



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Oral Health of 5-year-old children in the North East, 2002

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FOREWORD

As Assistant National Director of Primary, Community and Continuing Care for the HSE Dublin North East, I am very pleased to be associated with this Report, which is the first published population survey of 5-year-old children in Ireland.

It is well known that dental disease remains one of the most common chronic illnesses and yet it is preventable. Dental disease can affect a child's overall health and can cause acute pain and loss of sleep at night, causing upset and distress for the whole family. Dental treatment for small children can be difficult, especially for those with limited ability to co-operate and those with high treatment needs.

Although the oral health of all children has been steadily improving in Ireland since the introduction of water fluoridation in the 1960s, this Report shows that dental decay is still a cause for concern in our young children. For the first time we are also able to see that inequalities exist both between Local Health Office areas (Cavan/Monaghan, Louth/South Monaghan and Meath) and within a Local Health Office area (Meath). This highlights the value of collecting ongoing oral health data at a local level to assist with planning of preventive and treatment services.

The Health Services Executive has recently embarked on a new 'Transformation Programme' (2007 – 2010), and our aim is to ensure change, not only in what we do, but how we do it and most importantly, how we work together. This report is timely in terms of future planning of Oral Health Services, and also in that it recommends an integrated, early intervention, shared approach to the prevention of oral ill-health in young children. From the moment they are born, children often see a variety of primary and community health care professionals and all can have a role to play in health promotion.

I would like to thank the Public Dental Service survey teams who examined 3,310 children in 258 schools, and the teachers, children and parents who took the time to complete the questionnaire.

This report now gives us a standardised oral health database for 5-year-old children in the HSE Dublin North East, in line with the recommendation of previous strategy documents. It will also guide us in moving forward with future strategy and policy making, to improve the oral health of our children.

Tadhg O'Brien

Assistant National Director

Primary, Community and Continuing Care, Dublin North East



SUMMARY

1. The number of children aged 0-5 years, living in the North East, increased by 22.2% between 1996 and 2002. This age group is not currently targeted for routine care by the Public Dental Services in the North East.
2. Five-year-old children living in the North East have not achieved the oral health goals set out in the 1994 national health strategy *Shaping a Healthier Future*. In fluoridated areas in 2002, 59% of 5-year-olds had no decay experience (goal 85%) and in non-fluoridated areas, 49% of children had no decay experience (goal 60%).
3. In the North East as a whole, 41% of 5-year-olds in fluoridated areas and 51% of those in non-fluoridated areas had experienced tooth decay. Over 80% of the decay was untreated.
4. The level of decay in 5-year-old children in the North East was significantly lower in children living in areas with water fluoridation compared to children living in non-fluoridated areas ($p < 0.0001$). Children living in fluoridated areas had, on average, 1.4 decayed, missing or filled teeth. In non-fluoridated areas, children had, on average, 2.1 decayed, missing or filled teeth. There has been no change in decay levels in this age group in the North East as a whole since 1995.
5. Levels of decay were significantly higher in 5-year-old children who were disadvantaged, as measured by parental medical card ownership ($p = 0.004$). However, disadvantaged children living in fluoridated areas had less decay than disadvantaged children living in non-fluoridated areas.
6. Oral health inequalities exist between Community Care Areas (now Local Health Office areas) within the North East, with Louth/South Monaghan and Cavan/Monaghan having a greater burden of dental disease in 5-year-olds compared to Meath.
7. Oral health inequalities also exist within Community Care Areas. The most marked example of this is in Meath, where the average decay experience of 5-year-old children in the Nobber area (mean vdmft = 2.49) was more than two and a half times that of children in the Dunboyne area (mean vdmft = 0.88).
8. Less than half (45%) of 5-year-olds brushed their teeth twice a day, and over one third of them (37%) received no help with toothbrushing.
9. The decay levels of 5-year-olds in this study who brushed their teeth twice a day or more were significantly lower than those who brushed once a day or less ($p = 0.010$).
10. Forty one percent, or 2 out of 5 children used more than the recommended amount of toothpaste for this age group.
11. Children who were breastfed as infants had significantly lower levels of decay than children who had not been breastfed ($p = 0.02$).
12. The age at which children were weaned from their baby bottle was significantly associated with decay levels. Children who were older than 2 years of age when they were weaned from their bottle had higher decay levels than those who were weaned before 12 months of age ($p = 0.03$).



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13. Nineteen percent of 5-year-olds in the North East consumed sweet food or drinks between meals three or more times a day. Decay levels in these children were significantly higher than decay levels in children who consumed sweet food or drinks less frequently ($p=0.003$).
14. Almost one in 5 children had at least one first permanent molar (back tooth) present in the mouth at 5 years of age.
15. The majority (69%) of 5-year-old children in this survey had never been to the dentist. However, of those children who did attend the dentist, one child in three did so because of pain or an obvious dental treatment need. These children have been identified from this survey as a high risk group for tooth decay.
16. Parents felt strongly that children should be seen at a younger age by the Public Dental Service and that more information should be made available to them about treatment services and about oral health education/promotion.



RECOMMENDATIONS

1. This study found that in the North East as a whole, 41% of children in fluoridated areas and 51% of children in non-fluoridated areas had experienced decay at age 5. **In order to reduce the burden of dental disease in young children, an early intervention approach to the prevention of decay needs to be adopted in the North East. At this time, we recommend a Common Risk Factor Approach to prevention and oral health promotion, linking with other health promotion interventions which are aimed at younger age groups, and particularly those who are disadvantaged.**
2. **We recommend development of an Oral Health Strategy for the North East in this regard, which would complement a new National Oral Health Strategy.**
3. The results of this study show that, in the North East as a whole, 16% of all children in fluoridated areas and 25% of children in non-fluoridated areas have severe decay. For some of these children, the removal of the decayed teeth under general anaesthetic is the only treatment option. Comments from parents in our questionnaire stressed the difficulty in getting general anaesthetic appointments in a reasonable time frame within the North East. Although limited dental general anaesthetic services are available in Cavan/Monaghan and in Louth, children in Meath are currently travelling to Northern Ireland to have their decayed teeth removed under general anaesthetic. **We recommend that access to dental general anaesthetic services for children within the North East be improved as a matter of urgency.**
4. Our study has shown that 5-year-old children who attend the Public Dental Service in pain are a high risk, high need group. **We recommend that these high risk children be prioritised for follow-up oral health promotion and prevention services. This recommendation has resource implications which will need further discussion before implementation.**
5. Currently in the North East, routine dental services are targeted at children in 1st class (average age 7). The rationale for targeting this age group is to prevent decay in the newly erupted first permanent molars. This study has shown that 19% of 5-year-old children (Junior Infants class) have at least one first permanent molar present in the mouth. National figures show that at age eight, 20.5% of children in fluoridated areas and 24.6% of children in non-fluoridated areas have experienced decay in at least one permanent tooth. **We recommend that the targeted school dental service should include Junior and Senior Infants classes to allow maximum opportunity for prevention/early treatment of decay in first permanent molars. This recommendation has resource implications which will need further discussion before implementation.**
6. This study has shown the value of collecting oral health data at a local level to help with planning of dental services to reduce inequalities in oral health. **We recommend that in future, oral health data is collected at a local level on an ongoing basis. Developments in dental information and communications technology should be designed to facilitate such data collection.**
7. This study found that children who were breastfed had significantly lower levels of decay than those who were not breastfed. It also found that late weaning from the baby bottle (over the age of 2 years) was associated with higher levels of decay than early weaning (before 12 months of age). **We recommend that this finding be taken on board by all Health Service Executive staff who work with children, to ensure a multidisciplinary approach is adopted to improving oral health, while promoting sound nutrition strategies in this age group.**



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8. This study found that children who consumed sugary foods and drinks in between meals 3 or more times a day had significantly more decay than those who snacked on sugary foods or drinks less frequently. **We recommend that this finding be widely disseminated within the Health Service Executive, to schools and parents, and incorporated into future Oral / Health Promotion information and advice.**
9. This study found that less than half of all 5 year old children brushed their teeth twice a day, but those who did brush twice a day or more had significantly less decay than those who brushed once a day or less. **We recommend that this finding be incorporated into all Oral/Health Promotion information and advice, and that research be undertaken to identify how best to encourage more frequent toothbrushing among children in the North East.**
10. This study provides information on the toothbrushing practices of 5-year-old children in the North East immediately prior to the publication of recommendations on toothbrushing and toothpaste use in Report of the Forum on Fluoridation. **We recommend that a new study be carried out to measure the level of compliance with these recommendations.**



INTRODUCTION

On January 1st 2005, a new agency, the Health Service Executive (HSE), assumed responsibility for the health service in the Republic of Ireland. As part of the Irish government's Health Service Reform Programme, the functions of Health Boards, including the former North Eastern Health Board, were transferred to the Health Service Executive. The former North Eastern Health Board is now under the auspices of the Health Service Executive and is part of the HSE Dublin North East. The administrative areas that made up the former North Eastern Health Board were known as Community Care Areas but are now called Local Health Offices. Since this report covers a period that predates the formation of the Health Service Executive, the former terms "North East" and "Community Care Area" are used throughout this report.

The North East covers the counties of Cavan, Monaghan, Louth and Meath. For administrative purposes, the Public Dental Services in the North East are delivered through three local Community Care Areas (CCAs) - Cavan/Monaghan, Louth/South Monaghan and Meath.

The following profile of the population of the North East is adapted from the Central Statistics Office online Census Interactive Tables¹ and *Health Status of the people of the North East, 2004*².

Profile of the population of the North East

The population of the North East has increased dramatically since the mid 1990s, mainly due to the widening commuter belt around Dublin. Between 1996 and 2002, the population of the North East increased by 12.7%, from 306,155 to 344,965. The greatest increases were seen in Meath, where the population increased by 22.1% and in Louth, where the population increased by 10.5%. Cavan and Monaghan showed modest increases of 6.8% and 2.5% respectively (Table 1). The number of children aged 0-5 years in the North East increased from 26,697 in 1996 to 32,624 in 2002, an increase of 22.2%. The population of the North East has continued to grow since 2002, as shown in Table 1.

Table 1: Population of the four counties of the North East, 1996-2006

	1996	2002	2006	% difference 1996 - 2002	% difference 2002 - 2006
Louth	92,166	101,821	110,894	10.5	8.9
Meath	109,732	134,005	162,621	22.1	21.4
Cavan	52,944	56,546	63,961	6.8	13.1
Monaghan	51,313	52,593	55,816	2.5	6.1
North East	306,155	344,965	393,292	12.7	14.0

Note: Adapted from CSO online interactive tables¹

Considerable differences exist between the four counties of the North East in terms of social and environmental factors that can impact upon health, such as employment, social class profile, urban/rural split and medical card ownership (Table 2). The populations of Cavan and Monaghan are mainly rural, and the unemployment rates in these two counties are similar to the national rate. Louth has the most urbanised population, with almost two thirds of the population living in the large towns of Dundalk and Drogheda. It has the highest levels of unemployment (13.0%) and the highest percentage of medical card holders in the North East (35.3%). Meath, in contrast, can be considered the most



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“advantaged” county of the North East, with the lowest levels of unemployment (6.6%) and medical card ownership (23.5%), and the highest percentage of persons in social classes 1 and 2 (34.2%) (Table 2).

Table 2: Social and environmental population profile of the North East

	Louth	Meath	Cavan	Monaghan	National
% living in urban areas	64.2	44.6	16.8	27.9	59.6
Unemployment rate	13.0	6.6	7.9	9.9	8.8
Medical card ownership	35.3	23.5	33.2	31.6	29.4
% in social class 1 and 2	27.4	34.2	25.4	27.9	31.6

Note: Adapted from Health status of the people of the North East, 2004²

Material deprivation in the North East

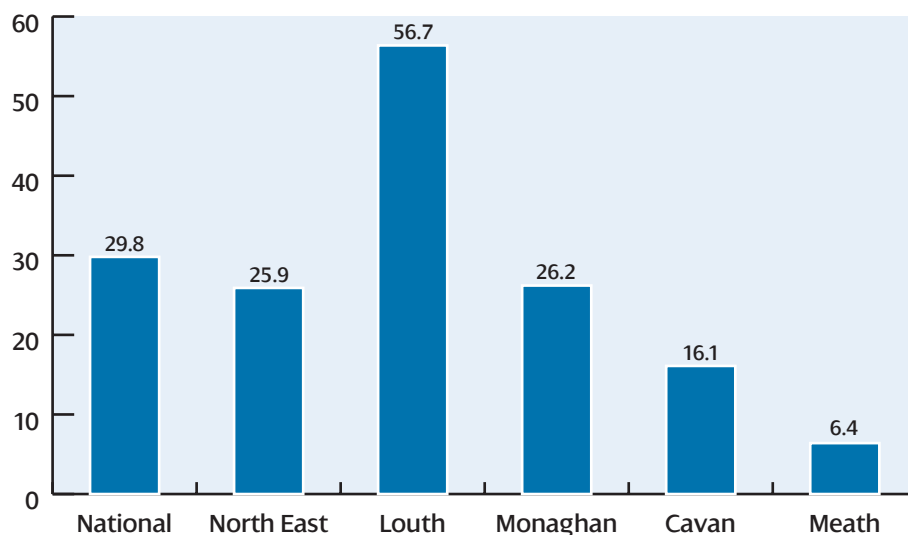
The Small Area Health Research Unit (SAHRU) in Trinity College Dublin has developed a mathematical model to calculate deprivation scores for all Electoral Divisions (EDs) in the country³. This model uses five census-based variables, which are widely acknowledged to represent, or be a determinant of, material deprivation. The census variables used are:

1. Unemployment: proportion of the economically active population (15 years or older) unemployed or seeking a first time job.
2. Low social class: proportion of the population (social classes 1 to 6 only) in social class 5 or 6.
3. No car: proportion of permanent private households with no car.
4. Rented accommodation: proportion of permanent private households rented privately or from a local authority, or in the process of being acquired from a local authority.
5. Overcrowding: ratio of the total number of persons divided by the total number of rooms in permanent private household.

The deprivation index ranges from 1 to 10. An ED with a score of 1 is classified as most affluent, while an ED with a score of 10 is classified as most deprived. Figure 1 shows the percentage of the population living in deprived EDs (deprivation score 9 or 10) in the North East and nationally. In the North East as a whole, 25.9% of the population live in EDs that are classified as deprived. This compares favourably with the national figure of 29.8%. However, when the deprivation index is applied to each of the individual counties within the North East, marked differences are seen. In Louth, the percentage of the population living in deprived EDs is 56.7%, compared to 26.2% in Monaghan, 16.1% in Cavan and just 6.4% in Meath. These findings reinforce the fundamental differences in population profile that exist between the counties that make up the North East.



Figure 1: Percentage of population living in deprived electoral districts by national deprivation score



Note: Adapted from Health status of the people of the North East, 2004²

Fluoridation status

Water fluoridation was introduced into the Republic of Ireland in the 1960s⁴ as a public health measure to tackle the extremely high levels of dental decay that existed at that time. Numerous studies since then have shown that decay levels among children and adults who have fluoridated water supplies are lower than those who live in non-fluoridated areas⁵⁻¹⁰. Approximately 71% of the population of the Republic of Ireland has fluoridated domestic water supplies⁹. In the North East as a whole, the figure is approximately 55%, but this figure varies widely between the Community Care Areas. Approximately 76% of the population of Meath has fluoridated water compared with 70% in Louth/South Monaghan and 31% in Cavan/Monaghan⁷.

Background to study

In 1995, a survey of children and adolescents in the North East showed that, between 1984 and 1995, the oral health of 8-, 12- and 15-year-olds improved in both fluoridated and non-fluoridated areas⁷. Among 5-year-olds, however, it was found that there had been no improvement in dental decay levels. This was considered, at the time, as an indication that the dramatic and constant improvement in the oral health of children since the 1960s seemed to be “levelling out”.

It is recognised that the most consistent predictor of caries risk is past caries experience¹¹⁻¹³. Therefore, the oral health of 5-year-olds could be considered as an indicator of the potential future burden of disease for these children. In addition, the oral health of 5-year-olds is of concern in terms of planning oral health services, including oral health promotion, as this age group is not routinely targeted for dental care in Ireland. Since the 1980s, the Public Dental Service in Ireland has generally operated a targeted approach to the delivery of dental services to children. This targeted approach has been strongly influenced by the availability of resources and also by the *Report of Working Group appointed to review the delivery of Dental Services*¹⁴. This report, commonly known the Leyden Report, recognised that resources for comprehensive dental services were not available at that time, and therefore recommended that the service should focus on children in 1st and 6th classes and that priority should be given to the treatment of permanent teeth. In line with these recommendations, the classes most frequently targeted by the Public Dental Service are 1st or 2nd, 4th and 6th¹⁵.



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In 1999, the Department of Health and Children commissioned a series of research contracts as part of a major review of various aspects of the dental services in Ireland. One of these research contracts included a national survey of the oral health of children, which would involve the participation of every health board dental service in the country in the conduct of the fieldwork.

Given the existing concern about levels of decay in 5-year-old children in the North East, the dental service and senior management of the North East decided to use the opportunity of the national survey to concurrently undertake a comprehensive survey of the oral health of 5-year-olds in order to develop an evidence base from which to plan future services.



AIMS AND OBJECTIVES

The aim of the survey was to establish a standardised database of the oral health status of 5-year-old children in the North East, in line with the 1994 National Health Strategy *Shaping a Healthier Future*¹⁶. In addition, it was hoped that the findings of the survey would help develop quality public dental services in the North East, with a focus on people-centredness and equity, as outlined in the National Health Strategy 2001, *Quality and Fairness - a Health System for you*¹⁷.

The objectives were to:

- Measure levels of dental decay in 5-year-old children living in fluoridated and non-fluoridated areas of the North East in 2002.
- Compare levels of decay in 5-year-olds in the North East with national figures for this age group in 2002.
- Compare decay levels in the North East in 2002 with those of previous studies in 1995 and 1984.
- Compare levels of dental decay in the three Community Care Areas of the North East.
- Measure the impact of disadvantage (using parental medical card ownership as an indicator of disadvantage) on levels of decay in this age group.
- Identify geographic areas within the North East where decay levels are highest.
- Measure dental health care practices and parental attitudes to dental treatment for this age group.
- Measure use of dental services by this age group within the North East.



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METHODOLOGY

The target population for the survey was all children in Junior Infant class in mainstream national schools under the care of the Public Dental Service in the North East. In September 2001, there were 295 such national schools; 118 in Cavan/Monaghan, 77 in Louth/South Monaghan and 100 in Meath. Department of Education statistics for September 2001 reported a total of 5,015 children in Junior Infant class in the counties of Louth, Meath, Cavan and Monaghan.

This survey was carried out as an extension of the national survey of children's oral health, commissioned by the Department of Health and Children. The protocol for the national survey was developed by the national survey project team in the Oral Health Services Research Centre, Cork, and approved by the Ethics Committee of the Cork Teaching Hospitals. The national protocol was followed in the North East for the examination of 5-year-old children.

The survey involved a dental examination carried out in the school for all children returning positive consent. Consent forms were issued through the schools to the parent/guardian of every child in Junior Infant class. Each consent form was accompanied by a four-page questionnaire, which sought information on oral hygiene and diet habits, dental attendance of the child, and parental attitudes to dental treatment. The questionnaire was developed within the North East and was piloted before use in the survey.

Three dental teams were trained and calibrated for the survey (one for each Community Care Area) and fieldwork was carried out between late 2001 and mid 2002. An additional trained and calibrated fieldworker replaced one of the original examiners during the course of the survey. The list of survey teams is provided in Appendix 1. Ten percent of the total sample was re-examined to ensure examiner consistency.



RESULTS

Numbers examined

Two hundred and fifty eight schools were visited in the course of the survey (92 in Cavan/Monaghan, 69 in Louth/South Monaghan and 97 in Meath), representing 87.5% of all eligible schools in the North East (Table 3).

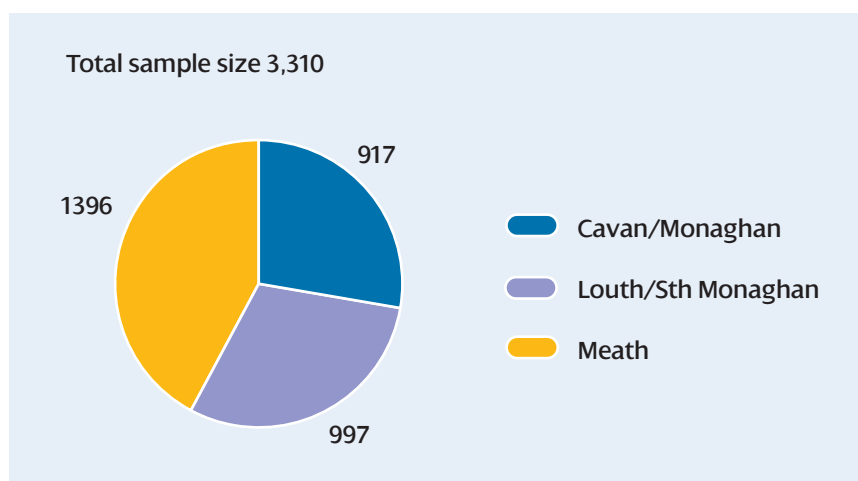
Table 3: Number and percentage of schools visited in the survey, by Community Care Area

	Cavan/Monaghan	Louth/South Monaghan	Meath	Total
Number of primary schools	118	77	100	295
Number of schools visited	92	69	97	258
% of schools visited in survey	78%	90%	97%	87.5%

The lower percentage of schools visited in Cavan/Monaghan is partly explained by the high number of small schools in this mostly rural Community Care Area, which made it more difficult for the examining team to visit all schools in the necessary time frame.

A total of 3,310 children were examined, representing 66.0% of the population of children in Junior Infant class. The numbers examined in each Community Care Area are presented in Figure 2. Table 4 shows a breakdown of the number and percentage of children examined, by Community Care Area.

Figure 2: Number of children examined by Community Care Area



Although the percentage of schools visited was lowest in Cavan/Monaghan, the percentage of children examined was higher in this Community Care Area than in Louth/South Monaghan.



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Table 4: Number and percentage of children examined by Community Care Area

	Cavan/Monaghan	Louth/South Monaghan	Meath	Total
No. of children in Junior Infants*	1449	1697	1869	5015
Number examined	917	997	1396	3310
% of eligible children examined	63.2%	58.7%	74.7%	66%

*Note: Taken from Dept of Education figures for Sept 2001.

Some of the differences between the Community Care Areas in the percentage of children examined could be explained by the different administrative arrangements that were set up in each of the areas in order to carry out the survey. In Meath, one of the survey team members was released full time to carry out the extensive administrative work involved in the survey, whereas this was not the case in the other two areas. The response rate may also have been affected by the lengthy and complicated consent form, which a considerable number of parents failed to sign, in spite of indicating their willingness to participate by completing the four-page questionnaire. Unless these parents could be contacted on the day of the examination, and consent obtained either by phone or by the parent calling to the school, these children had to be excluded.

Fluoridation status

In this survey, fluoridation status was assigned to each child based on information given by the parent/guardian on the type of water supply at the child's current and any previous addresses. The classification of fluoridation status was the same as that used in the national children's survey, namely:

Full:	The child had a fluoridated domestic water supply in the home since birth.
None:	The child had no exposure to fluoridated water in the home since birth and has never used fluoride mouthrinses or supplements.
Part:	The child had fluoridated water in the home, but not continuously since birth.
Rinse only:	The child's home address had never had a fluoridated water supply but the parent reported that the child had taken a fluoride mouthrinse or participated in a school fluoride mouthrinse scheme.
Mixed:	Children in this group reported taking fluoride supplements and may also have used fluoride mouthrinse.
Not recorded:	There was insufficient information to determine the fluoridation status of the domestic water supply.

Table 5 contains the breakdown of the sample by fluoridation status. A considerable percentage of children in Meath (16.0%) fell into the "Part" category, due either to migration from a fluoridated area to a non-fluoridated area, or because of interruption to the fluoridated water supply which had occurred in parts of Meath in the preceding 5 years. The low figure for full fluoridation in Cavan/Monaghan (20.5%) reflects the fact that only a minority of the population in this CCA have a fluoridated water supply.



Table 5: Number and percentage of children examined by fluoridation status and Community Care Area

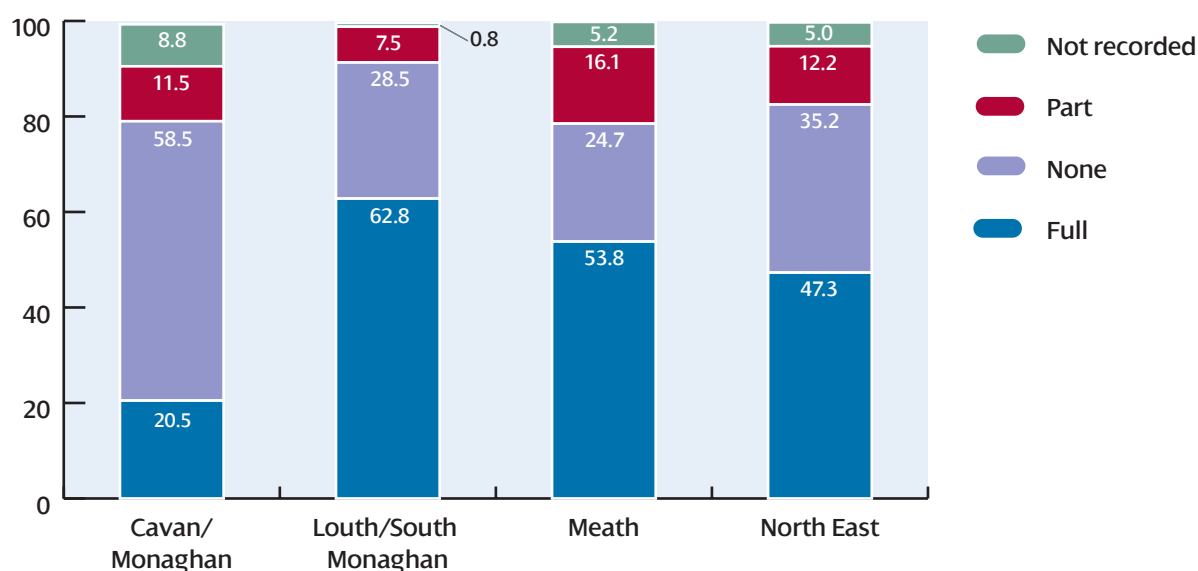
	Cavan/Monaghan		Louth/South Monaghan		Meath		North East	
	n	%	n	%	n	%	n	%
Full	188	20.5	626	62.8	751	53.8	1565	47.3
None	536	58.5	284	28.5	345	24.7	1165	35.2
Part	105	11.5	75	7.5	224	16.1	404	12.2
Rinse	1	0.1	1	0.1	2	0.1	4	0.1
Mixed	6	0.7	3	0.3	2	0.1	11	0.3
Not recorded	81	8.8	8	0.8	72	5.2	161	5.0
Total	917	100%	997	100%	1396	100%	3310	100%

Percentages may add to >100 due to rounding

The percentage of children in each of the main fluoridation categories is shown in Figure 3.

Figure 3: Percentage of children in each fluoridation category by Community Care Area

(Rinse and mixed categories excluded due to small numbers)



In this report, results are presented only for children with a fluoridation status of “Full” or “None”.

Medical Card Status

The Medical Card Scheme entitles the holder of a medical card to a range of free health services. In most cases, with the exception of persons over the age of 70, eligibility for a medical card is based on a means test. Because the majority of medical card holders are on low incomes, medical card status has been used in dental surveys in Ireland as an indicator of disadvantage^{9, 18, 19}. Table 6 contains a breakdown of the sample by medical card status. Louth/South Monaghan had the highest percentage of children with medical card cover (29.0%) and Meath had the lowest (18.0%). This finding is consistent with the distribution of medical card ownership for all age groups within the North East (Table 2).



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Table 6: Number and percentage of children examined by medical card status and Community Care Area

	Cavan/Monaghan		Louth/South Monaghan		Meath		North East	
	n	%	n	%	n	%	n	%
Medical Card Yes	227	24.8	289	29.0	251	18.0	767	23.2
Medical Card No	665	72.5	700	70.2	1128	80.8	2493	75.3
Not Recorded	25	2.7	8	0.8	17	1.2	50	1.5
Total	917	100.0	997	100.0	1396	100.0	3310	100.0

Dental decay - terminology

Dental decay is traditionally recorded using the DMF index (Decayed, Missing or Filled), which records all decay experience, both treated (i.e. teeth filled or extracted due to decay) and untreated. By convention, DMFT in capital letters denotes permanent teeth while dmft in lower case letters denotes primary teeth. Because of the age of the children in this survey, all values for decay relate to primary teeth only and therefore “dmft” will be used throughout this report. The methodology of the World Health Organisation (WHO) for dental surveys²⁰ records decay at cavitation level i.e. only when a cavity into dentine is present, and into which a 0.5mm diameter probe can be inserted. This method has been used in past dental surveys in Ireland and internationally. However, it is accepted that recording decay at cavitation level underestimates the level of decay by approximately 15-20%²¹, as decay into dentine frequently occurs without obvious cavitation. To overcome this problem, a modified version of the dmft index has been introduced, which records visual decay at dentinal level *without* cavitation, in addition to decay at cavitation level, to give a more accurate measure of decay in the population. The scientific notation for decay including the visual component is $d_{3vc}mft$. In this report, decay levels are reported including the visual component, unless otherwise stated, and for simplicity are denoted “vdmft”. Where decay levels are compared with surveys prior to 1995, the original dmft index is used, as the recording of the visual component of decay was not introduced into dental surveys in Ireland until the mid 1990s.

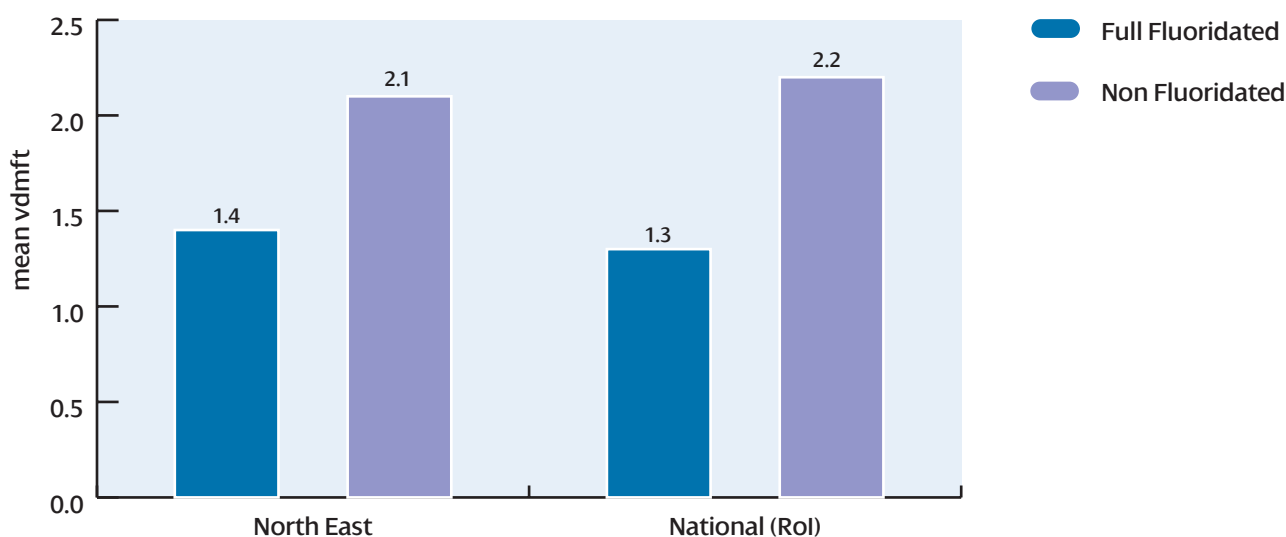


CLINICAL RESULTS

Levels of decay in the North East

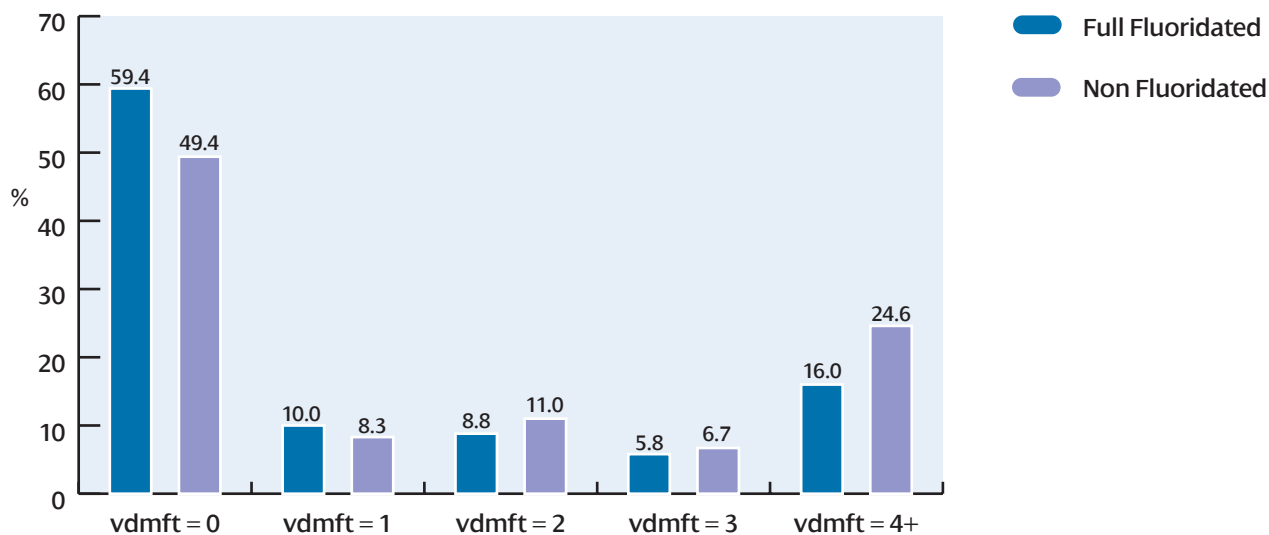
This survey found that the decay levels of children living in fluoridated areas in the North East were considerably lower than those of children living in non-fluoridated areas. **Five-year-old children with water fluoridation had, on average, 1.4 decayed, missing or filled teeth (mean vdmft = 1.4), whereas the mean vdmft for those in non-fluoridated areas was 2.1 (Figure 4).** The average level of decay experienced by 5-year-old children in the North East was almost identical to that found in 5-year-olds in the Republic of Ireland⁹.

Figure 4: Average decay experience (mean vdmft) of 5-year-olds in the North East and RoI, 2002



However, it is known that decay in children is not evenly distributed – many children have no decay while a substantial proportion experience high levels of decay. The distribution of decay in 5-year-olds in the North East is shown in Figure 5. It can be seen that in fluoridated areas, over half of all 5-year-olds (59.4%) had no decay experience (i.e. vdmft = 0), while in non-fluoridated areas, just under half of all 5-year-olds (49.4%) had no decay experience.

Figure 5: Distribution of decay experience (vdmft) in 5-year-olds in the North East, 2002





ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

The healthcare strategy of the 1990s, *Shaping a Healthier Future*¹⁶, set a number of oral health goals to be achieved by the year 2000. For 5-year-olds, the goal was for at least 85% of children in optimally fluoridated areas to be free of decay, and at least 60% of children in non-fluoridated areas to be free of decay. As can be seen in Table 7, the North East has fallen well short of these targets.

Table 7: Percentage of 5-year-old children who were free of decay in the North East in 2002, compared with goals set for the year 2000

	Fluoridated	Non-Fluoridated
Oral Health Goal for the year 2000	85%	60%
North East 2002	59.4%	49.4%
National (Rol)	63.1%	45.5%

Another way to analyse decay levels in children is to consider the proportion of children who have experienced decay, i.e. those who have a vdmft score of 1 or more. **In the North East, 40.6% of 5-year-olds in fluoridated areas had experienced decay while in non-fluoridated areas, the figure was 50.6%** (Figure 5).

The more decayed teeth a child has, the greater the problem; both for the child, who has a greater chance of developing pain from diseased teeth, and also for the dental services. Treatment of a single tooth for this age group can often be challenging, but treatment of multiple teeth for such young children often necessitates general anaesthesia, which carries additional risks for the patient and substantial costs to the health service. In this survey, a vdmft value of 4 or more was taken as a measure of severe decay. In fluoridated areas in the North East, 16.0% of all 5-year-olds had severe decay (**4 or more decayed, missing or filled teeth**) while in non-fluoridated areas, the figure was 24.6%, or **approximately one child in four** (Figure 5).

As mentioned earlier, the vdmft index represents total decay experience, both treated (i.e. filled or extracted) and untreated. Table 8 presents the contribution of the decay component of the vdmft score to average decay experience of 5-year-olds in the North East and nationally. In the North East, untreated decay accounted for almost 86% of all decay experience of children in fluoridated areas, and for 84% of decay experience in non-fluoridated areas. The national figures were approximately 83% in both fluoridated and non-fluoridated areas⁹.

Table 8: Contribution of the decay component to the vdmft score in the North East and Rol by fluoridation status, 2002

	North East		National (Rol)	
	mean vdmft	%d	mean vdmft	%d
Fluoridated	1.4	85.7	1.3	82.6
Non-Fluoridated	2.1	84.0	2.2	83.1

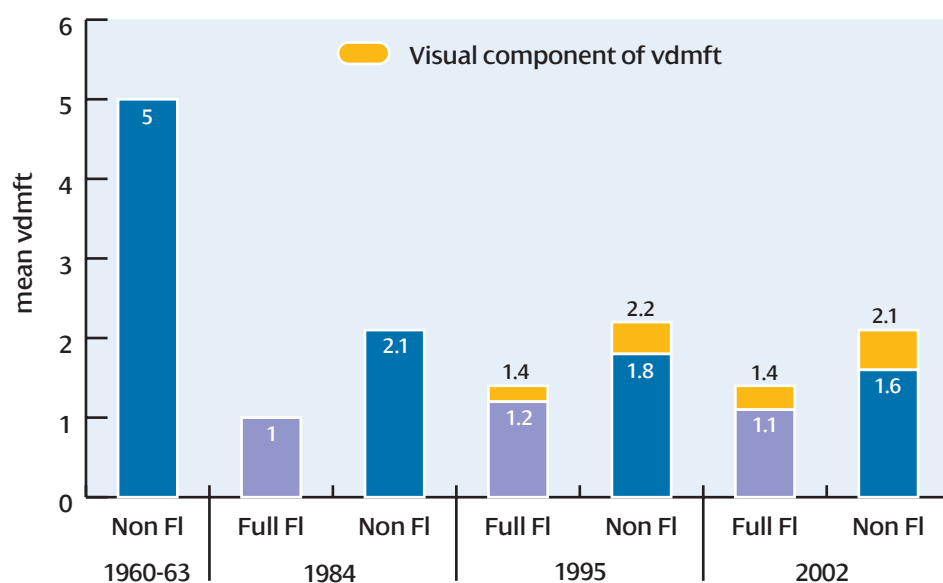


Changes in decay in the North East over time

Decay levels in 5-year-old children in the North East in 1960-63, 1984, 1995 and 2002 are shown in Figure 6. Prior to 1995, dental caries was measured using the dmft index only which, as mentioned earlier, records decay at cavitation level and does not include a visual component. Decay levels from 1995 onwards are shown using both the dmft and vdmft indices. The 1995 dmft data for the North East is taken from the report *North Eastern Health Board – Oral Health of Children and Adolescents, 1995*⁷. The vdmft data is unpublished data from the same survey.

The level of decay experienced by 5-year-old children in the North East has fallen dramatically in fluoridated and non-fluoridated areas since the 1960s (Figure 6). The average number of decayed, missing or filled teeth (dmft) fell from 5.0 in 1960-63 to 1.0 in fluoridated areas and to 2.1 in non-fluoridated areas in 1984. A further decline in mean dmft was seen in non-fluoridated areas between 1984 and 2002, while decay levels in fluoridated areas have remained fairly static since 1984 (Figure 6). Using the vdmft index, there was virtually no change in decay levels in fluoridated and non-fluoridated areas between 1995 and 2002.

Figure 6: Average decay experience of children in the North East by fluoridation status and time



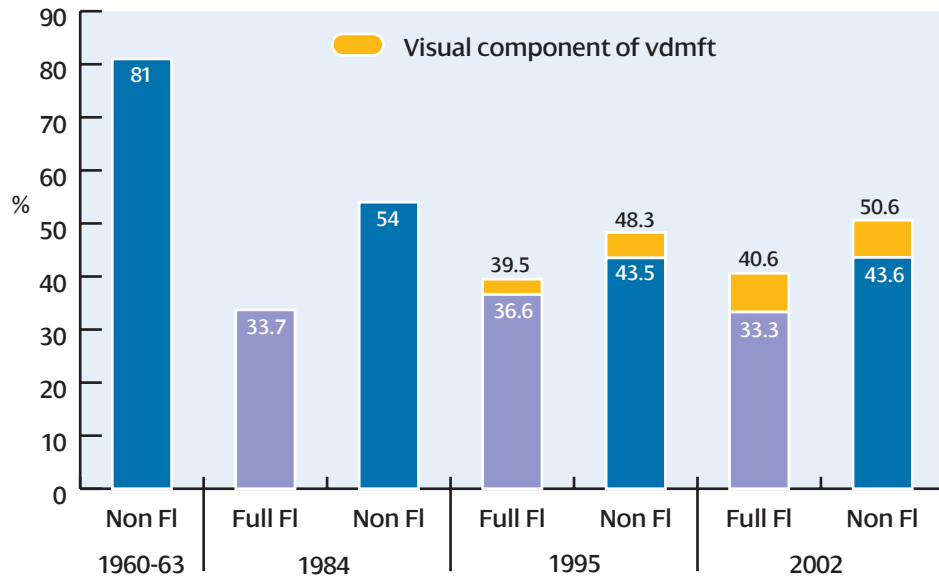
Note: mean dmft shown within column and mean vdmft shown above column.

The percentage of children who experienced decay also fell dramatically in fluoridated and non-fluoridated areas of the North East since the 1960s (Figure 7). In 1960-63, 81% of 5-year-olds had experienced decay. Between 1960-63 and 1984, the percentage of children with decay fell to 54% in non-fluoridated areas and 33.7% in fluoridated areas. Looking at the dmft index, the percentage of children with decay in non-fluoridated areas declined further between 1984 and 1995 (from 54% to 43.5%) but has since levelled out. In fluoridated areas, the percentage of children with decay increased from 33.7% to 36.6% between 1984 and 1995. However, the figure for 2002 was almost identical to that of 1984. Using the vdmft index, the percentage of children with decay in the North East increased between 1995 and 2002 by approximately 1% and 2% in fluoridated and non-fluoridated areas respectively (Figure 7).



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Figure 7: Percentage of children with decay experience in the North East by fluoridation status and time

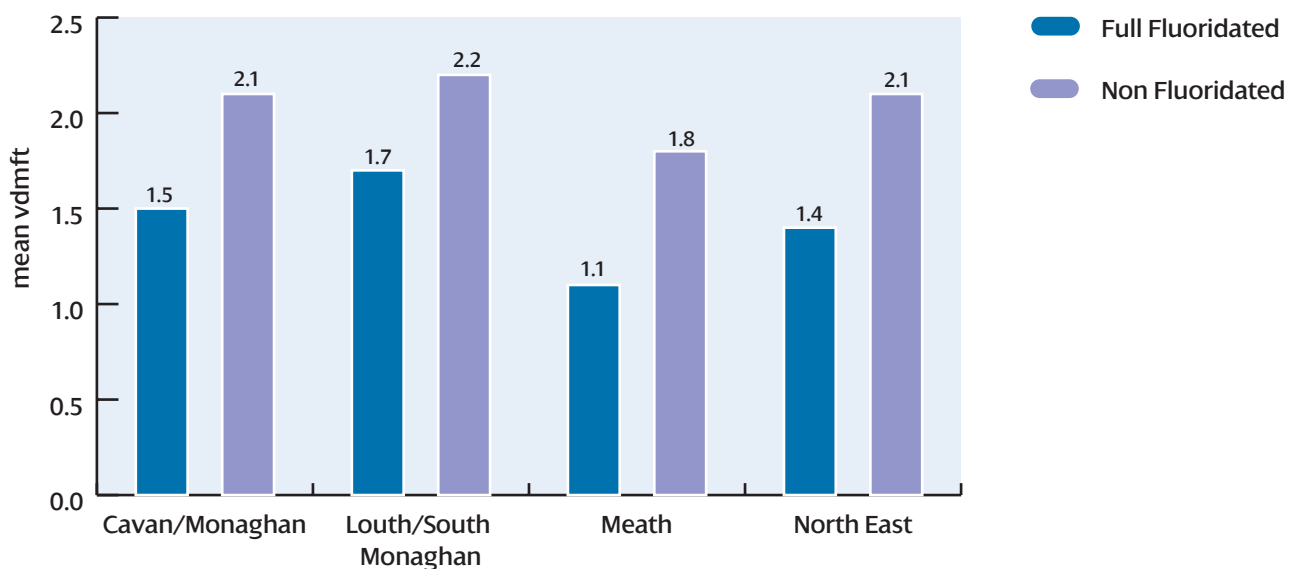


Note: % measured using dmft index shown within column, % using vdmft index shown above column.

Levels of decay by Community Care Area

We have already seen that in 2002, decay levels in 5-year-olds in the North East as a whole were almost identical to the national figures (see Figure 4). However, when decay levels were analysed by Community Care Area, striking differences were seen between the areas. **Decay levels were substantially higher in both Cavan/Monaghan and Louth/South Monaghan than in Meath.** The average decay experience (mean vdmft) of children in fluoridated areas in Louth/South Monaghan was 1.7, which is 55% higher than that of Meath (mean vdmft = 1.1). In non-fluoridated areas, the difference was approximately 22% (mean vdmft 2.2 vs 1.8). The mean vdmft by Community Care Area is shown in Figure 8.

Figure 8: Average decay experience (mean vdmft) by Community Care Area and in the North East as a whole, 2002





The percentage of children with decay experience also differed between Community Care Areas (Figure 9). In fluoridated areas, the percentage of children with decay varied from 42.6% in Cavan/Monaghan to 46.5% in Louth/South Monaghan and 35.3% in Meath. In non-fluoridated areas, the values were 47.8%, 57.4%, and 49.6% respectively. Although Cavan/Monaghan had the lowest percentage of children with decay experience in non-fluoridated areas (47.8%), it must be remembered that the majority of the population in Cavan/Monaghan lives in non-fluoridated areas, in contrast with the two other Community Care Areas, where the minority of the population lives in non-fluoridated areas.

Figure 9: Percentage of children with decay experience by Community Care Area and in the North East as a whole, 2002

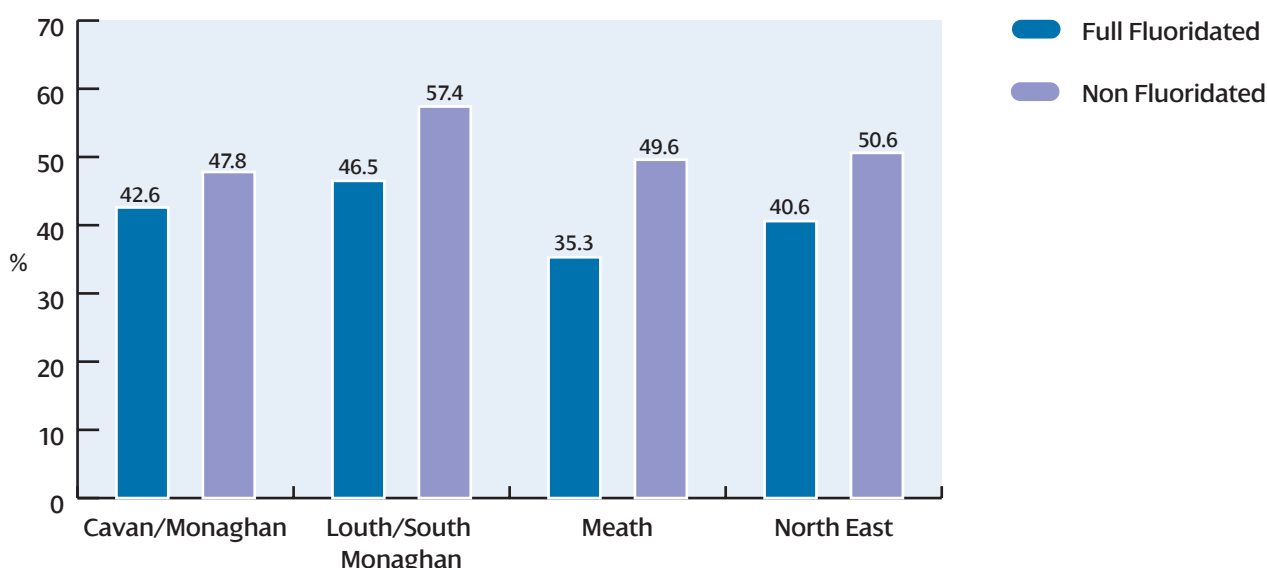


Table 9 compares the percentage of children with no decay experience, i.e. vdmft = 0, in each Community Care Area, with the goals set for the year 2000 for 5-year-olds. While the North East as a whole falls short of reaching the goals for both fluoridated and non-fluoridated areas, the gap is greatest in Louth/South Monaghan, which falls 31.5% short of the target in fluoridated areas and 17.4% short in non-fluoridated areas.

Table 9: Percentage of 5-year-old children in each Community Care Area who were free of decay in 2002 compared with the goals set for the year 2000

	Fluoridated	Non-Fluoridated
Goal for the year 2000	85%	60%
Cavan/Monaghan	57.4%	52.2%
Louth/South Monaghan	53.5%	42.6%
Meath	64.7%	50.4%
North East	59.4%	49.4%

Average decay levels in children with decay

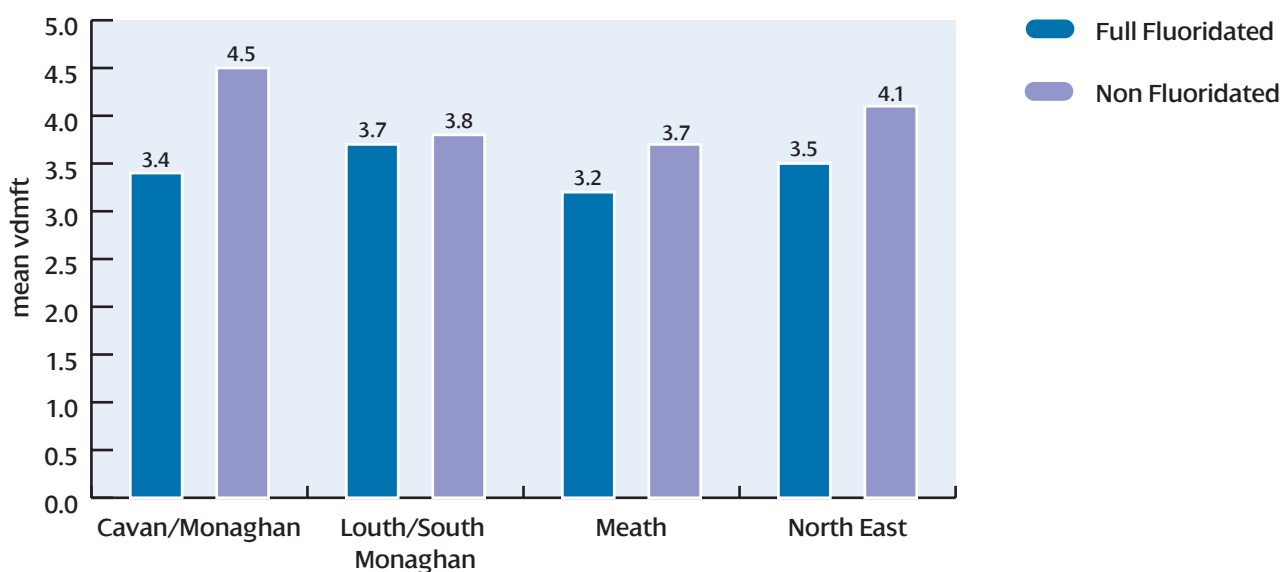
When decay levels were compared across Community Care Areas, looking only at those children who had experienced decay (i.e. mean vdmft of 1 or more), the highest decay levels were seen in children living in non-fluoridated areas in Cavan/Monaghan (mean vdmft = 4.5) (Figure 10).



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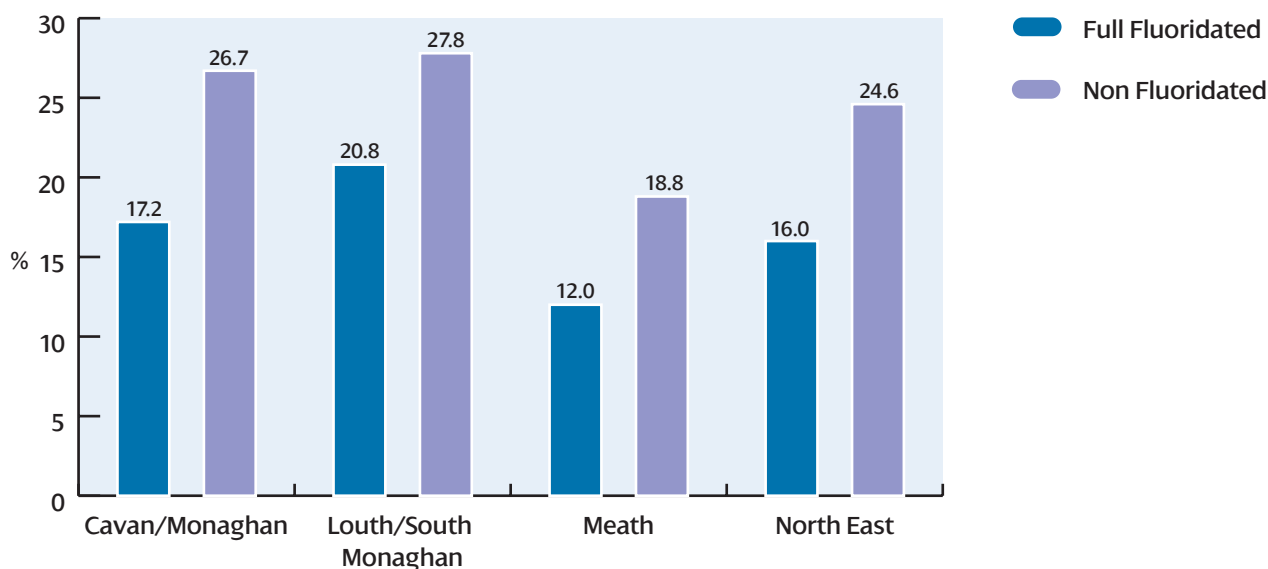
The corresponding values in non-fluoridated areas of Louth/South Monaghan and Meath were 3.8 and 3.7 respectively. In fluoridated areas, the mean vdmft of children with decay was highest in Louth/South Monaghan (3.7) and was 3.4 in Cavan/Monaghan and 3.2 in Meath.

Figure 10: Average decay experience (mean vdmft) of children with decay by Community Care Area, 2002



In this survey, a vdmft score of 4 or more was taken as a measure of severe decay. Figure 11 shows the percentage of children with severe decay by fluoridation status and Community Care Area. The prevalence of severe decay was lower in fluoridated areas compared to non-fluoridated areas in all three Community Care Areas. **The highest burden of disease was found in non-fluoridated areas in Cavan/Monaghan and Louth/South Monaghan, where approximately one child in four had severe decay (26.7% and 27.8% respectively).** Even in fluoridated areas of Meath, which had the lowest percentage of children with severe decay (12%), this still amounted to one child in eight having four or more decayed, missing or filled teeth.

Figure 11: Percentage of children with severe decay (vdmft ≥ 4) by Community Care Area, 2002

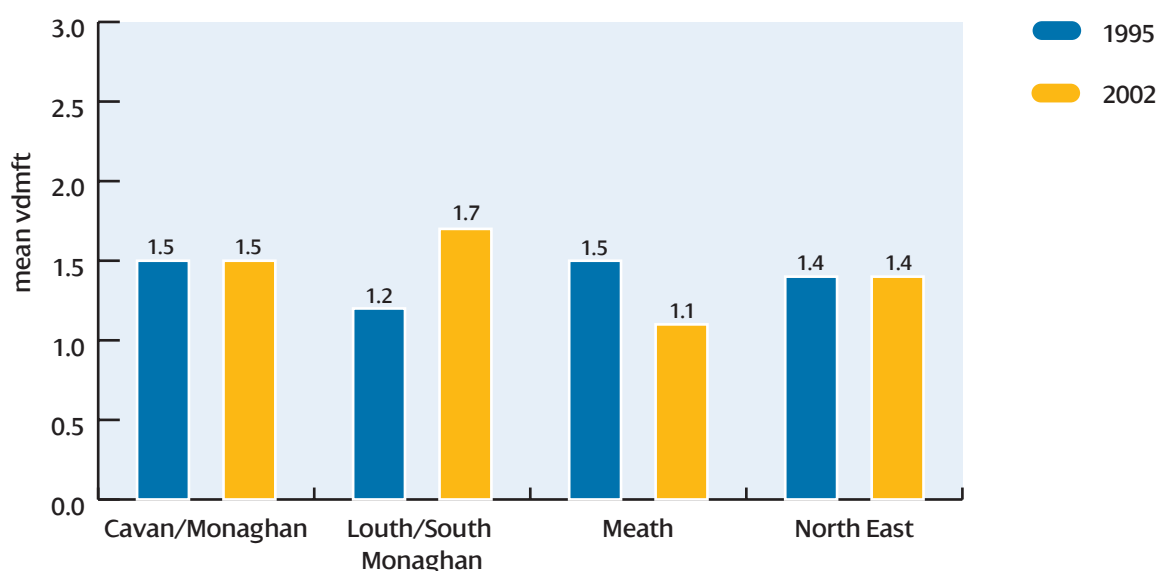




Changes in decay by Community Care Area between 1995 and 2002

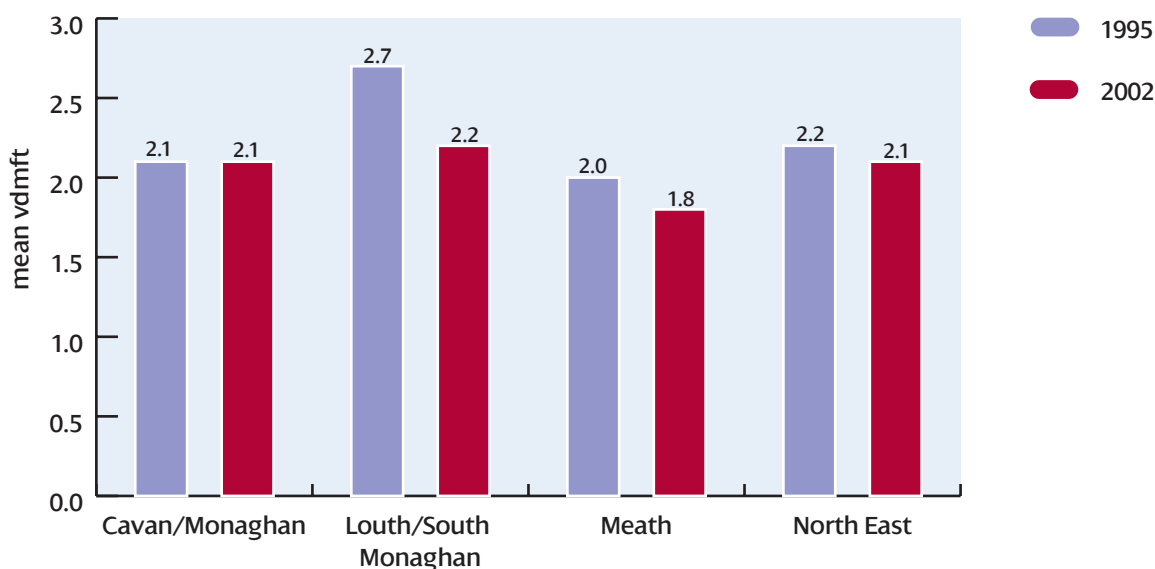
We have already seen that for the North East as a whole, there was virtually no change in decay levels in 5-year-olds in both fluoridated and non-fluoridated areas between 1995 and 2002 (Figures 6 and 7). However, when the same comparison is made by Community Care Area, marked differences are seen. **Between 1995 and 2002, in fluoridated areas, the mean vdmft of 5-year-old children remained unchanged in Cavan/Monaghan (mean vdmft = 1.5), increased from 1.2 to 1.7 in Louth/South Monaghan and decreased from 1.5 to 1.1 in Meath (Figure 12).** In the space of 7 years, Louth/South Monaghan went from having the lowest levels of decay in fluoridated areas of the North East, to having the highest.

Figure 12: Average decay experience (mean vdmft) in fluoridated areas by Community Care Area in 1995 and 2002



In non-fluoridated areas, the mean vdmft remained unchanged in Cavan/Monaghan (mean vdmft = 2.1), fell from 2.7 to 2.2 in Louth/South Monaghan and from 2.0 to 1.8 in Meath (Figure 13).

Figure 13: Average decay experience (mean vdmft) in non-fluoridated areas, by Community Care Area in 1995 and 2002

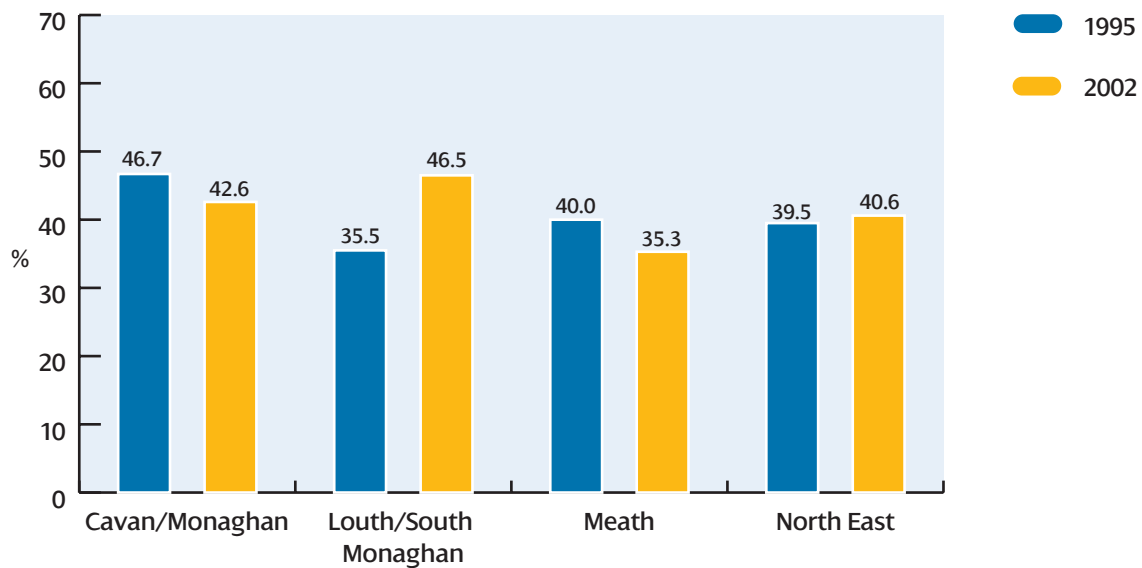




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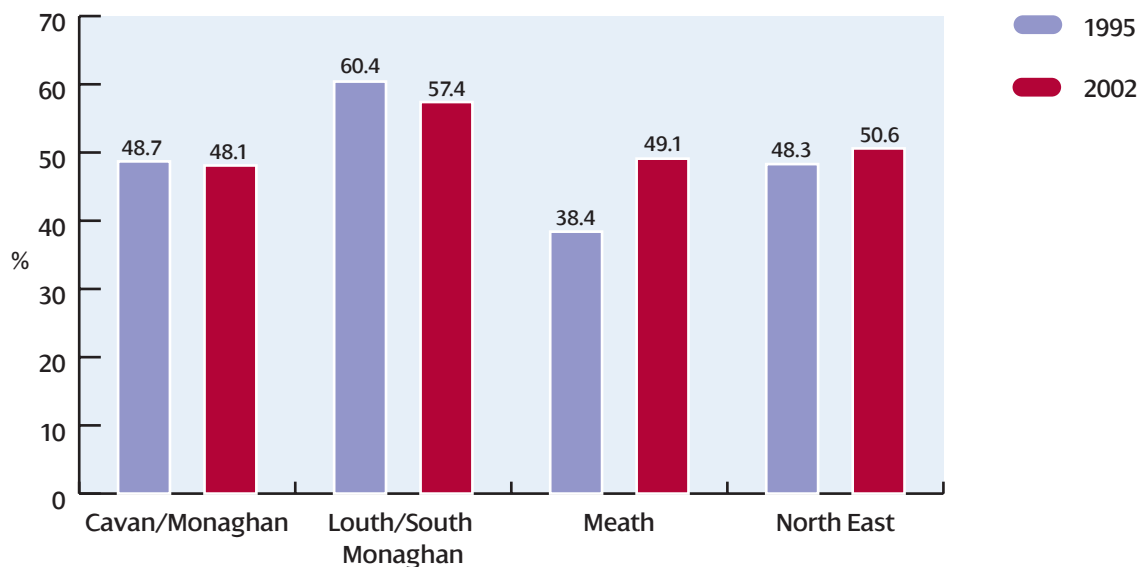
For the North East as a whole, the percentage of children experiencing decay increased by approximately 1% in fluoridated areas and 2% in non-fluoridated areas between 1995 and 2002 (Figure 7). However, once again, the combined figure for the North East conceals very different changes that occurred at the level of the Community Care Area. In fluoridated areas, a decrease of 4.1% in Cavan/Monaghan and 4.7% in Meath was offset by an 11.0% increase in the percentage of children with decay experience in Louth/South Monaghan (Figure 14).

Figure 14: Percentage of children in fluoridated areas with decay experience by Community Care Area in 1995 and 2002



In non-fluoridated areas, the percentage of children with decay experience remained virtually unchanged in Cavan/Monaghan, increased by 3.0% in Louth/South Monaghan and by 10.7% in Meath (Figure 15). The differences seen at the level of Community Care Area, which were not apparent when decay levels were measured at regional level, highlight the importance of monitoring oral health at local level.

Figure 15: Percentage of children in non-fluoridated areas with decay experience by Community Care Area in 1995 and 2002





Decay and disadvantage

In this survey, medical card ownership by parents of the children examined was used as an indicator of disadvantage. Children whose parents had a medical card had higher decay levels than children whose parents did not have a medical card. The association between higher decay levels and parental medical card ownership was seen in all Community Care Areas and in fluoridated and non-fluoridated areas (Figures 16 and 17). However, decay levels were lower in fluoridated areas than in non-fluoridated areas for both medical card holders and non-medical holders. The greatest relative difference in decay levels between children with and without medical card cover was seen in fluoridated areas in Meath, where the mean vdmft of children whose parents had a medical card was more than twice that of children whose parents did not have a medical card (2.0 v 0.9). The reason for this large difference requires further investigation.

Figure 16: Average decay experience (vdmft) in fluoridated areas by medical card status and Community Care Area

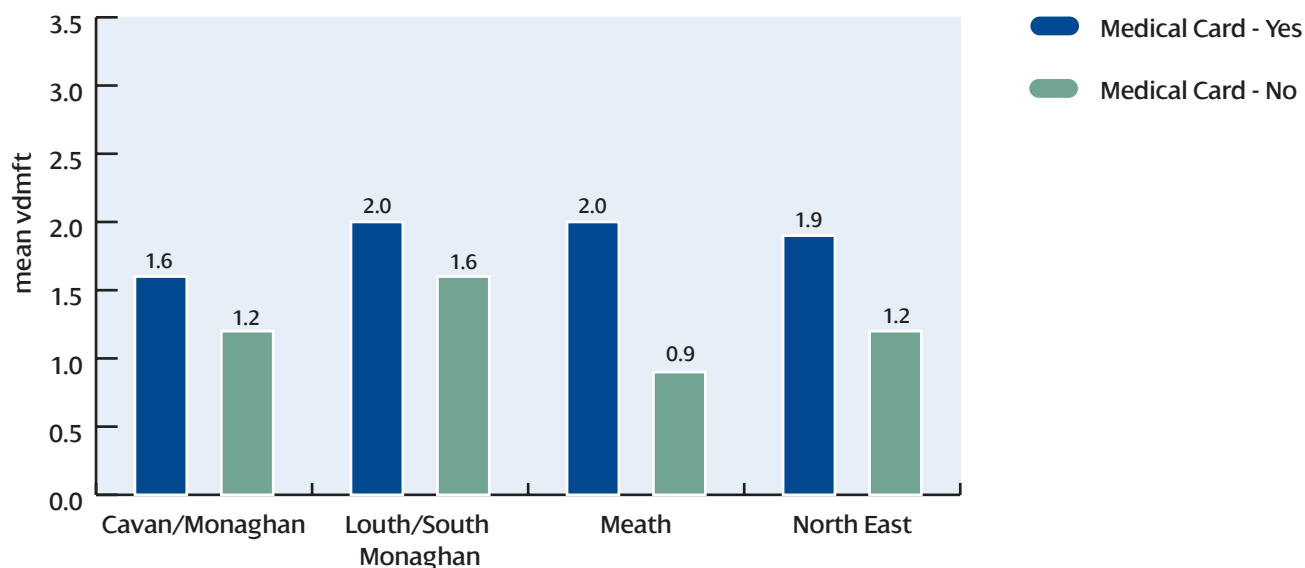
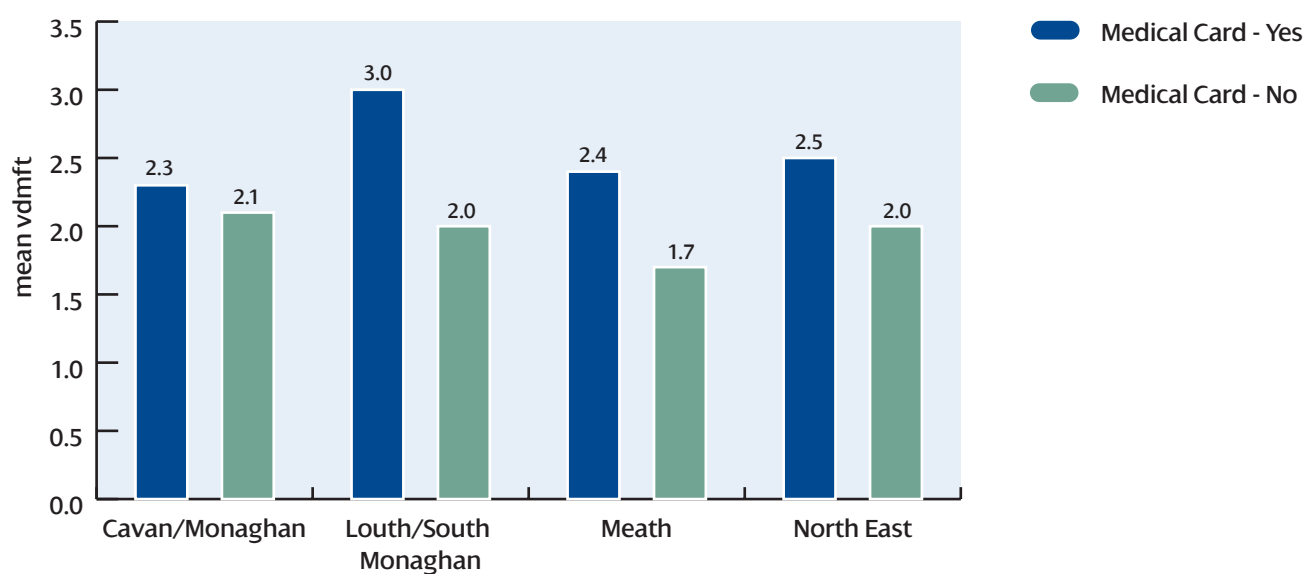


Figure 17: Average decay experience (mean vdmft) in non-fluoridated areas by medical card status and Community Care Area



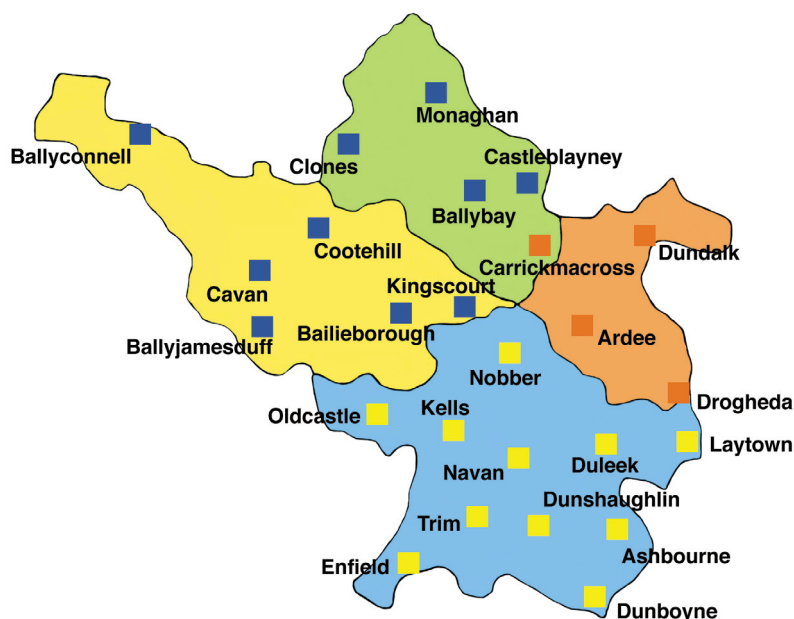


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Geographic distribution of decay in the North East

The North East Public Dental Service operates a school-linked system, whereby each school in the region is assigned to a particular dental clinic. The location of dental clinics in the North East is shown in Figure 18. Each dental clinic serves a discrete population, which is defined by the primary schools assigned to it. An average decay score (mean vdmft) was calculated for each school visited in the survey. Schools were then grouped according to the clinic to which they were assigned, and a weighted average vdmft for each clinic was calculated. This allowed comparison of the decay levels being encountered by clinics, both within and between Community Care Areas (Table 10).

Figure 18: Location of dental clinics in the North East



Routine dental treatment is not generally provided for 5-year-olds by the Public Dental Service, and, as will be seen in the next section (Figure 22), the majority of children in this survey (69%) had never been to the dentist. It is known that decay in the primary dentition is a useful predictor of decay in the permanent dentition, therefore it can be predicted that those areas with a high vdmft score at age 5 are likely to have greater dental health needs in older age groups. When decay experience was analysed by individual child, the mean vdmft of 5-year-olds in Louth/South Monaghan and Cavan/Monaghan was significantly higher than that of 5-year-olds in Meath (Figures 12 and 13). However, when the data was grouped by school and then by clinic (Table 10), it can be seen that two clinical areas in Meath - Nobber and Oldcastle - had the highest decay levels in the whole North East region (mean vdmft of 2.49 and 2.28 respectively). Although the number of children is small in both these areas, the mean vdmft value is still higher than equivalent group sizes in the other Community Care Areas. The clinical area with the lowest vdmft score in the North East was Dunboyne (mean vdmft = 0.88), which is also in Meath. Further study is required to explain why such inequality in oral health exists *within* Meath, when, in other respects it compares so favourably with the two other Community Care Areas in the North East. What is clear, however, is that dental decay is a greater problem for children in some parts of the North East than in others, and a greater input of resources will be required to try to meet the need identified.



Table 10: League table of clinics, ranked by mean vdmft of schools assigned to each clinic

CCA	Clinic	Number of schools	Number of children	Mean vdmft score for clinic (weighted)	Difference between highest & lowest clinic mean vdmft within CCA
Cavan	Ballyconnell	6	72	2.14	
	Cootehill	10	97	2.14	
	Cavan	27	215	2.13	0.66
	Bailieborough	9	89	2.04	
	Ballyjamesduff	9	105	1.58	
	Kingscourt	5	48	1.48	
Monaghan*	Monaghan GH	11	150	1.65	
	Castleblaney	5	64	1.63	0.56
	Clones	6	40	1.53	
	Ballybay	3	32	1.09	
Louth/South Monaghan	Dundalk 3	14	106	2.24	
	Ballsgrrove - Drogheda	10	127	2.22	
	Carrickmacross	9	80	2.21	
	Dundalk 1	10	123	2.14	0.70
	Ardee	9	106	1.82	
	Muirhevnamore - Dundalk	4	133	1.62	
	Dundalk 2	5	121	1.56	
Haymarket- Drogheda	8	201	1.54		
Meath	Nobber	9	57	2.49	
	Oldcastle	4	32	2.28	
	Kells	10	127	2.02	
	Duleek	9	76	1.89	1.61
	Navan	17	323	1.48	
	Trim	12	163	1.36	
	Enfield	7	70	1.29	
	Laytown	5	99	1.03	
	Ashbourne	7	149	0.98	
	Dunshaughlin	9	139	0.90	
	Dunboyne	8	161	0.88	

Note: In Monaghan, a number of schools were not visited, and for this reason, the ranking of clinics in this area must be interpreted with caution.



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Permanent teeth and 5-year-olds

The timing of eruption of permanent teeth has been the subject of recent investigation in Ireland²². Currently in the North East, routine dental services are targeted at children in 1st class. The rationale for targeting this age group is to prevent decay in the newly erupting first permanent molars. **This large-scale study of 5-year-old children found that 18.8% of children in Junior Infant class had one or more first permanent molars present in the mouth.** National figures show that at age 8, 20.5% of children in fluoridated areas and 24.6% in non-fluoridated areas have experienced decay in at least one permanent tooth⁹.



QUESTIONNAIRE RESULTS

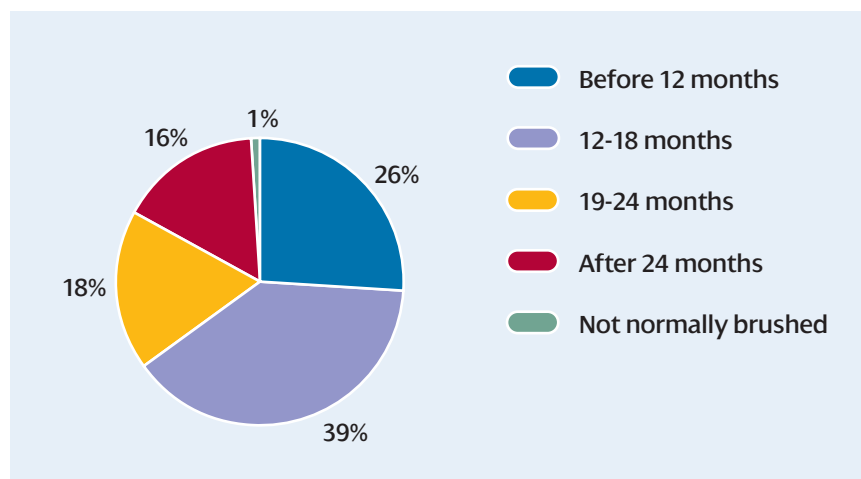
A questionnaire was given to each child for completion by their parent or guardian. The questionnaire comprised twenty questions and asked about oral hygiene, dietary habits, attitudes to dental treatment and use of dental services. The response rate to the questionnaire was over 90%. Results are presented for the North East as a whole, using the vdmft index. The total number of responses varies from question to question, as not all questions were answered by all respondents.

Oral hygiene practices

Age toothbrushing commenced

There was considerable variation in the age at which toothbrushing commenced for children in the North East (Figure 19). The most commonly reported age for commencing toothbrushing was between 12 and 18 months (39%). Approximately one quarter of parents (26%) reported that toothbrushing started for their child before the age of 12 months. For 18% of children, toothbrushing started between 19 and 24 months of age and for 16%, brushing started after 24 months. One percent of parents reported that their child's teeth were not normally brushed.

Figure 19: Age at which toothbrushing commenced



Average decay experience (mean vdmft) by age of commencing toothbrushing is shown in Table 11. Children for whom brushing commenced before the age of 12 months had the lowest level of decay compared to all other groups.

Table 11: Mean vdmft by age of commencing toothbrushing

	n	%	mean vdmft
Before 12 months of age	822	26	1.3
Between 12 and 18 months of age	1218	39	1.7
Between 19 and 24 months of age	550	18	1.8
After 24 months of age	504	16	2.0
My child's teeth are not usually brushed	35	1	2.1
Total	3129	100	1.6

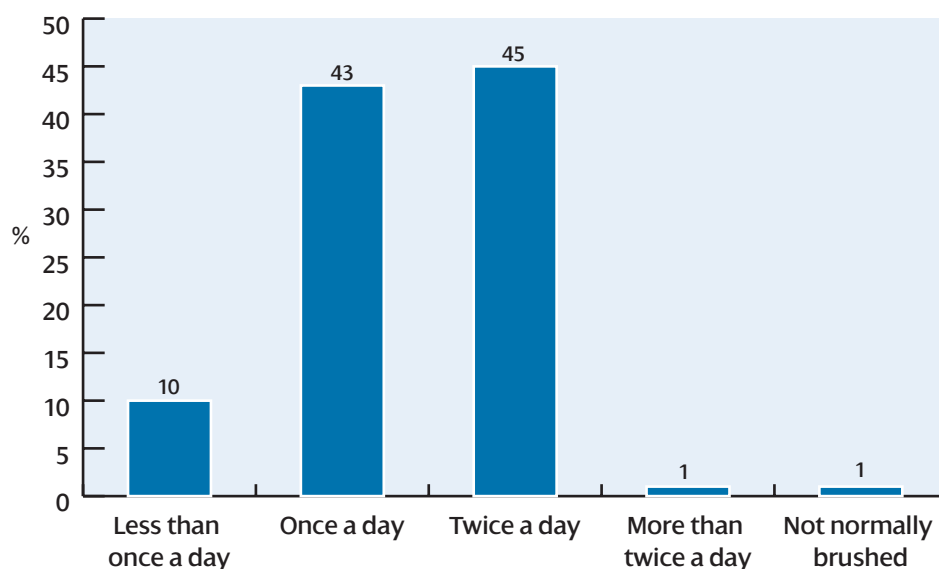


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Frequency of toothbrushing

There is evidence to show that brushing with fluoride toothpaste twice a day is more effective at preventing decay than brushing once a day^{23,24}. In this survey, less than half of 5-year-olds (45%) in the North East brushed their teeth twice a day (Figure 20).

Figure 20: Frequency of toothbrushing



The mean vdmft of children who brushed twice a day or more was lower (1.5) than that of children who brushed once a day (1.7) or less than once a day (1.9) (Table 12).

Table 12: Mean vdmft by frequency of toothbrushing

	n	%	mean vdmft
Less than once a day	312	10	1.9
Once a day	1357	43	1.7
Twice a day	1401	45	1.5
More than twice a day	33	1	1.5
My child's teeth are not usually brushed	24	1	1.6
All	3127	100	1.6

Toothpaste use

Dental fluorosis has been defined as a dose response effect caused by fluoride ingestion during pre-eruptive development of teeth²⁵. The aesthetic impact of fluorosis can range from almost imperceptible white lines to yellow/brown discolouration and pitting, and the severity of fluorosis is related to the dose and duration of exposure to fluoride at the critical time of enamel development²⁶. The inappropriate use of fluoride toothpaste during infancy and early childhood has been associated with the development of dental fluorosis in permanent incisor teeth²⁷.

In 2002, *the Report of the Forum on Fluoridation*²⁵ issued the following recommendations on toothpaste use in young children, as part of a strategy for reducing the risk of enamel fluorosis:

- Parents should be advised not to use toothpaste when brushing their children's teeth until the age of 2 years.
- Parents should supervise children aged 2-7 years when brushing their teeth and should ensure only a small, pea-sized amount of fluoride toothpaste is used and that swallowing of the toothpaste is avoided.



- Paediatric toothpastes with low concentrations of fluoride require further research before the Forum can recommend their use.

As the fieldwork for this survey was carried out prior to the publication of the Forum on Fluoridation report, our survey did not include a question about the use of fluoride toothpaste under the age of 2 years. It did, however, include questions about supervision of brushing and amount and type of toothpaste used. We found that 37% of 5-year-olds in the North East receive no help with toothbrushing (Table 13).

Table 13: Help with brushing

	n	%
My child brushed his/her own teeth without help	1159	37
Mother / Father helps child	1889	60.5
Brother / sister helps child	43	1.4
Guardian / Nanny / Childminder	11	0.4
Child's teeth are not usually brushed	21	0.7
All	3123	100*

*Column adds to over 100 due to rounding of figures

We also found that 58% of respondents reported using the recommended pea-size amount of toothpaste, while 41% used more than the recommended amount. A full breakdown of the amount of toothpaste used by 5-year-old children in the North East is shown in Table 14.

Table 14: Amount of toothpaste used

	n	%
Pea-sized amount of toothpaste	1826	58
Half brush of toothpaste	1050	34
Full brush of toothpaste	200	6
Overflowing brush of toothpaste	16	1
My child's teeth are not usually brushed	18	1
My child does not use toothpaste	23	1
All	3133	100*

*Column adds to over 100 due to rounding of figures

Sixty four percent of 5-year-old children in this survey used children's toothpaste and 35% used adult toothpaste. The remaining 1% did not use toothpaste. The mean vdmft of children using adult toothpaste was 1.7 compared to 1.6 in those using children's toothpaste.

Diet

The WHO / UNICEF Global Strategy for Infant and Young Child Feeding²⁸ states that: "As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health". Breastfeeding rates in Ireland are among the lowest in Europe, and to redress this situation, a five-year Strategic Action Plan for Breastfeeding in Ireland²⁹ was launched in 2005. This action plan aims to improve the nation's health by ensuring that breastfeeding is the norm for infants and young children in Ireland. *Health Status of the People of the North East, 2004* reported the results of a survey of breastfeeding in the North East, which found that under one third of respondents were breastfeeding at 6 weeks². In our survey of 5-year-olds, parents were asked if their



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child had been breastfed as an infant. Thirty six percent of respondents stated that their child had been breastfed. Decay levels were lower in children who had been breastfed compared to children who were not breastfed (mean vdmft 1.4 v 1.8) (Table 15). The duration of breastfeeding had little impact on levels of decay, although it is possible that this finding was influenced by the difficulty in accurately recalling the duration of breastfeeding, more than four years after the event (Table 16).

Table 15: Percentage of children who were breastfed and mean vdmft

	n	%	Mean vdmft
Yes	1112	36	1.4
No	1970	64	1.8
All	3082	100	1.6

Table 16: Duration of breastfeeding and mean vdmft

	n	%	Mean vdmft
Less than 2 months	317	29	1.3
2 – 4 months	359	33	1.4
4 – 6 months	197	18	1.4
Longer than 6 months	227	21	1.6
No response	12	-	-
All	1112	100	1.4

Baby bottle feeding practices

The most popular drinks consumed from baby bottles by children in the North East are shown in Table 17. Almost all children (94%) drank milk from a bottle.

Table 17: Types of drinks consumed from a baby bottle and mean vdmft

Drink	n	%*	Mean vdmft
Milk	1637	94	1.6
Water	665	37	1.4
Fruit juices	462	29	1.9
Squash (no sugar added)	308	18	1.8
Squash (diluted)	274	18	1.8
Tea	195	13	1.9
Carbonated drinks	73	5	2.1

* Percentages add to over 100 as more than one option could be selected

Drinking from a baby feeding bottle, particularly at bedtime, has been associated with high levels of decay in Irish 5-year-olds³⁰, although a recent systematic review of risk factors for dental caries concluded that the literature on baby bottle use and caries risk is weak³¹. Our survey found that 41% of 5-year-olds in the North East had taken a feeding bottle to bed. The mean vdmft of children who had taken a bottle to bed was higher than that of children who had not (mean vdmft 1.9 vs 1.4). It is recommended that children should be weaned from a bottle by the age of one year³². In this survey, only one child in 4 (24%) was weaned from their bottle before 12 months of age. The majority (58%) stopped using the bottle between the age of 1 and 2 years, while 16% were older than 2 years before they stopped

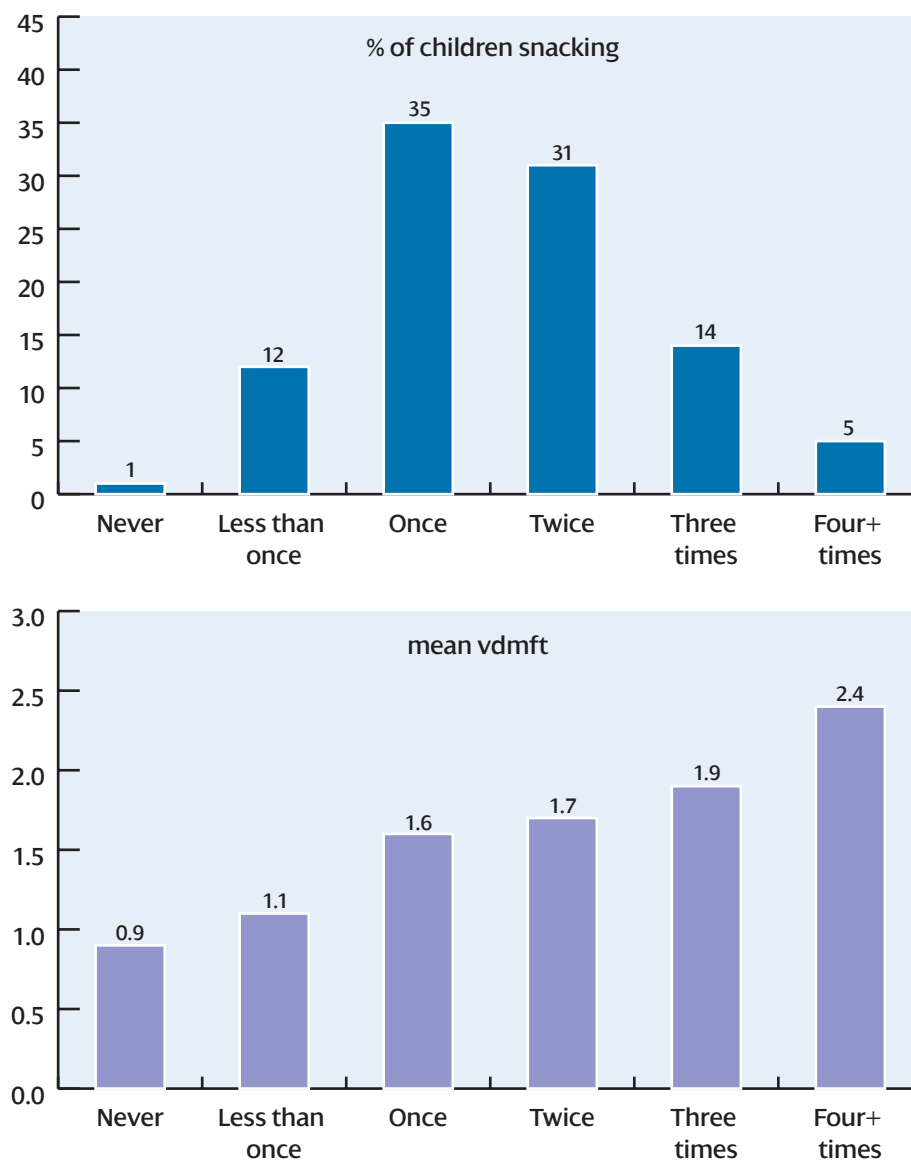


using the baby bottle. Decay levels were higher in children who were older than 2 years when they stopped using the baby bottle (mean vdmft = 2.1), compared to those who were 12 months or younger (mean vdmft = 1.9) or between 1 and 2 years (mean vdmft = 1.7) when they were weaned.

Consumption of sweet foods and drinks

Parents were asked how often their child consumed sweet food or drinks between normal meals. Approximately one third of children (35%) had sweet food or drink between meals once a day, while a further one third (31%) had something sweet twice a day. Nineteen percent of children had sweet food or drinks between meals three or more times a day. A clear relationship was seen between frequency of snacking on sweet foods or drinks between meals and levels of decay. As the frequency of snacking increased, the level of decay also increased (Figure 21). Children who snacked four or more times a day had a mean vdmft of 2.4 compared to a mean vdmft of 1.6 in children who snacked once a day.

Figure 21: Frequency of consumption of sweet food or drink between meals and mean vdmft





ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

Liquid medicines and dental caries

One child in four (25%) in this survey had taken liquid medicines over a long period or had taken short courses frequently. Decay levels were higher in children who had taken medicines compared to those who had not (Table 18).

Table 18: Frequent/prolonged exposure to liquid medicine and mean vdmft

Has your child taken any liquid medicines over a long period of time or taken short courses frequently	n	%	Mean vdmft
Yes	772	25	2.0
No	2297	75	1.5
All	3069	100	1.6

Attitudes to dental treatment

Ninety percent of parents thought that it was important to treat decay in primary teeth. The main reasons given are shown in Table 19.

Table 19: Reasons given by parents for treating decay in primary teeth

Reason	Number of responses	%
I feel decay should be treated	329	12
Decay might cause pain	591	22
May have crowding later	153	6
Important to treat diseased teeth	752	28
Decayed teeth look bad	29	1
All of the above	837	31
Other	37	1
All	2728	100*

*Total >100 due to rounding

When it came to treatment options for primary teeth, the majority of parents (58%) would prefer their child to have a painful primary tooth taken out. Twenty seven percent opted for filling and 15% were unsure or had no opinion. There was little difference in decay levels between children whose parents opted for filling and those who opted for extraction of a painful primary tooth (1.7 v 1.8 respectively). The situation was entirely different when treatment of a painful permanent back tooth was concerned – 79% of parents would prefer filling, 8% would prefer extraction and 13% of parents were unsure. The difference seen for permanent teeth could indicate the greater value placed on the preservation of permanent teeth compared to primary teeth. The mean vdmft of children whose parents chose filling as their preferred treatment option for a painful permanent tooth was considerably lower than that of children whose parents would prefer extraction (mean vdmft 1.6 v 2.7). Interestingly, decay levels were lowest in children whose parents were unsure or had no opinion about treatment for either primary or permanent teeth (Table 20).



Table 20: Parent's preferred treatment for a painful primary and permanent tooth and mean vdmft

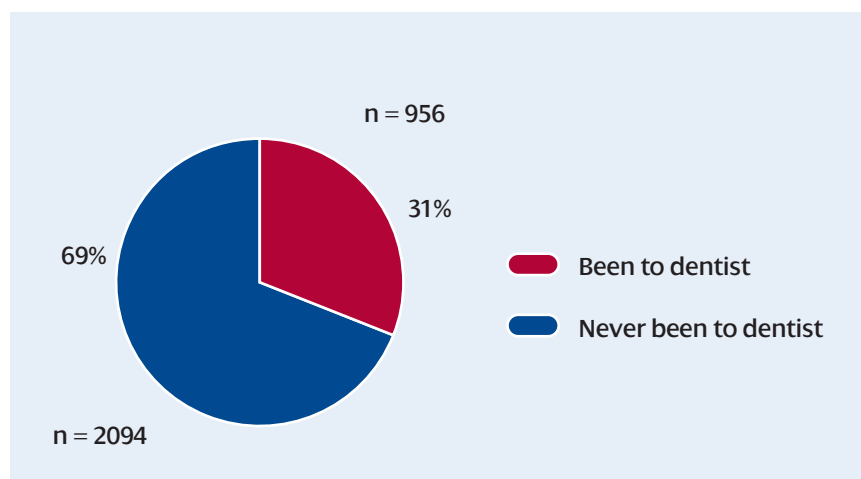
	Painful Primary tooth			Painful Permanent back tooth		
	n	%	mean vdmft	n	%	mean vdmft
Filled	820	27	1.7	2438	79	1.6
Taken out	1780	58	1.8	250	8	2.7
Don't know/No opinion	476	15	1.1	401	13	1.3
Total	3076	100	1.6	3089	100	1.6

A large number of parents expressed the view that children should be seen at a younger age by the North East dental service, and that information on dental services, and oral health advice, should be more readily available.

Dental attendance

Responses were received from 3,050 parents regarding their child's dental attendance. Sixty nine percent of 5-year-olds, or approximately two out of three children, had never been to the dentist (Figure 22). Decay levels in children who had been to the dentist were substantially higher than those who had not attended the dentist (mean vdmft 2.6 vs 1.2 respectively).

Figure 22: Distribution of dental attendance

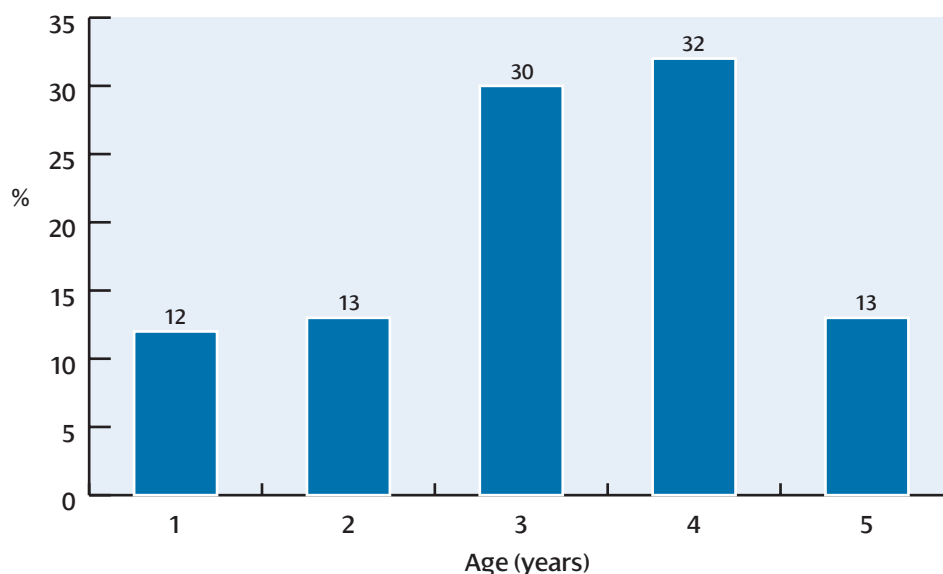


Of the 956 children who had attended the dentist, the majority (62%) made their first visit between the age of 3 and 4 years (Figure 23).



ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

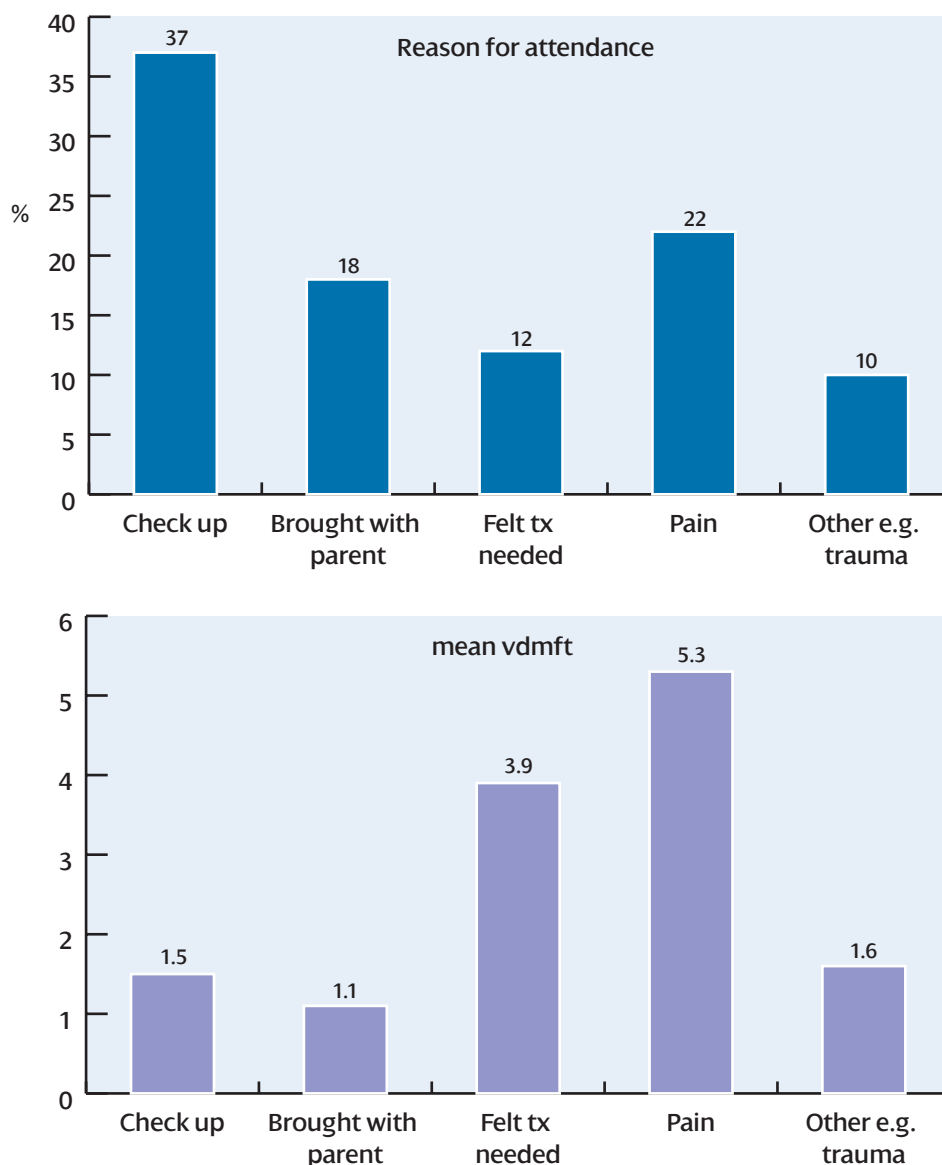
Figure 23: Distribution of age of first attendance at the dentist



The reason for the child's first dental attendance is shown in Figure 24. Approximately one third of children (37%) made their first visit for a check up and a further 18% attended at the same time as a parent. Thus, for over half (55%) of 5-year-old children who had been to the dentist, their first visit could be considered a "routine" visit. Twenty two percent of children attended for the first time in pain and a further 12% attended because the parent felt that treatment was needed. Therefore, for just over one third of children (34%) their first visit could be considered 'symptomatic'. Decay levels were higher in children who had 'symptomatic' first visits compared to those who had "routine" first visits. (Figure 24). The mean vdmft of children who attended in pain was 5.3 and for those who attended because the parent noted a need for treatment, the mean vdmft was 3.9. This is in stark contrast to the children who made their first visit for a check up or who attended with a parent, where the mean vdmft was 1.5 and 1.1 respectively. At present, the only service offered by the Public Dental Service to this age group in the North East is an emergency service. It is clear that children who attend in pain are a high risk, high need group and as such should be prioritised for preventive services. Similarly, children who attended the dentist because their parent detected a need for treatment have the second highest levels of decay, and therefore are another high risk group that could be prioritised for preventive services.



Figure 24: Reason for first attendance at the dentist and mean vdmft

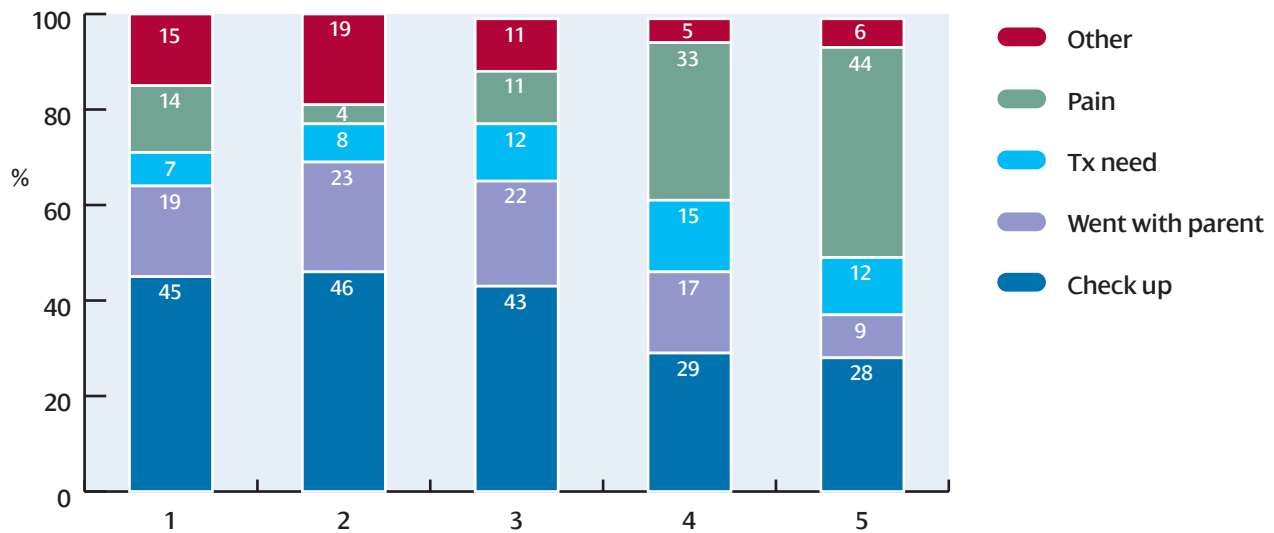


Differences were seen in the reason for the first dental visit by age. Up to the age of 3 years, the main reasons for first attendance at the dentist were for a check up or attending at the same time as the parent. For children who first attended at age 4 or 5, the main reason for attendance was pain (Figure 25).



ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

Figure 25: Reason for first attendance by age

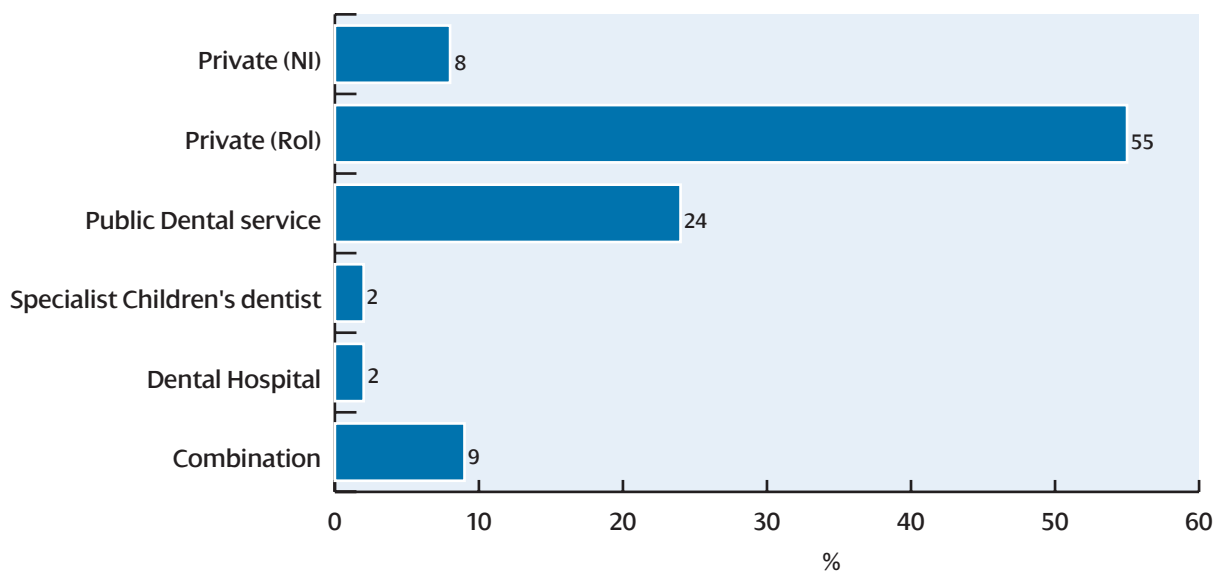


In the sample as a whole, 123 parents (5%) had a sleepless night in the previous 6 months because their child was awake with toothache.

Type of dental service normally attended

Of the 956 children who had been to the dentist, information on the type of dental service normally attended was available for 926 children. Just over half of these children (55%) normally attend a private dentist in the Republic of Ireland, while a further eight percent attend privately in Northern Ireland. However, despite the lack of routine services for young children in the North East, 24% of respondents indicated that their child normally attends the Public Dental Service. Two percent of children normally attend a dental hospital and a further 2% attend a specialist children's dentist. The remaining 9% attend a combination of dental services (Figure 26).

Figure 26: Distribution of dental attendance by type of dentist normally attended





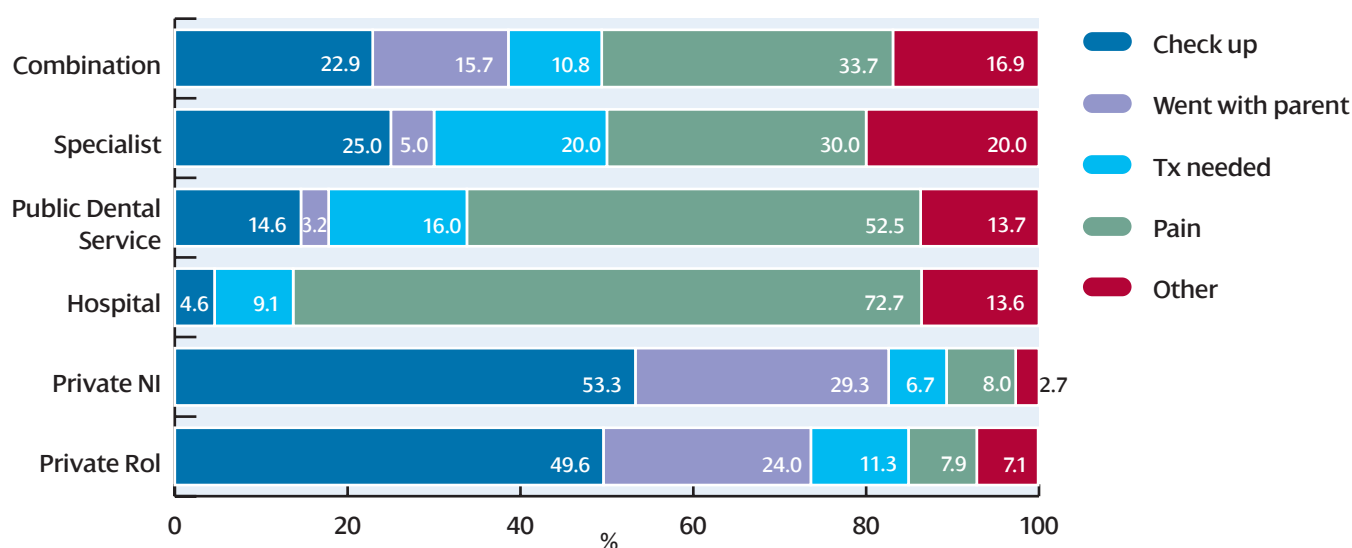
Average decay experience by type of dentist normally attended is shown in Table 21. Although the majority of 5-year-old children in the North East who have attended a dentist have done so privately, these children have the lowest levels of decay of all attenders (mean vdmft = 1.6). Twenty four percent of parents indicated that their child normally attended the Public Dental Service, and decay levels in these children were more than twice that of children attending privately (mean vdmft = 4.1). The highest level of decay was seen in the 2% of children attending a dental hospital (mean vdmft = 5.9). This is not unexpected, as the need to avail of hospital services at such a young age would imply a high treatment need. Only 2% of children normally attended a specialist practice, and the mean vdmft of these children was 3.4.

Table 21: Type of dental service attended and mean vdmft

Type of dental service	n	%	Mean vdmft
Private Rol	507	55	1.6
Private NI	75	8	2.5
Public Dental Service	219	24	4.1
Hospital	22	2	5.9
Specialist (children)	20	2	3.4
Combination	83	9	3.7
Total	926	100	N/A

When we look at the type of dental service normally attended by the reason for the first visit, a clear difference is seen between those who normally attend privately and those attending other dental services (Figure 27). Almost 3 out of 4 children who normally attend privately had “routine” first visits, i.e. they went for a check up or were brought with their parent. Only 8% of children attending privately had their first visit because of pain, whereas 73% of children attending a dental hospital made their initial visit because of pain. Just over half of children who normally attend the Public Dental Service had their first visit because of pain.

Figure 27: Reason for first attendance by type of dentist normally attended





ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

MULTIVARIATE ANALYSIS

Statistical analysis of the data was performed using Generalized Linear Modelling (GLM). This type of multivariate analysis allows the identification of variables which are independently associated with caries levels, while controlling for all other variables in the model. The variables included in the model were Fluoridation Status (Full, None or Part), Community Care Area, Medical Card status, Gender and all questions from the questionnaire. For the multivariate analysis, some of the response categories for individual questions were collapsed (dichotomised) e.g. the responses to the question on frequency of brushing were dichotomised to twice a day or more and once a day or less. Only subjects for whom responses were available for all variables were included in the model (n=2548). All two-factor interactions were also considered. If any of the two-factor interactions or the gender and questionnaire factors were not statistically significant ($p > 0.05$), they were dropped from the model.

The following variables were independently associated with decay levels in 5-year-old children in the North East:

Fluoridation Status

Children who had fluoridated home water supplies since birth ("Full Fluoridated") had lower decay levels than children whose home water supplies were not fluoridated ("Non Fluoridated") ($p < 0.0001$). The difference between those in the "Full Fluoridated" and "Part Fluoridated" categories were not statistically significant ($p > 0.05$).

Community Care Area

Children from Louth had higher decay levels than children from Meath ($p = 0.0065$). The differences observed between Louth and Cavan/Monaghan did not reach statistical significance ($p > 0.05$).

Medical Card Status

Children whose parents were medical card holders (disadvantaged) had higher decay levels than children whose parents did not have a medical card (non disadvantaged) ($p = 0.0038$).

Age of commencing toothbrushing

Children for whom toothbrushing began before 12 months of age had lower decay levels than children for whom brushing began after 12 months of age ($p = 0.0009$).

Frequency of toothbrushing

Children who brushed their teeth twice a day or more had lower decay levels than those who brushed their teeth once a day or less ($p = 0.0102$).

Breastfeeding

Children that were breastfed had lower decay levels compared to those who were not breastfed ($p = 0.0226$).

Age weaned from bottle

Children who were older than 2 years of age when they were weaned from their bottle had higher decay levels than those who were weaned from their bottle before 12 months of age ($p = 0.0317$). The differences observed between those who were weaned from their bottles before 12 months of age against those who were weaned from their bottles between 1-2 years or those whose parents did not remember what age their child was weaned did not reach statistical significance (both $p > 0.05$).

Children who drank milk from a bottle had lower decay levels than children who did not drink milk from a bottle ($p = 0.0001$).



Children who drank fruit juices from a bottle had higher decay levels than those who did not drink fruit juices from a bottle ($p=0.0027$).

Frequency of eating sweet food or drinks between meals

Children who consumed sweet food or drinks between meals three or more times a day had higher decay levels than those who consumed sweet foods or sweet drink twice a day or less ($p=0.0030$).

Treatment of a painful permanent back tooth

Children whose parents preferred to have their child's painful permanent back tooth taken out had higher decay levels than children whose parents preferred to have the tooth filled ($p=0.0017$). The difference observed between children whose parents would prefer a painful permanent back tooth filled and children whose parents didn't know or had no opinion did not reach statistical significance ($p>0.05$).

Treatment of a painful primary tooth

The difference observed between children whose parents would prefer a painful primary tooth filled and children whose parents would prefer a painful primary tooth taken out did not reach statistical significance ($p>0.05$). Children whose parents responded "No opinion/don't know" had lower decay levels than children whose parents preferred to have the painful baby tooth filled ($p=0.0073$).

Dental attendance

Children who had visited a dentist had higher decay levels than children who had never been to a dentist ($p<0.0001$).

A list of tables presenting the mean values for each of the variables that were significant in the Multivariate Analysis can be found in Appendix 3. However, it is important to note that Generalised Linear Modelling models the distribution of the values and not the means.



ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

FINAL COMMENTS

The final section of the 4-page questionnaire provided space for parents to add any comments if they wished to do so. The large number of parents who took the time to make comments is an indication of the high level of interest in and often strong feelings about, oral health services for children in the North East. The following is a just a small sample of the comments received from parents of 5-year-old children in the North East.

"Our son had to have dental treatment as he had four decayed teeth which had to be removed in hospital. At the time we were unaware that so much damage could have been caused at such an early age. As parents we felt we had really let our son down by being so naïve about early decay in his teeth...Having been through the ordeal of hospital, it is one we never want to repeat again".

"I feel it is a shame that school going children are not seen routinely until they are in 1st class. This is shameful as a lot of children need treatment long before that time, and should receive that treatment – not seen only because they are in pain, at which point, irreversible damage may already be done".

"It would be helpful for parents to receive guidelines on dental care for children. I was not sure what age they should start brushing their teeth or when /if I should start bringing them for regular dental visits".

"I have never received facts about looking after children's teeth and you hear several different accounts from family, friends, and peers, leaving you a bit lost as to what is the next option."

*"I am currently waiting on an appointment for **** Hospital, where my child has to get some back teeth removed by general anaesthetic. They are giving him pain and I requested a general anaesthetic as I feel he would be too young and frightened to have them removed by local anaesthetic."*

"Health board dental check ups should start earlier than school years. Very often, the decay has started by then".

"I feel that free Dental check-ups should be provided 6 monthly by the Health Board for all children so that any problems can be identified early. It is too late starting to check their teeth when they are 6+ years old and many already have decay present."

"I feel that children should get their check-ups and treatment from a school dentist at an early age. Because it is so expensive to take them to a private dentist most people couldn't afford to and their teeth decay very badly."

"I am unaware of the dental services provided by the Health Board for primary school children – are there any? - as my children have not yet been called by the local Health Board Dental Service. It is unacceptable that many children in need of treatment are deprived of the opportunity – just because they live in a particular area / region where the service is practically 'non-existent'."

*"***** has been having problems with his teeth for about 6 - 8 weeks. He is awaiting a dental appointment for hospital to get 8 back teeth out. He is in pain all these months and has been given 3 antibiotics in the last month. He is suffering very badly and no appointment has yet arrived."*

"I have brought my child to the dentist because I feel it is important to start at a young age. Children can often feel frightened



of the dentist. It is very important to get them into good habit of going. I think that school age is a long time to wait, when they get seen in school."

"I feel kids should be called to a dentist at an earlier age, to give them a chance to get used to the Dentist. I understand with Health Board that it is not easy, but without a medical card, it is very hard to go private as we have 4 other kids and our income doesn't cover all expenses, so I have to work. I would love to bring my kids privately but I can't afford to. But the Service is quite good when they are called."

"Dental treatment should be free. You should not have to wait so long for Health Board to call your child, especially when your child is in pain. Parents put things on the long finger when they have to pay. The longer a child is left untreated, the more treatment it will need as decay progresses. So it is in everybody's interest to speed the process up."

"I brought my child to a private dentist and was paying £20 - £30 each time, but then my sister told me about the Health Board School Dentist. I found them a lot nicer to my child and plus it is free – an added bonus."

"I wish we had been aware of the facility available free for emergency treatment in our local clinic with such patient, caring, child-centered dentists. Maybe other parents could be made aware of this excellent facility, which is on their doorstep."

"I sincerely hope that the quantity and quality of the children's dental health care will soon improve in this area because until now unless my children are in pain, they haven't been seen!"

"I hope this Survey will improve the dental services available to children in this country and maybe the powers that be will realise that parents can't afford the cost of dentist visits along with other costs for children's health care!!!!!"



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APPENDIX 1

Survey teams

Examiners

Evelyn Connolly	Cavan/Monaghan
Bernie Tiernan	Louth/South Monaghan
Mary O'Farrell	Meath, Cavan/Monaghan, Louth/South Monaghan
Rose Kingston	Louth/South Monaghan

Recorders

Joanne Lane	Cavan/Monaghan
Rosemary Cunningham	Louth/South Monaghan
Elizabeth O'Reilly	Meath
Mairead Clinton	Meath

Additional administration

Rosemary Kane	Meath
Mairead Clinton	Meath
Anna Condra	Meath
Anna Maria Tully	Meath
Rose Bradley Molloy	Meath

APPENDIX 2

Do not write in this space

Subject No.

School No.

National Survey of Children's Dental Health 2001/2002
NORTH EASTERN HEALTH BOARD
Questionnaire for Parents of Junior Infant Children

How to fill in this form

A. Most questions can be answered simply by putting a tick (✓) in the box next to the answer that applies to you.

B. Usually after answering each question you go on to the next one unless a box you have ticked has an arrow next to it with an instruction to go to another question. *In this example: If you tick the Yes box, go to question 4. If you tick the No box, continue to question 5.*

C. If you cannot remember, do not know, or are unable to answer a particular question please write that in alongside the tick box.

D. If you have more than one child, please answer the questions in relation to the child to whom this form was given.

E. When you have finished answering the questionnaire, please enclose in the envelope provided and have your child return the envelope to his/her teacher tomorrow.

We are most grateful for your help and co-operation.

Example: Yes	<input checked="" type="checkbox"/>	
No	<input type="checkbox"/>	

Example: Yes	<input checked="" type="checkbox"/>	→ Q4
No	<input type="checkbox"/>	→ Q5

Your Child's Name: _____

Your Child's Date of Birth: ____/____ (Date) ____/____ (Month) 19____ (Year)

How many children in your family? _____

Q1. At what age did you or your child start brushing your child's teeth?

Tick one box

My child's teeth are not usually brushed 1

Before 12 months of age 2

Between 12 and 18 months of age 3

Between 19 and 24 months of age 4

After 24 months of age 5

Q2a. How often does your child brush his/her teeth (or have them brushed for him/her)?

Tick one box

My child's teeth are not usually brushed 1

Less than once a day (e.g., every second day, once a week) 2

Once a day 3

Twice a day 4

More than twice a day 5

Q2b. Does anyone help your child brush his/her teeth?

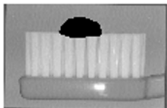
Tick one box

- My child brushes his/her own teeth and does not get any help 1
- Mother/Father 2
- Brother/Sister 3
- Guardian 4
- Nanny/Childminder 5

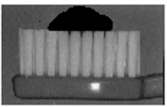
Q3a. These pictures show different amounts of toothpaste on a brush. Which picture shows the amount of toothpaste your child uses?

Tick one box

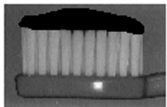
- My child's teeth are not usually brushed 1
- My child does not use toothpaste 2



Picture 1
pea-sized amount of toothpaste 3



Picture 2
half brush of toothpaste 4



Picture 3
full brush of toothpaste 5



Picture 4
overflowing brush of toothpaste 6

Q3b. When your child brushes his/her teeth (or has them brushed for him/her does he/she use

- Adult tooth paste
- Junior/children's toothpaste
- No toothpaste
- My child's teeth are not brushed
- I do not know what type of toothbrush is used

Q4a. Was your child breast-fed as a baby?

- Yes
- No → **Q5**

Q4b. How long was your child breast fed for?

Tick one box

- Less than 2 months
- 2-4 months
- 4-6 months
- Longer than 6 months

Q5. At what age was your child weaned from its baby feeding bottle to use a cup/mug?

- Before 12 months of age
- Between 1-2 years
- Older than 2 years
- I do not remember

Q6a. Did your child take the feeding bottle into bed?

- Yes
- No → **Q7**
- I do not remember → **Q7**

Q6b. At what age did your child stop taking a bottle into bed?

- Before 12 months of age
- Between 1-2 years
- Older than 2 years
- I do not remember

Q7. Which of the following liquids did your child drink from a bottle? (Tick all that apply please).

- Milk
- Milk with sugar/honey
- Water
- Water with sugar/honey
- Fruit juices
- Squash (No added sugar)
- Diluted squash
- Tea
- Coffee
- Carbonated (fizzy) drinks
- Other _____ (please specify)

Q8. How often does your child eat sweet food or sweet drinks (such as biscuits, cakes, sweets, Pepsi-Cola, 7-Up, Ribena, fruit drinks, etc.) between normal meals?

Tick one box

- Never 1
- Less than once a day: (e.g., once a week, every second day) 2
- Once a day 3
- Twice a day 4
- Three times a day 5
- Four times a day 6
- Five times a day 7
- Six times or more a day 8
- Don't know 9

Q9. Has your child taken any liquid medicine over a long period of time, or taken short courses frequently?

Tick one box

- Yes
- No

Q10a. If your child has a painful back tooth and it was not a baby (milk) tooth but a second (permanent) tooth, would you prefer if it was

Tick one box

- Filled 1
- Taken out 2
- Don't know/No opinion 3

Q10b. If your child has a painful front tooth and it was not a baby (milk) tooth but a second (permanent) tooth, would you rather it was

Tick one box

- Filled 1
- Taken out 2
- Don't know/No opinion 3

Q11a. If your child had a painful baby tooth would you prefer if it was

Tick one box

- Filled 1
- Taken out 2
- Don't know/No opinion 3

Q11b. Do you think it is important to treat decay in baby teeth?

Tick one box

- Yes → Q12
- No → Q13

Q12. If you answered YES to Question 11b (previous question), is this because

Tick one box

- I don't know why but I feel decay should be treated in baby teeth 1
- Decayed baby teeth might cause my child pain 2
- He/she may have crowding later on if baby teeth are lost early 3
- It is important to treat diseased teeth 4
- Decayed baby teeth look bad 5
- All of the above 6
- Other (Please Specify) 7

Q13. Please complete as applicable:

Enter age in years

My child has his/her first visit to a dentist (including Health Board (school dentist) at the age of 1 → Q14

Or **Tick Box**

My child has never been to a dentist 2 → Q18b

Q14. What was the reason for this first visit?

Tick one box

- Check up 1
- I felt treatment was needed but my child had no pain 2
- My child was in pain 4
- I was sent an appointment by school dentist
- Other (e.g., trauma to teeth) 5
- I was going to the dentist myself and brought him/her with me 6
- My child has never been to the dentist 7



APPENDIX 3

The following tables present the mean values for the variables that were significant in the Multivariate Analysis. However, it is important to note that the GLM models the distribution of the values and not the means. Note that the responses to questions 1, 2 and 8 have been dichotomised for the multivariate analysis.

Fluoridation Status

	vdmft		
	n	Column %	Mean
Non Fluoridated	925	36.30	2.00
Part	346	13.58	1.36
Full Fluoridated	1277	50.12	1.39
Total	2548	100.00	1.61

Community Care Area

	vdmft		
	n	Column %	Mean
Louth/South Monaghan	641	25.16	1.78
Cavan/Monaghan	798	31.32	1.82
Meath	1109	43.52	1.36
Total	2548	100.00	1.61

Disadvantage Status

	vdmft		
	n	Column %	Mean
No MC	1982	77.79	1.50
MC	566	22.21	1.97
Total	2548	100.00	1.61

Q1. At what age did you or your child start brushing your child's teeth?

	vdmft		
	n	Column %	Mean
Before 12 months of age	665	26.10	1.18
After 12 months of age	1883	73.90	1.76
Total	2548	100.00	1.61

Q2. How often does your child brush his/her teeth (or have them brushed for him/her)?

	vdmft		
	n	Column %	Mean
Once a day or less	1391	54.59	1.75
Twice a day or more	1157	45.41	1.43
Total	2548	100.00	1.61



ORAL HEALTH OF 5-YEAR-OLD CHILDREN IN THE NORTH EAST 2002

Q4a. Was your child breast-fed as a baby?

	vdmft		
	n	Column %	Mean
Yes	903	35.44	1.34
No	1645	64.56	1.75
Total	2548	100.00	1.61

Q5. At what age was your child weaned from its baby feeding bottle to use a cup/mug

	vdmft		
	n	Column %	Mean
Before 12 months of age	627	24.61	1.47
Between 1-2 years	1480	58.08	1.52
Older than 2 years	406	15.93	2.14
I do not remember	35	1.37	1.69
Total	2548	100.00	1.61

Q7. Which of the following liquids did your child drink from a bottle – Milk

	vdmft		
	n	Column %	Mean
No	139	5.46	2.75
Yes	2409	94.54	1.54
Total	2548	100.00	1.61

Q7. Which of the following liquids did your child drink from a bottle – Fruit juices?

	vdmft		
	n	Column %	Mean
No	1803	70.76	1.47
Yes	745	29.24	1.94
Total	2548	100.00	1.61

Q8. How often does your child eat sweet food or sweet drinks (such as biscuits, cakes, sweets, Coca-Cola, Pepsi-Cola, 7 Up, Ribena, fruit drinks etc.) between normal meals?

	vdmft		
	n	Column %	Mean
Twice a day or less	2046	80.30	1.51
Three times a day or more	502	19.70	2.02
Total	2548	100.00	1.61



Q10a. If your child a painful back tooth and it was not a baby (milk) tooth but a second (permanent) tooth, would you prefer if it was:

	vdmft		
	n	Column %	Mean
Filled	2027	79.55	1.55
Taken out	195	7.65	2.73
Don't know/No opinion	326	12.79	1.31
Total	2548	100.00	1.61

Q11a. If your child a painful baby tooth, would you prefer if it was:

	vdmft		
	n	Column %	Mean
Filled	681	26.73	1.61
Taken out	1484	58.24	1.75
Don't know/No opinion	383	15.03	1.04
Total	2548	100.00	1.61

Q13. My child has never been to the dentist

	vdmft		
	n	Column %	Mean
Yes	1770	69.47	1.21
No	778	30.53	2.51
Total	2548	100.00	1.61



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