed to participate in the study. Prior to the conduct of the examinations children in the selected classes were issued with consent forms and asked to return them to the teacher the following day once their parents had completed them. Subsequently, the examining teams visited the schools and conducted the dental examinations. The instrumentation used consisted of: a HNSY rechargeable pencil light with a detachable plane size 4 mirror on a cuff, an ash number 53 sickle shaped probe and a CPITN periodontal probe. A Fibre Optic Transilluminating light was used for transilluminating the teeth to aid the diagnosis of approximal caries.

Each examiner had twenty sets of instruments for use in the study. Portable autoclave sterilizers were purchased for use during the fieldwork. All instruments were sterilized at the end of the morning and afternoon sessions. Rigorous cross infection control procedures were adhered to, glasses, masks and gloves were worn by both examiners. Masks were changed hourly and gloves were changed between examinations. A clean disposable towel was used under each set of instruments and was changed between examinations.

A questionnaire was issued with the consent form, to parents of 8-year-old children prior to the conduct of the fieldwork in the children's school. It was returned with the consent form to the teacher and was collected by the examining dentist on arrival at the school for the conduct of the fieldwork. The records of the examinations were completed on duplicate sheets, the top copies of the examination records were forwarded with the

completed questionnaire to the Oral Health Services Research Unit in Cork. The duplicates were retained in County Clare as a back-up in case the original records were lost in transit.

Data Processing and Analysis

On receipt of the records at the Oral Health Services Research Unit in University College, Cork, keyboard operators entered the data into a computer. All data were entered twice by two different keyboard operators. The duplicate data sets were then cross checked as a validation exercise, inconsistencies were identified and corrected by reference to the original record form. Furthermore, during data entry, consistency checks were made and validation was carried out by means of a purpose designed data entry and validation programme. Once all the validation checks on the data were completed the data were analysed and a series of tables were produced. Some of the data collected in 1984 for the Mid-Western Health Board and presented in this report have not been presented previously. However, for the purpose of comparison with the 1990 County Clare data some further analysis of the 1984 National Survey of Children's Dental Health records for the MWHB was carried out.

RESULTS

TABLE 1

Number of Children Examined

A total of 810 children aged 5, 8 and 12 years were examined. After completion of the fieldwork, children were classified according to the length of time they had lived in an area with a fluoridated water supply. Children were classified as having full exposure to fluoride ('Full FI') where they had been lifetime residents of a fluoridated community. Children who had some exposure to fluoridated water but had not been lifetime residents of a fluoridated community were classed as partially fluoridated (Part FI). Children in the non-fluoridated group ('Non FI') were those who never received a public piped fluoridated water supply in their homes. It can be seen in Table 1 that the sampling yielded a good balance between the numbers of children in the full and non-fluoridated groups. It was not the aim of this study to look at children who were in the partially fluoridated group and very few children in fact were in this category. There was an even distribution between the sexes in the non-fluoridated group, sixty six 5-year-old males were examined and sixty seven 5-year-old females. Similarly in the 8 and 12-year-old non-fluoridated groups there was an even distribution between the sexes. However, in the fully fluoridated group there was a noticeably lower number of females; for example, in the 5-year-old group 70 males were examined and 42 females. Similarly in the 8 and 12-year-old groups lower numbers of females were examined. The results are presented for both sexes combined.

TABLE 1

Number of Children Examined

**Number of children examined in 1990 in County Clare by age group,
sex and fluoridation status (M-male, F-female).**

FI Status	Sex	Age Group		
		5	8	12
Full FI	M	70	85	68
	F	42	52	39
Part FI	M	8	8	10
	F	6	8	10
Non FI	M	66	70	72
	F	67	66	63
Total		259	289	262

TABLE 2

Average Age

There was no difference in the average ages of children in the various fluoridation categories examined in County Clare in 1990. Five-year-old children in the full fluoride group had an average age of 5.3 compared with 5.5 in the non-fluoride group. Similarly, in the 8 and 12-year-old groups there was little or no difference in the average age of the children in the different fluoridation categories. However, it must be noted that children examined in County Clare in 1990 were on average 0.5 of a year or 6 months older than those examined in the Mid-Western Health Board as a whole in 1984. For example, the mean age for the 'five-year-old' fully fluoridated group was 5.3 in 1990 and 4.7 in 1984. It would be reasonable to expect that if no change in the prevalence of dental caries had occurred since 1984, that the caries prevalence in County Clare in 1990 would be slightly higher than that found in the Mid-Western Health Board as a whole in 1984 given that in 1990 the children's teeth had an additional six months exposure to the oral cavity and to possible caries attack.

TABLE 2

Average Age

**Mean age of subjects examined in County Clare in 1990 and
in the Mid-Western Health Board (MWHB) in 1984
by age group and by fluoridation status.**

		Age Group		
		5	8	12
Clare 1990	Full FI	5.3	8.5	12.7
	Part FI	5.4	8.8	12.6
	Non FI	5.5	8.6	12.7
MWHB 1984	Full FI	4.7	8.1	12.2
	Non FI	4.8	8.0	12.0

TABLE 3

Caries Experience/Teeth

Table 3 shows a comparison between caries levels in fluoridated and non-fluoridated areas in County Clare in 1990 and between fluoridated areas and non-fluoridated areas in the Mid-Western Health Board in 1984. In all age groups in 1990 the prevalence of caries was lower in the children who had a lifetime exposure to fluoridated water. For example, in 8-year-old children the number of decayed, missing and filled teeth was 0.7 in children living in fluoridated areas and 1.0 in the children living in non-fluoridated areas. It is noteworthy that in both fluoridated and non-fluoridated areas, caries levels in 1990 in County Clare were lower than those recorded throughout the Mid-Western Health Board in 1984. It should also be remembered that children examined in County Clare in 1990 were on average six months older than those examined in the Mid-Western Health Board in 1984. Hence, this may represent a slight underestimate of the change in caries levels since 1984 (Table 2). It is not known whether caries levels in the Mid-Western Health Board in 1984 provided a reflection of caries levels in County Clare at that time. However, for the rest of this report it will be assumed that it did.

It could be said that the inclusion of carious lesions scored by fibre optic transillumination (FOTI) in the 1990 study could also increase the underestimate in the change in caries levels. In total an additional 8 lesions in 8-year-olds and 23 lesions in 12-year-olds were diagnosed by FOTI. These numbers were so low that the results were analysed with the inclusion of lesions diagnosed by FOTI. It was decided that they were not of a magnitude to affect any comparison with other studies using similar diagnostic criteria but not employing FOTI.

TABLE 3

Caries Experience - Teeth

Mean number of decayed, missing and filled teeth in 5-year-olds (dmft), 8 and 12-year-olds (DMFT) in County Clare in 1990 and in the Mid-Western Health Board area (MWHB) in 1984 by age group and fluoridation status.

		Age Group		
		5	8	12
		dmft	DMFT	DMFT
Clare 1990	Full FI	1.4	0.7	2.5
	Non FI	2.4	1.0	2.8
MWHB 1984	Full FI	2.3	1.0	3.1
	Non FI	4.0	1.1	3.7

FIGURES 1 and 2

Frequency Distribution of dmft in 5-year-olds

Figure 1 shows a frequency distribution of the number of decayed, missing (due to caries) or filled deciduous teeth for 5-year-old children living in areas with non-fluoridated water supplies. Forty four per cent of these children were caries free (dmft 0) in their deciduous dentition. Five-year-old children living in fluoridated areas are considerably better off (Figure 2) in terms of dental health, with 60% of them having no caries in their deciduous teeth. The distribution of caries in 5-year-old children in County Clare was such that in non-fluoridated areas, 26 per cent of children had a dmft ≥ 4 and this group had experienced 77 per cent of the total amount of decay for their age group. In fluoridated areas 22 per cent of the group had experienced 84 per cent of the total decay levels (dmft ≥ 3). These figures indicate that in deciduous teeth in 5-year-olds over three quarters of the decay is concentrated in approximately one quarter of the children.

FIG 1.

**Frequency Distribution, dmft
Co. Clare 5-year-olds Non-Fluoridated**

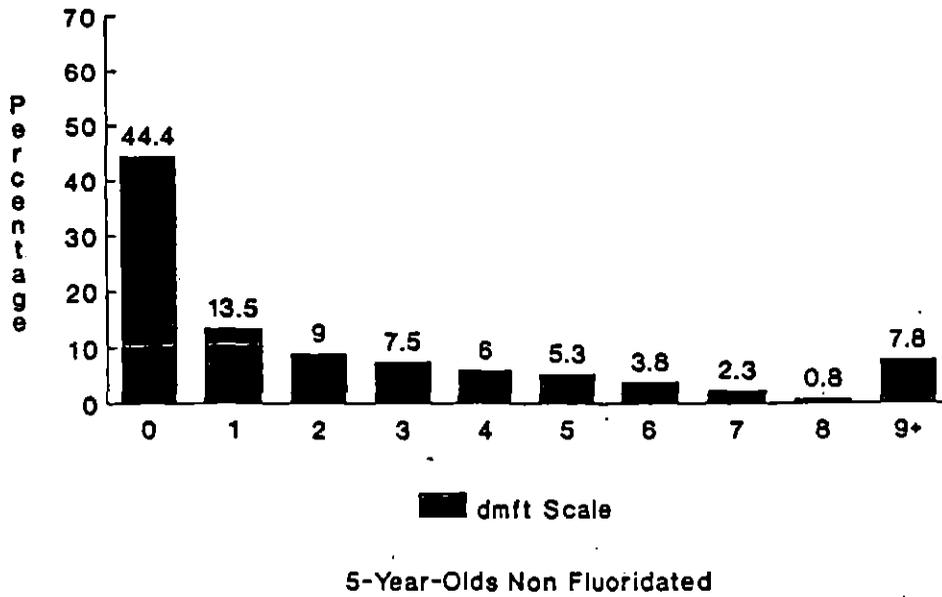
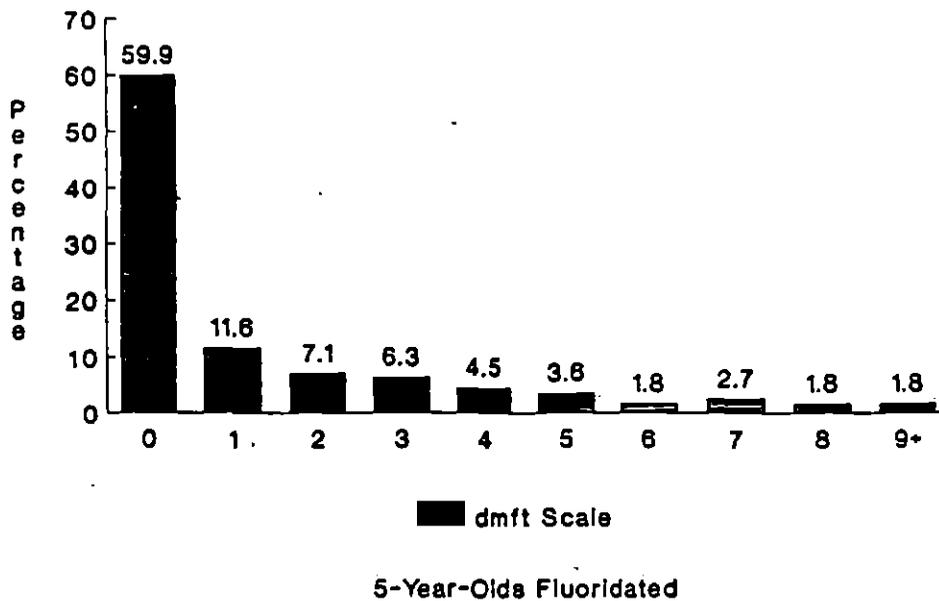


FIG 2.

**Frequency Distribution, dmft
Co. Clare 5-year-olds Fluoridated**



FIGURES 3 and 4

Frequency distribution of DMFT in 8-year-olds

The comparison of Figures 3 and 4 shows a large difference in the percentage of 8-year-olds caries free in fluoridated and non-fluoridated areas with 66 and 49 per cent caries free respectively in the two areas. The occurrence of four decayed, missing or filled teeth in non-fluoridated areas (8.1 per cent) is almost twice that of fluoridated areas (4.4 per cent). From these distributions it is again clear that over 75 per cent of the caries experience in permanent teeth occurs in approximately 25 per cent of 8-year-old children. In non-fluoridated areas 76 per cent of caries is found in 26 per cent of children and in fluoridated areas 83 per cent of caries is found in 22 per cent of children.

FIG 3.

Frequency Distribution, DMFT
Co. Clare 8-year-olds Non Fluoridated

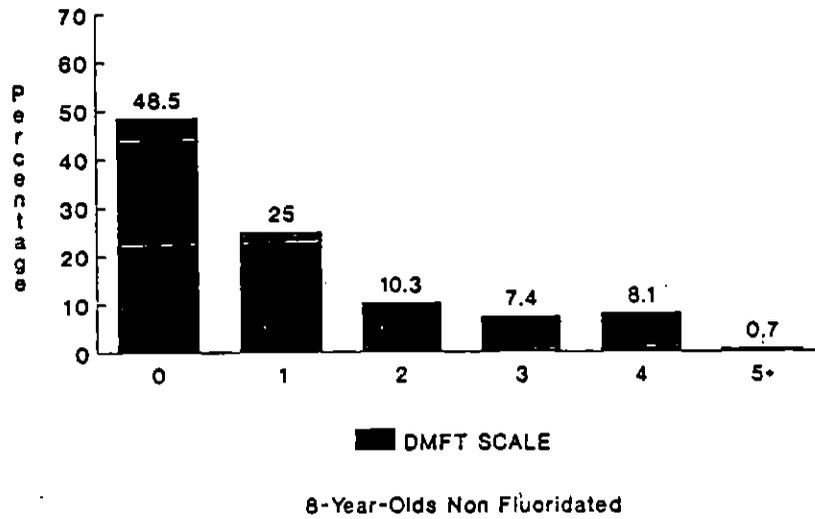
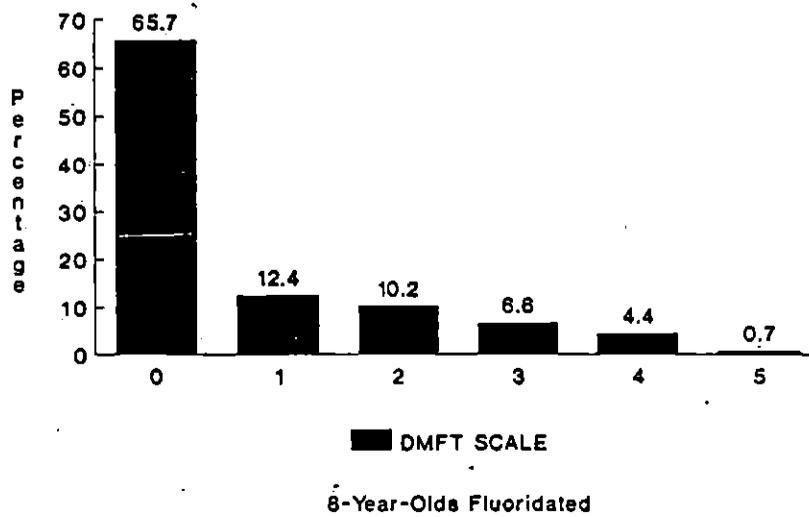


FIG 4.

Frequency Distribution, DMFT
Co. Clare 8-year-olds Fluoridated



FIGURES 5 and 6

Frequency Distribution of DMFT in 12-year-olds

The difference between the frequency distribution of caries experience between non-fluoridated and fluoridated areas is less marked in the case of 12-year-olds. Twenty two per cent of 12-year-olds in non-fluoridated areas are caries free compared with 26 per cent in fluoridated areas. Both distributions are bimodal with modes at 0 and 4. The mode at 4 is likely to represent the susceptibility of pit and fissure surfaces of first permanent molars to decay. Many of the children with a DMFT of 4 would have had caries on the pit and fissure surfaces of all four first permanent molars.

The reductions in the difference in caries levels between fluoridated and non-fluoridated groups may be attributed to what is now commonly known as the "halo effect". The "halo effect" is the effect of water fluoridation in urban areas on inhabitants of non-fluoridated rural areas in the same region. It is attributed to the use of fluoridated water in processing of foods and in the manufacture of drinks thus introducing fluoride into the diet of children living in a non-fluoridated area. Hence, children living in non-fluoridated areas theoretically derive some of the benefits of water fluoridation.

Looking at the distribution of caries in the 12-year-old groups one can calculate that 72 per cent of the total caries experience is concentrated in 38 per cent of children in non-fluoridated areas and in 35 per cent of children in fluoridated areas.

FIG 5.

Frequency Distribution, DMFT
Co. Clare 12-year-olds Non Fluoridated

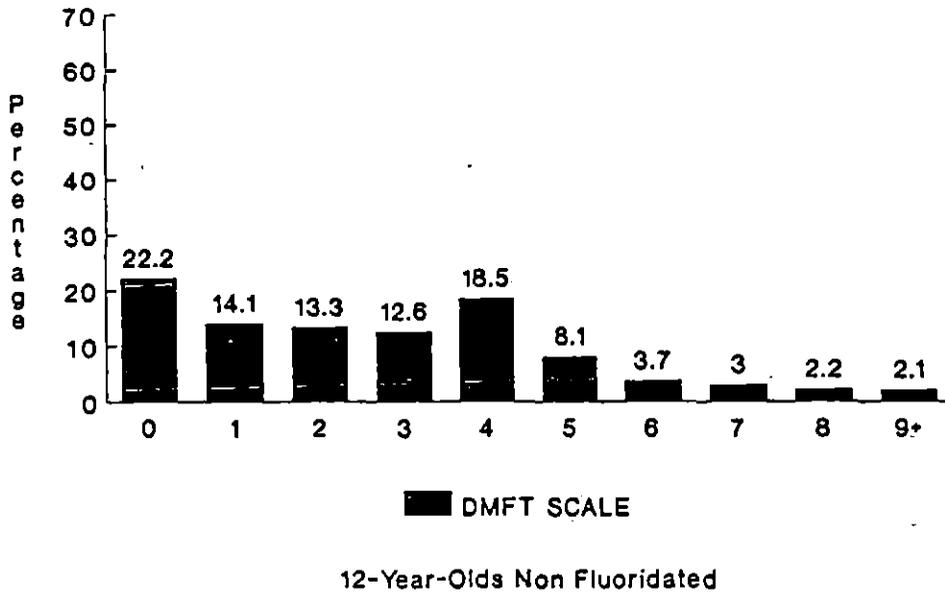


FIG 6.

Frequency Distribution, DMFT
Co. Clare 12-year-olds Fluoridated

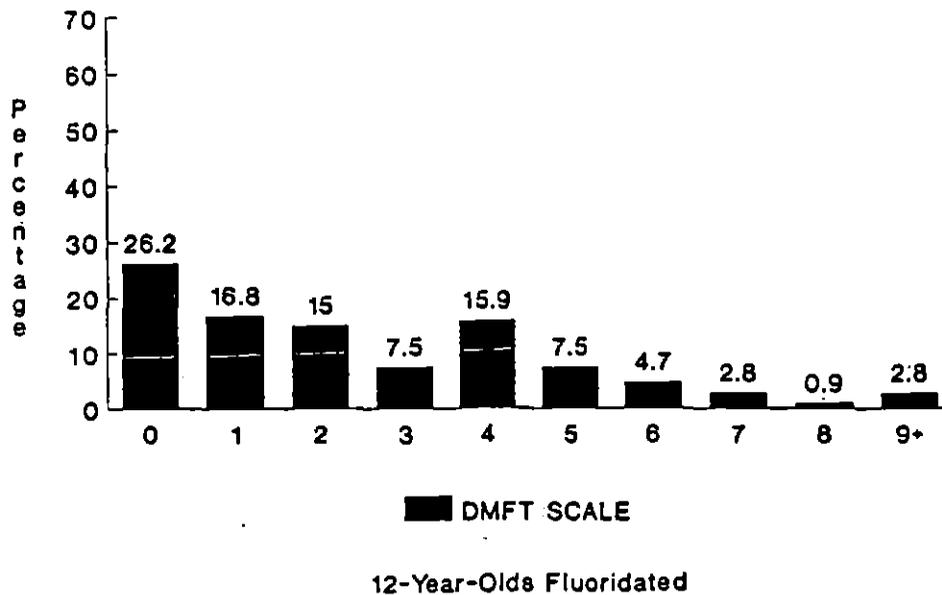


TABLE 4

Caries Experience - Surfaces

The mean number of decayed, missing and filled surfaces in 5-year-old children in Clare was 30 per cent lower in lifetime residents of fluoridated communities at 3.0 when compared with lifetime residents of non-fluoridated communities at 5.7 (Table 4). The corresponding difference in mean DMFS in 8 and 12-year-olds are 27 per cent and 18 per cent respectively.

Comparing the 1990 figures for County Clare with those for the Mid-Western Health Board as a whole in 1984 would suggest that caries has declined in the past six years particularly in deciduous teeth. For example in the 'Full FI' group the mean dmfs declined by 32 per cent from 4.4 to 3.0 whilst in the 'Non FI' group there was a 32 per cent decline from 8.5 to 5.7. The decline in caries in surfaces of permanent teeth (DMFS) between 1984 and 1991 is less, varying from 6 per cent in the non FI 8-year-old group to 26 per cent in the 12-year-old fluoridated group.

TABLE 4

Caries Experience - Surfaces

Mean number of decayed, missing and filled surfaces in 5-year-olds (dmfs), 8 and 12-year-olds (DMFS) in County Clare in 1990 and in the Mid-Western Health Board area in 1984 by age group and fluoridation status.

		Age Group		
		5	8	12
		dmfs	DMFS	DMFS
Clare 1990	Full FI	3.0	1.1	4.0
	Non FI	5.7	1.5	4.9
MWHB 1984	Full FI	4.4	1.3	5.4
	Non FI	8.5	1.6	5.7

TABLE 5

Untreated Caries

The mean number of teeth which were recorded as being carious at the time of examination is represented by dt/DT . This figure indicates the level of untreated caries recorded by the examiners.

In the 5-year-olds the percentage of the total caries experience (dmfs) left untreated was very high in fluoridated (81 per cent) and non-fluoridated (72 per cent) communities in County Clare in 1990. These figures were very similar to those recorded in the Mid-Western Health Board as a whole in 1984.

Approximately two thirds of the total number of carious surfaces in the permanent teeth of 8-year-olds in County Clare in 1990 were found to be untreated. The corresponding figures for 12-year-olds was approximately one-third.

Overall the percentage of untreated carious surfaces in County Clare in 1990 is slightly higher than that found in the Mid-Western Health Board in 1984. However, it should be noted that the percentage of untreated carious surfaces for County Clare in 1984 is not known.

It should be remembered that these figures represent an underestimate of the true need for treatment. Estimation of real need would require the conduct of a more detailed clinical examination involving cleaning and drying of the teeth and in some cases the use of radiographic examination. However, this epidemiological estimate is useful for the purpose of comparison and monitoring.

TABLE 5

Untreated Caries

Mean number of decayed teeth in 5-year-olds (dt), 8 and 12-year-olds (DT) and percentage (%) of dmft/DMFT attributable to d/D in each age group in County Clare in 1990 and in the Mid-Western Health Board area (MWHB) in 1984 by age group and fluoridation status.

		Age Group					
		5		8		12	
		dt	%	DT	%	DT	%
Clare 1990	Full	1.1	81	0.5	69	1.1	42
	Non FI	1.7	72	0.7	66	0.8	29
MWHB 1984	Full FI	1.9	83	0.6	60	1.2	39
	Non FI	2.9	73	0.5	45	0.8	22

TABLE 6

Treated Caries

The mean number of deciduous teeth extracted due to caries (mt) amongst 5-year-olds is considerably higher in lifetime residents of non-fluoridated communities in County Clare in 1990 at 0.6 than amongst residents of fluoridated communities at 0.2. A similar difference was apparent in the Mid-Western Health Board as a whole in 1984 (a mean of 0.9 compared with 0.4).

The mean number of extracted permanent teeth (MT) is similar in the 'Full FI' and 'Non FI' groups amongst 8 and 12-year-olds both in County Clare in 1990 and in the Mid-Western Health Board in 1984. A reduction in the number of extracted teeth would be a worthwhile goal which could perhaps be achieved by the early detection and treatment of caries. In both 8-year-olds and 12-year-olds in County Clare in 1990 and in the Mid-Western Health Board in 1984 the mean number of filled teeth tends to be higher in the 'Non FI' groups and also the proportion of the total DMFT attributable to fillings tends to be higher in the 'Non FI' groups.

TABLE 6

Treated Caries

Mean number of missing and filled teeth in 5, 8 and 12-year-old children in County Clare in 1990 and in the same age groups in the Mid-Western Health Board area (MWHB) in 1984, by age group and fluoridation status.
(m/M - missing, f/F = filled)

		Age Group					
		5		8		12	
		mt	ft	MT	FT	MT	FT
Clare 1990	Full FI	0.2	0.1	0.1	0.1	0.3	1.2
	Non FI	0.6	0.1	0.1	0.3	0.5	1.5
MWHB 1984	Full FI	0.4	0.1	0.1	0.3	0.4	1.5
	Non FI	0.9	0.3	0.1	0.5	0.4	2.4

TABLE 7

Fissure Sealants

Children's teeth were examined for fissure sealants. The presence of some fissure sealant on one or more teeth allowed the child to be placed in the "some" category.

Fissure sealants are not applied to deciduous teeth of 5-year-olds in County Clare in 1990 (0 per cent) and neither were they applied to the teeth of children in this age group in the Mid-Western Health Board in 1984 (0 per cent).

Ten per cent of 8-year-olds in County Clare had one or more teeth fissure sealed in 1990; the corresponding figure for the Mid-Western Health Board as a whole in 1984 was 3 per cent. In 12-year-olds in County Clare, only 5 per cent had 1 or more permanent teeth fissure sealed in 1990 whilst in the Mid-Western Health Board in 1984 the figure was 3 per cent.

It could be argued that these figures represent an underestimation of the true level of fissure sealants in County Clare children, as the teeth were not dried prior to the examination and hence, sealants may not have been detected. However, it is unlikely that failure to detect sealants occurred on a large scale. The level of sealants detected indicates that they are being underutilized in the County Clare area.

The potential of fissure sealants to prevent caries in County Clare children can be expressed by calculating the percentage of decayed and filled permanent teeth which were either decayed or filled on pit and fissure surfaces only and on which all other surfaces were caries (or filling) free. In other words, the percentage of decayed or filled permanent teeth which, if successfully fissure sealed soon after eruption would not have subsequently developed caries. For 8-year-olds in fluoridated and non-fluoridated areas the percentages of the DMFT which could have been prevented by fissure sealing were 97 per cent and 89 per cent respectively and in the case of 12-year-olds 82 per cent and 79 per cent respectively.

TABLE 7

Fissure Sealants

**Percentage of children with some fissure sealants on their teeth
in County Clare in 1990 and in the Mid-Western Health Board
(MWHB) in 1984 by age group.**

	Age Group		
	5	8	12
Clare 1990	0	10	5
MWHB 1984	0	3	3

ENAMEL OPACITIES

The buccal surfaces of the upper permanent first premolars, canines and incisors and the lower first molars were examined for enamel opacities or hypoplasia. An opacity is defined as a qualitative defect of enamel identified visually as an abnormality in the translucency of enamel. It is characterised by a white or discoloured (cream, brown, yellow) area but in all cases the enamel surface is smooth and the thickness of enamel is normal, except in some instances when associated with hypoplasia.

Opacities may be:

- 1) demarcated with well defined margins or
- 2) diffuse in which case the opacity may consist of fine white lines or may have have an irregular cloudy appearance lacking well-defined margins.

Generally the demarcated opacity is associated with trauma or some other isolated disturbance during amelogenesis. Diffuse opacities have been associated with increased fluoride intake and are found in higher levels in populations with increased levels of fluoride in the water supplies. They are generally due to a more chronic low grade.

Hypoplasia is defined as a quantitative defect of the enamel which presents a reduced thickness than that which would be morphologically expected. Defects are identified visually and confirmed tactilly.

TABLE 8

Enamel Opacities : 8-year-olds

The percentage of subjects with one or more surfaces affected by enamel opacities was 44 in the 'Full FI' group and 40 in the 'Non FI' in County Clare in 1990. The corresponding percentages for the Mid-Western Health Board in 1984 were 51 and 45. The percentage of 8-year-olds affected by one or more of the different type of enamel opacities were very similar in the 'Full FI' and 'Non FI' areas of County Clare in 1990. A comparison of the figures for diffuse enamel opacities in the Mid-Western Health Board in 1984 with those of County Clare in 1990 would seem to show a marginal but non significant increase over the 6 year period.

TABLE 8**Enamel Opacities : 8-year-olds**

The percentage of 8-year-old subjects with at least one enamel opacity on the buccal surfaces of their permanent upper first premolars, upper canines, upper incisors or lower first molars by type of opacity. Figures presented by fluoridation status for children in County Clare in 1990, and children in the Mid-Western Health Board (MWHB) in 1984 (na: figure not available).

Type of Opacity	8-year-olds (%)			
	County Clare 1990		MWHB 1984	
	Full FI (n = 137)	Non FI (n=136)	Full FI (n=115)	Non FI (n=126)
No Opacity	56	60	49	55
Any Opacity	44	40	51	45
Demarcated	30	28	41	41
Diffuse	16	16	13	10
Hypoplastic	4	2	3	3
Demarcated and Diffuse	4	1	na	na
Demarcated and Hypoplastic	1	3	na	na
Diffuse and Hypoplastic	0	1	na	na

TABLE 9

Enamel Opacities : 12-year-olds and 15-year-olds

The percentage of 12-year-olds in County Clare in 1990, and of 15-year-olds in the Mid-Western Health Board in 1984 affected by the different types of opacity, suggests that there has been an overall decline in the percentage affected by any opacity (i.e. all types combined), a decline in the percentage affected by demarcated opacities but a slight increase in the percentage affected by diffuse opacities. It should be noted that although 14 per cent of 15-year-old children had hypoplasia in the 'Full FI' group in the Mid-Western Health Board in 1984, this represents only three out of the 22 children examined in this group. Due to the small number of children in the 15-year-old 'Full FI' group the results should be interpreted with caution.

TABLE 9**Enamel Opacities : 12-year-olds**

The percentage of 12-year-old subjects in County Clare in 1990 and 15-year-old subjects in the Mid-Western Health Board (MWHB) in 1984 with at least one enamel opacity on the buccal surfaces of their permanent upper first premolars, upper canines, upper incisors or lower first molars, by type of opacity. Figures presented by fluoridation status.
(na: figure not available).

Type of Opacity	12-year-olds (%)		15-year-olds (%)	
	County Clare 1990		MWHB 1984	
	Full FI (n = 107)	Non FI (n=135)	Full FI (n=22)	Non FI (n=98)
No Opacity	56	63	41	51
Any Opacity	44	37	59	49
Demarcated	25	28	41	45
Diffuse	17	13	9	6
Hypoplastic	7	2	14	5
Demarcated and Diffuse	1	1	na	na
Demarcated and Hypoplastic	0	1	na	na
Diffuse and Hypoplastic	0	0	na	na

TABLE 10

Dean's Index of Fluorosis

Dean's Index involves the categorisation of enamel opacities which are typical of those caused by excessive fluoride intake. A score of normal indicates the absence of fluorosis type opacities.

The prevalence of fluorosis, as measured by Dean's Index was very low in County Clare in 1990 in both 8 and 12-year residents of fluoridated and non-fluoridated communities, with 96 per cent or more having normal enamel. Of those affected by fluorosis all are in the "Questionable" or "Very Mild" grade. These figures are similar to those recorded for 8 and 15-year-olds in the Mid-Western Health Board in 1984.

The figures indicate that excessive fluoride intake was not a problem in County Clare during the period of formation of these children's permanent dentitions.

TABLE 10**Dean's Index of Fluorosis**

Percentage of 8 and 12-year-old children according to Dean's Index scores in County Clare in 1990 and in 8 and 15-year-old children in the Mid-Western Health Board (MWHB) in 1984 by age group and by fluoridation status.

Age	Area	Normal	Questionable	Very Mild	Mild	Moderate
8	Clare 1990					
	Full FI	96	2	2	-	-
	Non FI	100	-	-	-	-
8	MWHB 1984					
	Full FI	95	5	-	-	-
	Non FI	99	1	-	-	-
12	Clare 1990					
	Full FI	98	-	1	-	1
	Non FI	100	-	-	-	-
15	MWHB 1984					
	Full FI	95	5	-	-	-
	Non FI	100	-	-	-	-

TABLE 11

Treatment Need - Amount

The criteria adopted for the recording of dental caries in the study were those recommended by WHO for epidemiological surveys. These criteria record the presence of caries at cavitation level, i.e. at a stage when caries is undisputedly present and can be reliably and reproducibly diagnosed. It is recognised that the recording of caries at this stage, coupled with the lack of radiographic examination results in an underscoring of the condition. However, as epidemiological surveys have been using similar criteria for many years the results provide a valid indication of the trend in caries prevalence, that is, whether caries levels are declining or on the increase. Furthermore, valid comparisons can be made with other countries using the same criteria.

The recording of the examining dentists own clinical judgement of the treatment required on each tooth in addition to the standardised surface condition recording, gives a clearer indication of the levels of treatment required. The dentists' assessment of treatment need is presented in Table 11.

The most common treatment required was fillings ('total fillings required') with 8-year-olds resident in non-fluoridated areas having the greatest requirement (1.49). However, much of this need was for treatment of deciduous teeth, the mean number of fillings required in this group's permanent teeth was 0.66 fillings per person. The next most common treatment required was fissure sealants or preventive resin restorations in 8-year-old children, in the non-fluoridated sample the mean number of teeth requiring this treatment was 1.03 and in the fluoridated sample it was 0.64. Most of the extractions required were of the deciduous teeth of 5 and 8-year-olds.

TABLE 11**Treatment Need - Amount**

Mean number of teeth indicated for treatment according to the examiners' clinical judgement, by type of treatment and by age group (- = 0.00).

Treatment Need	Age Group							
	5		8		8		12	
	All teeth		All teeth		Permanent Teeth only		All Teeth	
	Full FI	Non FI	Full FI	Non FI	Full FI	Non FI	Full FI	Non FI
Fissure Sealant/Preventive Resin Rest	0.07	0.14	0.64	1.03	0.64	1.03	0.17	0.20
One surface filling	0.34	0.54	0.50	0.88	0.26	0.54	0.67	0.59
Two surface filling	0.25	0.38	0.39	0.54	0.08	0.10	0.30	0.27
Three surface filling	0.05	0.04	0.07	0.07	0.03	0.02	0.04	0.06
Crown	-	-	-	-	-	-	-	-
Pulp Treatment	-	-	-	-	-	-	-	-
Extraction due Caries	0.15	0.39	0.30	0.52	0.02	0.05	0.12	0.10
Extraction due Perio	-	-	-	-	-	-	-	-
Other Extractions	-	-	-	0.01	-	-	0.01	0.02
Other Treatment	-	-	-	-	-	-	-	0.03
Total Fillings Required	0.64	0.96	0.96	1.49	0.37	0.66	1.01	0.92

TABLE 12

Treatment Need - Distribution

According to the methods used in this study treatment requirements were considerably higher for children living in non-fluoridated areas. For example, 46 per cent of 5-year-old children in the non-fluoridated group required some treatment, only 28 per cent of the same age children in the fluoridated group required some treatment. For 8-year-old children 56 per cent of the 'Non FI' group required some treatment of their permanent teeth compared with 36 per cent of the 'Full FI' group. The need for both types of treatment; fillings and extraction was higher in the non-fluoridated sample in all age groups.

Most of the urban water supplies in Ireland are fluoridated. Hence, children who do not receive fluoride in their water supplies tend to be those living in rural areas. The higher level of unmet treatment in non-fluoridated areas could, therefore, be due both to the higher caries levels in children in these areas and also to the difficulties encountered by rural dwellers in attending dental clinics which tend to be sited in areas of high population density.

TABLE 12

Treatment Need - Distribution

Percentage of County Clare children requiring any treatment, fillings or extractions by age group in 1989.

	Age Group							
	5		8		8		12	
	All Teeth		All Teeth		Permanent Teeth		All Teeth	
	Full FI	Non FI	Full FI	Non FI	Full FI	Non FI	Full FI	Non FI
No treatment	72	54	43	24	64	44	51	38
Some treatment	28	46	57	76	36	56	49	62
One or more fillings	27	44	46	59	22	34	41	43
One or more extraction	5	11	15	32	1	4	8	9

TABLE 13

Periodontal Disease

The Community Periodontal Index of Treatment Needs (CPITN) was used to record the Periodontal status of 12-year-old children. It should be noted that children presenting with a highest score of calculus may also have bleeding gums. Thus, to ascertain the percentage of children requiring oral hygiene instruction the percentage with a score of bleeding should be added to the percentage with higher scores.

The percentage of 12-year-olds in County Clare in 1990 with a maximum score of pocketing of any depth was zero. Thirty five per cent had calculus as a maximum score whilst 38 per cent had a maximum score of bleeding. Twenty seven per cent were deemed to have all sextants healthy. These figures suggest that periodontal health in 12-year-olds in County Clare in 1990 is better than in 12-year-olds in the Mid-Western Health Board as a whole in 1984, where only 13 per cent were deemed to have all sextants healthy.

The mean number of sextants affected by each condition indicates the extent of the conditions present. In County Clare children in 1990, on average 3.4 of the six sextants examined, were healthy; 1.8 had bleeding and 0.6 had calculus. This indicates that although 35 per cent of children had calculus it was not present in many sextants. These figures were similar to those recorded in the MWHB in 1984.

TABLE 13

Periodontal Disease

Community Periodontal Index of Treatment Needs (CPITN). The percentage of 12-year-olds with a maximum score of H (healthy), B (bleeding), C (calculus) and P (pocketing). Also, the mean number of sextants affected by the different codes.

		12-year-olds				
		H	B	C	P	X
% with max. score	Clare 1990	27	38	35	0	0
	MWHB 1984	13	52	35	0	0
Mean no. of sextants aff.	Clare 1990	3.4	1.8	0.6	0.0	0.2
	MWHB 1984	3.2	2.0	0.5	0.0	0.3

TABLE 14

Dentofacial Anomalies

Orthodontic treatment need was classified according to the guidelines recommended by the Department of Health to the Health Boards. In addition both the dentists' and subjects' assessment of treatment need was recorded.

The percentage of 12-year-olds in County Clare who were deemed to require orthodontic treatment (i.e. in categories A, B or C) was 14 per cent, 12 per cent having non-handicapping conditions needing treatment and 2 per cent with extreme handicapping conditions.

The need for treatment as assessed by the dentists was somewhat higher at 19 per cent, the extra 4 per cent likely to be those who in the dentists' opinion were not within the "guidelines" but nevertheless required treatment.

The subjects' perception of his need for orthodontic treatment revealed that 45 children or 17 per cent felt that they needed orthodontic treatment. Further analysis would be required to ascertain the proportion of these 45 subjects who were included in the 51 recorded by the dentists as requiring orthodontic treatment.

TABLE 14

Dentofacial Anomalies

Percentage of 12-year-old children examined in County Clare in 1990 who had dentofacial anomalies by type and severity of anomaly. Percentage who had a perceived need for orthodontic treatment (subjects' assessment) and percentage who in the opinion of the dentist needed orthodontic treatment (Dentists' assessment).

	Category	n	%
A	Severe congenital/pathological defects present/repaired	0	0
B	Extreme handicapping malocclusions	5	2
C	Non handicapping malocclusions needing treatment	31	12
	Treatment needed		
	Dentists assessment	51	19
	Subjects assessment	45	17

TABLE 15

Trauma to Permanent Incisors

The four upper and four lower permanent incisors were examined in 8 and 12-year-old children for evidence of trauma.

A total of 14 children (4.8%) in the 8-year-old group examined in County Clare in 1990 had one or more permanent incisors with trauma excluding enamel fractures. The corresponding percentage for 12-year-olds was 6.1. Trauma of permanent incisors is considerably more prevalent in males compared to females the ratio being of the order of 3.5 : 1.0.

The figures for untreated fractures involving enamel and dentine suggest that many of the traumatised permanent incisors had not been treated or that the treatment (tip replacement) had been carried out but had failed. In the 8-year-old group 2.8 per cent of children had untreated incisor fractures (Fracture involving enamel and dentine). The percentage of 12-year-olds with such fractures was 2.7 per cent. Although there was little difference in the prevalence of untreated fractures involving enamel and dentine between the two age groups, there was a much higher percentage of treated fractures (Tip Replacements) in the 12-year-old group (3.8 as compared with 1.7 per cent). Loss of teeth due to trauma was found in only one child.

TABLE 15

Number and percentage of children with at least one permanent incisor affected by trauma by age group, sex and type of trauma.
(Enamel fractures not included).

	Age Group					
	8-year-olds			12-year-olds		
	M	F	Total	M	F	Total
Number with trauma	12	2	14	13	3	16
Trauma %	7.4	1.6	4.8	8.7	2.7	6.1
Fracture involving enamel and dentine %	4.3	0.8	2.8	4.7	0.0	2.7
Tip replacements %	3.1	0.0	1.7	4.7	2.7	3.8
Tooth lost due to trauma %	0.0	0.8	0.3	0.0	0.0	0.0

TABLE 16

Oral Health Knowledge 1. Source

Only 36 per cent of parents reported having had formal dental health education regarding their child from their dentists, dentists' assistant or doctors. Twenty six per cent of parents had received no information regarding care of their child's teeth and gums. Other parents (24 per cent) reported obtaining information from television, newspapers, magazines, etc.

These results clearly illustrate the need for an improvement in formal dental health education for parents.

TABLE 16

Oral Health Knowledge 1. Source

The number and percentage of parents responding to the question regarding the source of their oral health knowledge by response.

Who told you about the care of your child's teeth and gums?

	n	%
Don't know	16	6
Nobody	70	26
Dentist/Doctor or Dentist's Assistant	98	36
Media	65	24
Other	24	9

TABLE 17

Oral Health Knowledge 2. General

The level of oral health knowledge amongst parents was encouragingly high. Most parents (95 per cent) agreed that a child should visit the dentist for regular check-ups. Many parents didn't know about the effects of fluoridated water, 44 per cent knew that it would have an effect on the child's teeth. Ninety nine per cent of parents were aware of the harmful effect of sugar on teeth.

Three per cent disagreed with the potential for brushing with toothpaste to prevent cavities and 10 per cent did not know. This figure is surprising because of the extensive television advertising campaigns broadcast by toothpaste manufacturers aimed at enlightening parents regarding the caries preventive potential of various toothpastes.

Sixty five per cent of parents felt that caring for the gums in childhood was important. Nineteen per cent thought it would have little effect on gum disease later on, both this group and the 16 per cent who didn't know would benefit from some dental health education targeted at increasing their awareness of the role of plaque in the development of gum disease.

TABLE 17

Oral Health Knowledge 2. General

The percentage of parents who agreed or disagreed with each of five statements pertaining to oral health by statement and by response (percentage giving correct answer in heavy print).

	Agree	Disagree	Don't know	Total
	%	%	%	
A child should go to the dentist even when there are no problems with the teeth or gums.	95	3	3	100
Drinking water with fluoride has no effect on a child's teeth.	17	44	39	100
Eating sweet foods or sweet drinks regularly can be harmful to a child's teeth.	99	1	0	100
Thorough toothbrushing with toothpaste can reduce the chances of getting cavities in children's teeth.	87	3	10	100
Caring for the gums in childhood has little effect on gum disease later on.	19	65	16	100

TABLE 18

Oral Health Practices 1. Frequency of brushing child's teeth (8-year-olds)

Fifty four per cent of parents reported that their child brushed at least twice a day, of this group 62 per cent were caries free and the mean DMFT was 0.8. Forty per cent reported that their children brushed once a day and 55 per cent of these were caries free, the mean DMFT for this group was 0.9. Seven per cent reported that their children did not brush their teeth on a daily basis.

These figures show that 94 per cent of children brush their teeth at least once a day and there is a tendency for those who brush twice a day or more to have a slightly lower caries experience.

TABLE 18

Oral Health Practices 1. Frequency of brushing child's teeth (8-year-olds)

Number, per cent of total, mean DMFT and per cent caries free
for 8-year-olds according to reported frequency of brushing
(Values given where $n \geq 30$)

Frequency of brushing	n	% of total	DMFT	% caries free
Twice a day or more	150	54	0.8	62
Once a day	110	40	0.9	55
Less than once a day	18	7	-	-
Total	278	100	0.8	58

TABLE 19

Oral Health Practices 2. Who usually brushes the child's teeth (8-year-olds)

It was reported that 2 per cent of children never brushed their teeth. In 81 per cent of cases the child brushed them alone and in 16 per cent of cases the teeth were brushed under the parents' supervision. It is noteworthy that a higher percentage (76 per cent) of children brushing under parental supervision were caries free compared with those who brushed on their own (55 per cent). The mean DMFT for children who were supervised was 0.4 compared to 0.9 for those who brushed on their own. However, this relationship is possibly an indirect one in that parental supervision of tooth brushing may indicate a dentally aware family who are motivated towards prevention of dental caries.

TABLE 19

Oral Health Practices 2. Who usually brushes the child's teeth (8-year-olds)

Number, per cent of total, mean DMFT and per cent caries free
for 8-year-olds according to who brushes the child's teeth
(Values given where $n \geq 30$).

Who usually brushes child's teeth	n	%	DMFT	% caries free
No one	5	2	-	-
Child	224	81	0.9	55
Parent	2	1	-	-
Child and Parent	45	16	0.4	76
Other	1	0	-	-
Total	227	100	0.9	58

TABLE 20

Oral Health Practices 3. Frequency of snacks between meals (8-year-olds)

Fifty four per cent of children eat snacks once a day or less. There was a higher percentage of this group caries free (63 per cent) than of the 28 per cent who ate snacks more often (51 per cent caries free). There was a tendency for the mean number of decayed, missing or filled teeth to increase with the frequency of taking sweet snacks between meals although the increase was small. These findings are consistent with those of other studies where difficulties have been encountered in relating a current dietary pattern to a measurement of caries which relates to a dietary pattern which existed a year or so earlier when the caries was initiated. Although unlike some studies involving older children, there is some evidence in these figures, of the relationship between diet and dental caries.

TABLE 20

Oral Health Practices 3. Frequency of sweet snacks between meals (8-year-olds)

Number, per cent of total mean, DMFT and per cent caries free
for 8-year-olds according to parents' reported frequency
of snacking for 8-year-old children
(Values given where $n \geq 30$).

	n	%	DMFT	% caries free
Once a day or less	150	54	0.8	63
Twice a day	78	28	0.9	51
Three times a day or more	36	13	1.0	50
Don't know	15	5	-	-
Total	279	100	0.9	53

TABLE 21

Oral Health Practices 4. Duration of time since child's last visit to the dentist
(8-year-olds)

Only 33 per cent of children had been to the dentist in the last six months. Twenty three per cent had attended in the previous 6-12 months. Twenty seven per cent had attended more than 12 months ago, while, 16 per cent had never been to the dentist. The highest DMFT was found in the group who had visited the dentist in the last six months. However, it should be noted that the reason for the last visit to the dentist is not taken into account in this question. Further analysis would be necessary to reveal the percentage who visited in the last six months for relief of pain or for a check-up.

TABLE 21

Oral Health Practices 4. Duration of time since child's last visit to the dentist
(8-year-olds)

Number, per cent of total, mean DMFT and per cent caries free for
8-year-olds according to the duration of time since the child
last visited the dentist (Values given where $n \geq 30$).

	n	%	DMFT	% caries free
6 months or less	90	33	1.0	54
6-12 months	64	23	0.7	54
More than 12 months	73	27	0.9	52
Never	44	16	0.7	64
Don't know	3	1	-	-
Total	274	100	0.9	58

TABLE 22

Oral Health Practices 5. Type of dentist last visited (8-year-olds)

Most children were last seen by a dentist in the health board dental service (75 per cent). Fifty four per cent of this group were caries free compared with 65 per cent free in the group who had last visited a dentist in general practice (21%). This difference may be due to different dental awareness in the parents of the two groups with parents who have a higher dental awareness bringing their children to see their own family dentist rather than waiting for an appointment to be sent to them by the public dental services.

TABLE 22

Oral Health Practices 5. Type of dentist last visited (8-year-olds)

Number, per cent of total, mean DMFT and per cent caries free for 8-year-olds by type of dentist last visited by child
(Values given where $n \geq 30$).

	n	%	DMFT	% caries free
General Practice	49	21	0.5	65
Health Board	173	75	1.0	54
Other	10	4	-	-
Total	232	100	0.9	57

TABLE 23

Oral Health Practices 6. Reason child visited the dentist last time (8-year-olds)

The children with the lowest caries experience were those who had last visited the dentist for a check-up (DMFT 0.6, 62 per cent caries free). Only 46 per cent of those who last visited because of problems with their teeth were caries free, these children had on average more than twice the number of decayed, missing and filled teeth (DMFT 1.3) compared with those who last attended for a check-up.

TABLE 23

Oral Health Practices 6. Reason child visited the dentist last time (8-year-olds)

Number, per cent of total, mean DMFT and per cent caries free for 8-year-olds according to the reason the child last visited the dentist (Values given where $n \geq 30$).

	n	%	DMFT	% caries free
Trouble	87	38	1.3	46
Called in	39	17	0.8	59
Check-up	82	36	0.6	62
Other	23	10	-	-
Total	231	100	0.9	57

TABLE 24

Attitudes to Oral Health 1. How often should your child go to the dentist?

Most parents felt that their children should visit the dentist at least every six months (70 per cent). Only 5 per cent reported that they felt dental visits should be less frequent than every 12 months.

TABLE 24

Attitudes to Oral Health 1. How often should your child go to the dentist?

Number, per cent of total, mean DMFT and per cent caries free for 8-year-olds according to parents' attitude regarding correct frequency of dental visits (Values given where $n \geq 30$).

	n.	%	DMFT	% caries free
Every 6 months	188	70	0.9	56
Every 12 months	64	24	0.7	59
Less than once every 12 months	12	5	-	-
Don't know	5	2	-	-
Total	269	100	-	57

TABLE 25 and 26

Attitudes to Oral Health 2. Preferred treatment of carious permanent teeth

When asked what treatment they would prefer if their child had a carious permanent tooth 14 per cent said they would opt for extraction of a carious posterior tooth and 5 per cent said they would opt for extraction of carious anterior teeth. Clearly a higher value is placed on anterior teeth possibly because of their aesthetic importance. It is interesting to note that only 37 per cent of the children of parents who would prefer extraction of carious posterior teeth were caries free compared to 59 per cent of children of parents who would have expressed a preference for conservation of teeth. The mean DMFT for the former group was 1.5 and 0.8 for the latter group.

TABLE 25

Attitudes to Oral Health 2. Preferred treatment of carious permanent posterior teeth

Number, per cent of total, mean DMFT and per cent caries free for 8-year-olds according to the type of treatment preferred by their parents for carious posterior teeth.

How would you have a bad back tooth treated for your child?

	n	%	DMFT	% caries free
Filling	217	80	0.8	59
Extraction	38	14	1.5	37
Don't know	15	6	-	-
Total	270	100	0.9	57

TABLE 26

Attitudes to Oral Health 2. Preferred treatment of carious permanent anterior teeth

Number, per cent of total, mean DMFT and per cent caries free for 8-year-olds according to the type of treatment preferred by their parents for carious anterior teeth.

How would you have a bad front tooth treated for your child?

	n	%	DMFT	% caries free
Filling	240	90	0.9	58
Extraction	14	5	-	-
Don't know	14	5	-	-
Total	268	100	0.9	58

TABLE 27

Perceived Availability of Dental Services

Many parents (29 per cent) felt that there would not be a dentist available locally to treat their child if he/she had toothache. Forty per cent felt that routine treatment was not available locally and only 37 per cent felt that there were enough dentists working locally. These results indicate a high degree of dissatisfaction with the availability of dentists for the provision of routine dental care for children.

TABLE 27

Perceived Availability of Dental Services

**Percentage of parents who agreed, disagreed or "didn't know"
whether there were dentists available locally.**

	Agree	Disagree	Don't know	Total
If my child has toothache there is a dentist available to treat him/her locally.	69	29	3	100
If my child needs treatment but is not in pain there is a dentist available to treat him/her locally.	54	40	7	100
There are enough dentists working locally.	37	54	10	100

TABLE 28

Access to Dental Services 1. Perceived waiting period for dental appointment

Parents were asked how long they thought they would have to wait for an appointment if they wanted to bring their child to the dentist. Two hundred and seventy four parents answered the question. Twenty two per cent thought they could get an appointment within the week and 22 per cent thought it would take 1-4 weeks. Thirty eight per cent felt that they would have to wait more than one month for an appointment for their child.

TABLE 28

Access to Dental Services 1. Perceived waiting period for dental appointment

Number, per cent of total, mean DMFT and per cent caries free for 8-year-olds according to their parents' perceived waiting period for a dental appointment for the child.

	n	%	DMFT	% caries free
Less than 1 week	61	22	0.9	56
1-4 weeks	60	22	0.6	65
1-6 months	35	13	0.9	60
More than 6 months	70	26	0.9	57
Don't know	48	18	0.9	54
Total	274	100	0.9	58

TABLE 29

**Access to Dental Services 2. Preferred frequency of child's past dental visits
(8-year-olds)**

Two hundred and sixty five parents answered the question relating to their satisfaction with their child's visiting pattern to the dentist in the past. Seventy three per cent expressed dissatisfaction with the frequency of their child's visits and would like to have seen them attending more frequently. Of this group 56 per cent were caries free compared with 65 per cent of the group whose parents were satisfied with their frequency of attendance. These responses reflect parents' dissatisfaction with their access to dental services for their children in the past.

TABLE 29

**Access to Dental Services 2. Preferred frequency of child's past dental visits
(8-year-olds)**

**Number, per cent of total, mean DMFT and per cent caries free for
8-year-olds according to their parents preferred frequency of past
dental visits in respect of the child.**

	n	%	DMFT	% caries free
More frequent	193	73	0.9	56
The same	69	26	0.6	65
Less frequent	3	1	-	-
Total	265	100	0.8	59

TABLE 30

Access to Dental Services 3. Barriers to more frequent attendance

Most parents expressed a desire for increased access to dental services. Cost of dental treatment was perceived as a major barrier to attendance at the dentist with 92 per cent agreeing that their children would attend the dentist more often if good dental care cost less.

TABLE 30

Access to Dental Services 3. Barriers to more frequent attendance

My child would attend the dentist more often:

	Agree	Disagree	Don't know
If good dental care cost less	92	6	2
If travelling to and waiting at the dentists took less time	64	34	2
If we could get an appointment at a time that was suitable for us.	71	26	3

Acceptability of Services

Some questions were asked of parents of 8-year-old children which were designed to ascertain the acceptability both of dentists and dental services.

Acceptability of dentists was at a high level with 93 per cent of parents reporting that they found dentists "reasonably" or "very" friendly. Five per cent reported finding dentists a "little" or "quite" unfriendly. Ninety one per cent of parents thought dentists were good at their jobs, only one per cent thought that they weren't and 8 per cent didn't have any opinion one way or the other. Parents were also asked if they thought dentists tried to avoid causing pain, 91 per cent felt that they did, 2 per cent thought that they didn't and 8 per cent didn't know. The level of communication between dentist and parent was assessed by asking whether the dentist told parents what they were doing to the child's teeth. Eight five per cent of parents responded that dentists usually told them what they were doing, 7 per cent responded "sometimes", 3 per cent responded "rarely" or "never" and 5 per cent didn't know whether or not they had been given information of this kind.

Taking all the responses into account the dentist/parent relationship in County Clare appears to be very favourable.

Acceptability of services was measured by asking parents of children who had not been to the dentist in the past year, what was the reason for their non-attendance. Fifty nine per cent or 171 parents responded to the question, this number was greater than expected because 56 per cent of parents had already responded that their child was at the dentist within the previous 12-month period. However, some parents may have thought they should complete all questions. The most common reason given for non-attendance was "my child had no problem or need for treatment" (68 per cent). The next most common reason given was "it would cost too much money" (10 per cent), followed by "we didn't think the dental trouble our child had was serious enough to go to the dentist" (8 per cent). Five per cent "did not like to bother the dentist unless it was really serious". Parents of 4 children or 2.3 per cent of respondents said "I was afraid the treatment might be painful for my child". Four per cent "didn't know any good dentist". One per cent didn't have time to bring the child and one per cent found that the dental surgery was too far away to attend.

The responses to this question indicate that dental services are widely acceptable and fear of pain is not a major deterrent to "would be" attenders.

DISCUSSION

Introduction

This study of children's dental health in County Clare in 1990 was designed to fulfil four aims, namely

- the assessment of the oral health status of County Clare children in 1990 and a comparison with the results of the National Survey of Children's Dental Health in 1984;
- the provision of information for the planning and monitoring of oral health services in County Clare;
- the assessment of the effectiveness of water fluoridation in County Clare;
- the assessment of attitudes and knowledge relating to oral health among parents of 8-year-old children in County Clare.

This discussion will present a brief summary of the assessments made and some of the more relevant information gained from the study.

Dental Caries

The results indicate a lower level of dental caries in children living in fluoridated areas in all age groups when compared with children living in non-fluoridated areas. Differences between the two groups were in the order of 42, 33 and 11 per cent in 5, 8 and 12-year-old children respectively (Table 3). The diminution of the difference with age is attributed by many investigators to the availability of fluoride in foods and drinks processed in urban fluoridated areas to children living in non-fluoridated areas. Thus, Irish children who do not receive fluoridated water supplies are still likely to derive some of the benefit of water fluoridation. Furthermore, the prevalence of fluorosis in County Clare was only very slightly increased in fluoridated areas as compared with non-fluoridated areas.

A comparison of caries levels in County Clare in 1990 with those reported for the Mid-Western Health Board in 1984 (Table 3) shows an apparent reduction in caries levels in the six-year period 1984-1990. Caution should be exercised when comparing the two sets of data because the 1984 sample was selected from children living in Counties Clare, Limerick and North Tipperary and the 1990 sample is representative for children living in County Clare only. The two sets of data may not be directly comparable.

Although the reduction in caries levels found in children in recent years is encouraging the problem of high levels of caries is still a problem for many children. For example, 19 per cent of 12-year-old children have 5 or more decayed missing or filled teeth. In fact if one studies the distribution of caries in County Clare children, it is noteworthy that most caries is concentrated in one quarter to one-third of children. For example, in fluoridated areas 22 per cent of 8-year-olds have experienced 83 per cent of caries in teeth (DMFT ≥ 2). In the case of 12-year-olds 72 per cent of caries is experienced by 35 per cent of children (DMFT ≥ 4).

Treatment of Caries

Levels of untreated caries are high (Table 11) with 12-year-olds requiring approximately one filling per child on average. However, the need for treatment is concentrated in approximately half of each age group (Table 12). This indicates that screening of children prior to requesting them to attend a clinic may increase the cost effectiveness of services.

Periodontal Disease

Periodontal Disease is not a public health problem in 12-year-old County Clare children. Scaling of the teeth, however, is required for over a third of children (Table 13) whilst oral hygiene instruction is required for 73 per cent (those with bleeding gums, 38 per cent plus those with calculus, 35 per cent).

Prevention of Caries and Periodontal Disease

The early identification of children at risk to high caries levels and the targeting of preventive resources towards them would be a useful exercise. Children with high initial levels of caries have been found to be at greatest risk of developing further higher caries increments in subsequent years than those with initial low levels of caries (Whelton,

1989). Thus, the selection of children with high levels of caries for inclusion in preventive programmes may be a worthwhile exercise.

Between 1987 and 1989 a field trial of a preventive programme took place in the Southern Health Board (Goggin, 1990). The trial consisted of a fortnightly 2-minute rinse by school children with a 0.2% solution of sodium fluoride as well as placement of fissure sealants on the teeth of some subjects selected on the basis of previous high caries experience. The mean two year DMFS increment in the group included in the preventive programme was 0.6 surfaces which was 68 per cent lower than the increment (1.9 surfaces) which occurred in the control group who were not included in any preventive programme. The main difference was in the occlusal surfaces. The criteria for selection of children for the application of fissure sealants were as follows:

- children with evidence of anterior caries in either deciduous or permanent dentitions;
- children with caries in one or two first permanent molars.

In total 70 per cent of children in the preventive programme were selected for the application of fissure sealants. Children in the study ranged in age from 8-13 years. Most of the decay recorded in this study would have been prevented if a 'blanket approach' to the placement of fissure sealants on molars soon after their eruption, were taken.

The percentage of the total amount of decay and fillings in teeth which could have been prevented by the early application of fissure sealants in County Clare children in 1990 ranged from 79 per cent in 12-year-olds in non-fluoridated areas to 97 per cent in 8-year-olds in fluoridated areas. The percentage of children examined in the study with some fissure sealants recorded as present was higher than in 1984 (Table 7), however, only 10 per cent of 8-year-olds and 5 per cent of 12-year-olds had any fissure sealants present on their teeth.

As already mentioned 73 per cent of 12-year-olds required oral hygiene advice and 35 per cent required scaling of the teeth. Also, only 36 per cent of parents of 8-year-olds remembered receiving any advice regarding the care of their child's teeth and gums. Although a high percentage of parents reported that their children brushed their teeth at least once a day (94 per cent) this brushing is unlikely to be effective in plaque control unless they have received repeated instructions in a thorough tooth brushing technique. Hence, a major professional input is required to establish favourable oral hygiene practices in these children, with the aim of preventing problems of periodontal disease when they are older.

A factor which may facilitate the introduction of preventive programmes encompassing the application of fissure sealants and the dissemination of dental health education is the recent establishment of a register of dental hygienists. Dental hygienists may now practise under the supervision of a dentist in Ireland. The duties which they are allowed to perform include placement of fissure sealants and the scaling and polishing of teeth. Another favourable development is that the giving of dental health education is no longer considered as the practice of dentistry hence, anyone can now give advice on care of the teeth. There may be some benefit in providing continuing education (e.g. Diploma in Dental Health Education) to dental surgery assistants and deploying them to give dental health education in schools to groups of school children or teachers. Such a programme is already in operation in parts of the Eastern Health Board.

Dentofacial Anomalies

The epidemiological assessment carried out in this study found a very low prevalence of extreme handicapping malocclusions (2 per cent). Hence, there should be no difficulty in arranging the necessary care for children in this category. Twelve per cent of the children assessed were classed as having non-handicapping malocclusions needing treatment.

Oral Health Knowledge and Practices

Oral health knowledge amongst parents was at a high level and reported tooth brushing frequency for their children was excellent. Snacking habits were such that 41 per cent had sweet snacks twice a day or more although 99 per cent of parents knew that eating sweet foods or drinking sweet drinks regularly can be harmful to a child's teeth. The difference between what is known about the cause of caries and children's actual dietary patterns demonstrates the difference between knowledge and practices with regard to health behaviour, thus illustrating further the need for a concerted dental health education programme designed to provide the impetus for translating knowledge into a positive behaviour pattern.

Availability Acceptability and Accessibility of Services

A high degree of satisfaction with the acceptability of the quality of services was expressed by parents of 8-year-olds. Fear of pain was not a deterrent to attendance by

their children at the dentist. Dissatisfaction with the availability of services was expressed with 29 per cent of parents responding that even if their child had toothache there would not be a dentist available locally to treat him/her. Access to services was also a problem for many parents. The perceived waiting period for an appointment was more than one month in 38 per cent of cases and 73 per cent of parents said that they would have preferred more frequent visits for their children in the past.

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