

The health of children and young people

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Chapter 3

Diet, nutrition, dental health and exercise

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Introduction

Dietary patterns in childhood and adolescence have an influence on dietary preferences and eating patterns in adulthood and are important contributing factors for growth and development. Good nutrition and physical exercise ensure that health complications in later life can be avoided. This chapter examines the diet and nutrition intakes of children and adolescents, and other aspects that affect their well-being such as eating disorders, overweight, obesity, dental health care and physical exercise.

Diet and nutrition

A healthy, balanced diet is a good foundation for improving the well-being of children, not just in childhood but later in life. It is well known that eating habits are established in childhood and preferences for food types emerge at this stage. This is a critical time for promoting growth and development of children by encouraging healthier eating. Another important aspect of healthier eating is that it helps reduce the risk of heart disease, obesity, stroke and some cancers in adulthood.

Experts recommend that a well-balanced diet providing all the nutrients required should include at least five portions of fruit and vegetables a day. This is to protect against heart disease, cancer, reduce symptoms of asthma in childhood and other diseases that may develop later in life. Information from the Department of Health states that less than four per cent (one in 25) of 4- to 6-year-olds eat the recommended five portions or more of fruit and vegetables a day.³

The data in this section are drawn from two of the series of National Diet and Nutrition surveys that were carried out in Great Britain during the 1990s: the 1992/1993 survey of 1½- to 4½-year-olds,¹ and the 1997 survey of 4- to 18-year-olds.²

Foods consumed in a typical week

Table 3.1 shows consumption of food among 1½- to 4½-year-olds¹ and the findings for a typical week in 1992/1993 were that:

- more than three out of five pre-school children (61 per cent) consumed wholegrain and high fibre breakfast cereals and two-thirds (66 per cent) consumed other breakfast cereals;
- high proportions of pre-school children had eaten high fat content foods such as chips (71 per cent); savoury snacks (78 per cent); biscuits (88 per cent) and chocolate confectionery (74 per cent);
- smaller proportions of pre-school children consumed vegetables such as cooked carrots (54 per cent); peas (53 per cent) and leafy green vegetables (39 per cent);
- half of all pre-school children had consumed apples and pears (50 per cent) and almost half of all pre-school children had consumed bananas (46 per cent);
- sausages and chicken & turkey dishes were the most popular types of meat consumed, with over half of all pre-school children consuming these foods (53 per cent and 52 per cent respectively);
- just over one-third of pre-school children (36 per cent) drank fruit juice but almost nine in 10 (86 per cent) drank other soft drinks; and



- on the whole, similar proportions of boys and girls had consumed the different types of food.

Examining the differences between male and female children and adolescents aged 4 to 18 years in the food types consumed, Table 3.2 shows that in a typical week in 1997:

- the most popular foods in that the highest proportions of boys and girls had eaten them were chips, other potatoes, savoury snacks, white bread, biscuits and chocolate confectionery all of which had been eaten by at least four in five of those aged 4 to 18 years;
- about three in five of those aged 4 to 18 years had not consumed any leafy green vegetables but more than half had eaten cooked carrots;
- only about one in four had consumed citrus fruits;
- about three quarters of those aged 4 to 18 years had drunk carbonated soft drinks (not low calorie) but only half had drunk fruit juice; and
- as with pre-school children, the proportions of boys and girls consuming the different foods were on the whole similar, except that girls were more likely than boys to have eaten raw and salad vegetables, and less likely to have eaten breakfast cereals and sausages.

The 1997 NDN survey² reported that boys consumed significantly larger amounts than girls for most food items. However, girls were found to consume significantly larger mean amounts of 'other' raw and salad vegetables, raw tomatoes, and apples and pears (refer to Table 4.12c in survey report).

Variations by age

The results from the 1992/1993 NDN survey and 1997 NDN survey have been combined in Table 3.3 to show food items where a significant difference in consumption exists across age groups. One of the main findings was that the proportion of children drinking whole milk decreased markedly as they got older, as 86 per cent of the youngest children, those aged 1½ to 2½ years had drunk whole milk, but among those aged 15 to 18, only 47 per cent of boys and 41 per cent of girls had done so. The reverse was the case for semi-skimmed milk as consumption rose with increasing age from 23 per cent among those aged 1½ to 2½ to 63 per cent of boys and 59 per cent of girls aged 15 to 18 years. Dietary recommendations are that full fat milk can be introduced to a baby from age one onwards as a main drink, semi-skimmed milk can be introduced from age two onwards⁴ and skimmed milk can be introduced from age five onwards,⁵ providing that the child is eating a varied diet.

Overall, younger children aged between 4 and 14 years (proportions falling within the range 71 to 83 per cent) were more likely to eat buns, cakes and pastries than adolescents aged 15 to 18 years (64 per cent for both boys and girls).

Variations in consumption of food items by socio-economic characteristics

There is evidence that socio-economic factors (Table 3.4) do have an impact on the type of foods consumed by young children and adolescents in a typical week. One example of this is the higher proportion of children and adolescents that consumed burgers and kebabs from lower socio-economic households (manual working background, receiving benefits, bottom income quintile with a gross weekly income of less than £160 a week) than those from



higher socio-economic households (non-manual working backgrounds, households not receiving benefits, top income quintile with a gross weekly income of £600 and greater).

Chips was another food option more likely to be eaten by children and adolescents from households in the bottom income quintile (95 per cent for boys; 92 per cent for girls) than those from households in the top income quintile (87 per cent for boys; 82 per cent for girls).

Children and adolescents from higher socio-economic households (non-manual, not receiving benefits, top income quintile – shown in Table 3.4) were more likely to have consumed 'other' raw and salad vegetables, apples, pears and bananas compared with those from lower socio-economic households (manual working background, receiving benefits, bottom income quintile).

Children and adolescents from lower socio-economic households were more likely to have consumed sugar than those from higher socio-economic households. In contrast, boys and girls from lower socio-economic households were less likely to have drunk fruit juice compared to those from higher socio-economic households.

Macronutrient contribution to total energy intake by age

Sufficient intakes of energy and nutrients are essential for good health. If intakes fall below the required amounts over a long period of time then there is a high risk of undernutrition occurring. Undernutrition can lead to adverse affects such as severe weight loss.

Overnutrition is brought about by the long-term consumption of an excess of nutrients and could be a contributing factor to the problem of overweight and obesity.

To assess adequacy or excess, the average energy and nutrient intakes of children and adolescents may be compared with the Estimated Average Requirements (EAR), Reference Nutrient Intakes (RNI) and Lower Reference Nutrient Intakes (LRNI) set by the Committee on Medical Aspects of Food Policy (COMA) Panel on Dietary Reference Values.⁶ The 1997 survey results show that average daily energy intakes fall below the recommended requirements (EAR) for both boys and girls at all age groups (Table 3.5). Reasons suggested by the NDN surveys for these low values of reported energy intake include under-reporting of food consumption possibly because of a change in dietary patterns during the record-keeping period. Young persons aged 15 to 18 years had the lowest energy intake (83 per cent of EAR for boys; 77 per cent of EAR for girls) and those aged 7 to 10 years had the highest energy intake (91 per cent of EAR for boys; 92 per cent of EAR for girls). The main sources of energy are cereals and cereal products, including bread, biscuits, buns, cakes and pastries as they provide approximately a third of the average energy intake (35 per cent for boys and 33 per cent for girls in the 1997 NDN survey).²

Boys and girls of all ages had average daily protein intakes that substantially exceeded the RNI levels for protein (Table 3.5). However, a high proportion of 15- to 18-year-olds had protein intakes below the RNI (14 per cent for boys and 26 per cent for girls). Average daily carbohydrate and starch intakes increased with age for boys but with girls, carbohydrate and starch intakes increased up to the age of 11 to 14 years and then decreased. Clear differences were also evident between boys and girls in the average daily intake of sugar: average daily intake of sugar generally increased with age among boys but among girls increased up to the age of 7 to 10 years and then declined.



Energy intake variations by region

There are no significant regional variations in average energy intakes.²

Energy and macronutrient intake variations by socio-economic characteristics

Household wealth does not appear to have an effect on the energy intakes of girls aged 4 to 18 years, as similar energy intake patterns exist between girls from wealthier households compared to girls from poorer households (Table 3.7). However, boys living in households receiving benefits had significantly lower energy intakes (80 per cent of EAR) than did boys in households not receiving benefits (91 per cent of EAR).

Boys aged 4 to 18 years living in households with a gross weekly income below £160 had significantly lower energy intakes (82 per cent of EAR) than those living in households with a gross weekly income of £600 or more (91 per cent of EAR).

The macronutrient intakes of children aged 1½ to 4½ were similar across social class groups except for average daily starch intakes where children living in households in receipt of benefits had higher starch intake, at 74g (Table 3.8) than did those living in households not in receipt of benefits, at 66g.

Macronutrient intakes among children and adolescents aged 4 to 18 years, varied according to socio-economic status, with lower carbohydrate intake for children living in households in receipt of benefits and gross weekly income of less than £160 (224g and 226g respectively, Table 3.8) compared to those in households not receiving benefits and with gross weekly income of greater than £600 (242g and 243g, respectively). Sugar intake was slightly higher among children and adolescents from more advantaged socio-economic households (non-manual, not receiving benefits, top income quintile).

Micronutrient intakes

Vitamins and minerals are only required in small amounts but are essential for the growth and metabolism of children and their bodies' normal function: prolonged deficiencies can affect children's health in a number of ways.

The main food sources of different vitamins were:

- Vitamin A: vegetables, savoury snacks, milk and liver.^{1,2}
- Riboflavin: fortified cereals, milk and milk products.²
- Vitamin C: fruit juice and soft drinks.
- Niacin: meat and meat products.

Average daily intakes of vitamins A, niacin, C and folate increased with age for both boys and girls (Table 3.9). However, more than two-thirds of those aged 7 to 18 years failed to reach the RNI levels for average intakes of vitamin A. On further examination of this data, the figures revealed that 13 per cent of boys aged 11 to 14 years had vitamin A intakes below the LRNI, but a higher proportion of girls (20 per cent) in the same age group had intakes below the LRNI. The same proportions of boys and girls aged 15 to 18 years had vitamin A intakes below the LRNI (12 per cent). Deficiency of vitamin A can lead to poor vision in dim light and eventually to blindness if corrective measures are not taken.



A high proportion of girls aged 11 to 18 years were observed to have intakes of riboflavin below the LRNI (22 per cent of those aged 11 to 14 years; 21 per cent of those aged 15 to 18 years). Riboflavin is needed to release energy from protein, carbohydrate and fat and low intakes can lead to dryness and cracking of the skin around the mouth and nose.

It should also be noted that 51 per cent of girls aged between 11 and 14 years and 53 per cent of girls aged between 15 and 18 years failed to reach the RNI levels for folate, but the proportions within these age groups with intakes below the LRNI were minimal.

Average daily intakes of iron, phosphorus, magnesium, sodium, potassium, zinc and copper increased with age for both boys and girls (Table 3.10). Nearly all girls aged between 11 and 18 years (98 per cent of those aged 11 to 14 years, and 94 per cent of those aged 15 to 18 years) had average daily intakes of iron that fell below the RNI values for iron. A high proportion of girls in these two age groups (45 per cent of 11- to 14-year-olds, and 50 per cent of 15- to 18-year-olds) had iron intakes below the LRNI. In post-menarche, girls require higher iron intakes than boys due to losses during menstruation. Food groups such as cereals, cereal products and milk were the major sources of iron and calcium.

Average daily intakes of calcium consistently increased with age for boys but not for girls. Higher proportions of boys and girls aged between 11 and 18 years had intakes of calcium, magnesium, potassium and zinc below their respective LRNI. About one in eight boys (12 per cent) and a quarter of girls (24 per cent) aged 11 to 14 years had calcium intakes below the LRNI. In addition to this, one in eleven boys (nine per cent) and one in five (19 per cent) of girls aged 15 to 18 years had calcium intakes below the LRNI. An adequate calcium intake is essential during phases of growth given its main functions of construction, formation and maintenance of bone and teeth.

Eating disorders

Eating disorders are considered by physicians and psychiatrists to be illnesses of a psychological and emotional nature, as a result of which individuals use food and eating as a way of coping with their problems. The most common eating disorders are anorexia nervosa, bulimia nervosa and binge eating.

There are widely differing estimates of the numbers of children and young people affected by eating disorders in the UK. A survey carried out in 1999 of the mental health of 10,438 children and adolescents aged 5 to 15 in Great Britain⁷ found no children aged 5 to 10 with eating disorders, and only 0.3 per cent of those aged 11 to 15 years (0.1 per cent of boys; 0.4 per cent of girls) had eating disorders. In 1992, the Royal College of Psychiatrists⁸ estimated that 60,000 people might have been diagnosed and treated for an eating disorder in the UK. The Eating Disorders Association⁹ estimated that in 2000, the actual numbers of those affected in the UK was more likely to be in the region of 1.15 million.

Anorexia nervosa

Anorexia nervosa is the refusal to eat enough to maintain a normal body weight and the constant fear of gaining weight and feeling fat even when the individual is of normal body weight for their age and height. Anorexic sufferers are obsessed with being thin and exercise excessively, take slimming pills or laxatives to lose weight.



The risk of suffering from anorexia is greater among females than males. A study using the General Practice Research Database (GPRD)¹⁰ revealed that in 1993 those most at risk of developing anorexia were aged 10 to 19 years: GPs detected 34.1 per 100,000 of the female population suffering from anorexia in this age group (Table 3.11).

Bulimia nervosa

Bulimia nervosa is a diet-binge-purge disorder whereby sufferers have a fear of gaining weight. An individual with this disorder binge eats frequently and repeatedly and this may be followed by self-induced vomiting. Bulimia sufferers may take laxatives, slimming pills or do strenuous exercise to prevent weight gain.

In 1993 GPs detected a high rate of bulimia sufferers at 41 per 100,000 of the female population in the 10 to 19 year age group¹⁰ (Table 3.12). Early onset of bulimia but later presentation of the illness can be explained by the fact that bulimia is an illness relatively easy to hide resulting in a longer duration of illness before detection by GPs.

Cause of eating disorders

The underlying cause of eating disorders is unknown, but the EDA⁹ suggests that biological factors, environmental and social pressures play a part. Cultural changes and changes in the perception by society of the ideal body size and image are thought to have increased the prevalence of eating disorders in recent years. Puberty and upsetting events are also considered to be potential reasons for eating disorders.

Provision of services for children and adolescents

There is an uneven distribution of services for young people with eating disorders with four regions (covering 25 per cent of the UK population) not providing any specialist services for children⁸ (Table 3.13). Of the clinics that do provide a service to children and adolescents for eating disorders, the range of therapies provided are much broader than those provided for adults (Table 3.14).

Overweight and obesity

In 2000, an international definition of overweight and obesity in childhood and adolescence was proposed to help calculate internationally comparable prevalence rates of overweight and obesity in children and adolescents.¹¹ The definition interprets overweight and obesity in terms of reference cut-off points for body mass index (BMI) by age and sex, in relation to a reference population based on pooled international data, and is linked to the widely used adult overweight cut-off point of 25kg/m² and adult obesity cut-off point of 30kg/m².

A birth cohort study on the prevalence of overweight and obesity in children aged 24, 49 and 61 months¹² showed that there was a high prevalence of overweight children in the UK in these age groups in 1990. Data provided in Table 3.15 show that there was a noticeable difference in the prevalence of overweight between boys and girls at 24 months, with 18 per cent of 24-month-old girls being overweight compared to 14 per cent of 24-month-old boys. Overall, the differences in prevalence of overweight or obesity between boys and girls were not significant. These results are based on previous recommendations that children and adolescents with BMI above the 85th centile were to be defined as overweight and those with BMI above the 95th centile were defined as obese.¹³



Statistical tests showed that the prevalence of overweight was significantly different to the expected frequencies for children aged 24, 49 and 61 months ($P < 0.05$; $P < 0.001$; $P < 0.001$ respectively). Obesity was found to be significantly different to the expected frequencies for children aged 49 and 61 months ($P < 0.001$ for both). It has been suggested that a baby who is fed solids too early risks becoming overweight and developing heart problems later in life.

Analyses of the Health Survey for England data was carried out on the prevalence of overweight and obesity, based on the international definition of overweight and obesity in childhood and adolescence. The results (Tables 3.16 and 3.17) show that there is an increasing prevalence of overweight and obesity in children and adolescents in England. Table 3.16 shows that there has been an increasing trend of overweight among boys aged 10 to 12 years and those aged 14 years and girls aged 12 to 13 years and 16 to 19 years. Between 1995 and 2000 the proportion of overweight boys (aged 2 to 19 years) increased by two per cent and the proportion of overweight girls increased by three per cent.

During 1995 and 2000 there was a greater increase in obesity among boys aged 12 to 15 years (Table 3.17) and girls aged six, nine, 12 and 14 years. The proportion of obese boys and girls (aged 2 to 19 years) increased by one per cent from 1995 to 2000.

Probable reasons for a rise in overweight and obesity in children are:

- changes in diets;
- an inactive lifestyle, with children spending too many hours in front of the television or computer; and
- fewer children walking to school due to safety fears and travelling longer distances.

There is a strong likelihood that obesity at an early age tends to continue to adulthood and these data provide some evidence to support this view. Overweight and obese adults are at increased risk of morbidity and mortality so interventions to prevent obesity should start in early childhood. Examples of the types of early intervention encouraged are:

- Reduction in sedentary behaviours and an increase in physical activity.
- Reduction in the consumption of foods with a high fat content and high in calories.
- Promotion of healthy eating and exercise habits within schools.
- Better management of childhood obesity through maintaining weight or allowing a slow weight gain rather than focusing on losing weight.

Dental health care

Information on the use of dental services can be found in Chapter 2: Provision and use of services.

This section reviews the epidemiological data on the oral health needs of UK children. It draws on the wealth of information available from national and local surveys to describe oral health trends in the main oral diseases and conditions over time, with reference to age, sex, social status, ethnicity and geographic region of the UK. Their association with key factors such as diet, oral hygiene, fluoride and dental attendance is also reported.



Dental caries, otherwise known as ‘tooth decay’ is one of the most prevalent diseases in children and young people despite enormous improvements in children’s dental health reported by Downer (1998)¹⁴ and demonstrated in successive child dental health surveys.¹⁵ Other conditions reviewed include periodontal/gum diseases, tooth wear, dental trauma and the need for orthodontic care (tooth movement and straightening), all of which have implications for the oral health of children, as well as being of greater consequence later in the adult years of life.

Information on oral health trends is gained from decennial surveys of the oral health of school children in the UK; a rolling programme of national diet and nutrition surveys in Britain; and local surveys co-ordinated nationally by the British Association for the Study of Community Dentistry (BASCD)^{15–28} (Table 3.18). Together they provide a wealth of data, which are available for monitoring and planning purposes. Only the BASCD co-ordinated data provides information on oral health trends during the 1990s as the other main surveys have only been conducted once during this time frame. Together they provide a comprehensive picture of the oral health of children. The results of the UK Child Dental Health Survey being conducted in 2003 will not be available until late 2004 or early 2005.

The data presented for all the national surveys, with the exception of the survey of pre-school children,¹⁶ relate to children in state schools. This creates bias as children from private schools are exempted, skewing the data away from the advantaged whose children attend private schools. This is probably more marked in older children than primary school children.

Geographic coverage of the surveys is not always complete. The National Diet and Nutrition surveys are conducted only in Great Britain and so these data do not include Northern Ireland.

It is important that the quality of data collection, frequency and coverage are maintained and the data used locally and nationally to support the planning and provision of dental care, including health promotion services. Examination of oral health trends is essential so that future need, supply and demand for oral health care can be harmonised as far as possible and oral health inequalities, which remain an important issue among children, are addressed.

Dental caries (tooth decay)

Tooth decay is much less common in today’s children.¹⁴ Although their dental health has improved dramatically in recent decades, it remains the main disease and source of tooth loss and dental pain in the primary (deciduous or baby teeth) and secondary (permanent teeth) dentitions of children in the UK. For decay to occur bacterial plaque and dietary sugars must be in contact with a susceptible tooth surface over time.²⁹ Bacterial plaque is present on all teeth and although removed by thorough tooth brushing it rapidly reforms. Sugars from the diet are metabolised by plaque bacteria and acid is formed that attacks the tooth surface and, over a period of time, causes dental caries (tooth decay), particularly if sugar consumption is frequent. In its early stages decay is symptom-less; however, as tooth decay progresses, pain, sepsis and tooth loss will result unless there is appropriate intervention in a timely manner. However, in the early stages, the process may be reversed by a suitable environment: low volume and frequency of sugar intake along with regular access to fluoride.^{30,31}



Comprehensive data from national and local surveys present a detailed picture of trends in tooth decay.^{16–28} Furthermore, the programme of National Diet and Nutrition Surveys in Britain provide the opportunity to link data on the oral health of school children with diet.^{16,17}

Prevalence of dental caries in pre-school children (1½ to 4½ years)

The dental report from the 1992/1993 National Diet and Nutrition Survey of children aged 1½ to 4½ years conducted in GB, provides an overview of the oral health of pre-school children.¹⁶ The findings from this report were that dental caries experience increases with age in pre-school children (Table 3.19) and is more strongly associated with social than with nutritional or behavioural factors. Key points included the following:

- dental caries is the most common oral disease in 1½ to 4½ year olds;
- one in six children (17 per cent) across the combined three-year group had experienced tooth decay;
- 16 per cent of those aged 1½ to 4½ years had active tooth decay present; thus, where tooth decay was evident it was largely untreated; and
- The prevalence of dental caries increased with age – four per cent of those aged 1½ to 2½ years had experienced tooth decay; 14 per cent of 2½ to 3½ year olds and 30 per cent of those aged 3½ to 4½ years.

Social class of head of household has an impact on the level of decay experience, with 40 per cent of children from manual backgrounds experiencing caries but only 16 per cent of children from non-manual backgrounds.¹⁶

Prevalence of dental caries in children and adolescents (4 to 18 years)

The results (Table 3.20) of the National Diet and Nutrition Survey of children aged 4 to 18 years conducted in 1997¹⁷ showed that:

- the proportion of children and adolescents with tooth decay increased with age;
- regional differences existed as Scotland had the highest proportion of children affected (66 per cent) and London and the South East had the lowest proportion of children affected (44 per cent);
- children in households of manual working background (57 per cent) and where parents were in receipt of benefits (63 per cent) were more likely to have experienced dental caries than those from non-manual backgrounds (46 per cent) and whose parents were not in receipt of benefits (50 per cent), with the greatest differences exhibited among 7- to 14-year-olds; and
- children were less likely to have had their decay in primary teeth treated, three-quarters of this disease being untreated at the time of survey.

Interestingly, no significant associations emerged in relation to the average daily consumption of sugary foods banded into three levels and across the four age groups analysed. However, Walker *et al* (2000)¹⁷ reported that of the young people aged 15 to 18 years, those with an intake of non-milk extrinsic sugars in the upper range were more likely to have caries experience (70 per cent) than those in the lower range of intake (52 per cent). A multivariate analysis demonstrated that a significant relationship existed between consumption of sugar confectionery and caries experience in children aged between 7 and 10 years.¹⁷



Prevalence of dental caries by ethnicity

National dental surveys have not reported on ethnicity and oral health, so local surveys are the main sources of information: there has been debate over whether ethnicity is related to oral health, or whether income and social class are more important.³² Studies have demonstrated that dental caries is higher in the primary teeth of Asian children.^{33,34} However Bedi and Uppal report that these differences are not significant when matched for social class and mothers' ability to speak English. Children from Asian origin have been shown to have less caries in their permanent dentition^{33,35} and in some studies they have been shown to have similar levels of caries as White and Afro-Caribbean children. Zoitopoulos *et al*, 1996³⁶ demonstrated that Afro-Caribbean children in South London had lower levels of dental caries than Caucasian children living in the same London boroughs and attending the same pre-school care facilities.

Gum diseases/periodontal diseases

Gum diseases result from the accumulation of bacterial plaque at the gum margins. Bacteria and their products in the plaque cause inflammation in the tooth's supporting tissues. In a relatively small proportion of susceptible individuals, this results in a very destructive process.^{37,38} Although the natural history of periodontal diseases is complex, and it would appear to be episodic, there is some evidence that its effects may be minimised by thorough daily removal of dental plaque. Tooth brushing has wider benefits to oral health when it involves application of fluoride toothpaste.

Signs and symptoms of gum disease include red swollen or bleeding gums, and may be associated with the presence of calculus to which plaque adheres. In children, an indication of the level of gum disease present is described by looking at several proxy indicators: the proportion with gum inflammation, visible plaque and calculus present.

Levels of gum inflammation (Table 3.21) and visible plaque (Table 3.22) exhibit similar patterns of prevalence among school children, increasing with age to about 10 years and then falling again as children become teenagers. About 63 per cent of 10-year-olds had gum inflammation and 73 per cent of 10-year-olds had plaque. In contrast, calculus increased with age from 5 to 15 years (Table 3.23).

A more detailed inspection of 15-year-olds in the UK revealed that fewer than 10 per cent had both gingivitis (swelling of gums) and pocketing present (Table 3.24).

Differences in the prevalence of gum disease are seen with age and sex. Children in England and Scotland were generally more likely to have evidence of gum diseases than those in Wales or Northern Ireland.¹⁵

The dental component of the 1997 NDNS¹⁷ identified that just over one-third (35 per cent, Table 3.25) of all young people aged 4 to 18 years were recorded as having unhealthy gums. The age groups with the highest proportion recorded as having plaque were 11- to 14-year-olds for boys (56 per cent) and 7- to 10-year-olds for girls (47 per cent). Deposits of calculus present increased with age for all young people aged between 4 to 18 years, such that 34 per cent of 15- to 18-year-olds had calculus.

In the older ages, 40 per cent of 15- to 18-year-olds had gingivitis (Table 3.26) as indicated



by bleeding when gums were explored with a blunt probe (i.e. 'probed'), and 17 per cent were considered to have pocketing, a phenomenon which was twice as common in boys (23 per cent) as girls (11 per cent).

Tooth wear

In parallel with falling caries prevalence there has been a greater awareness of other destructive conditions such as tooth wear in children, particularly erosion associated with chemical (dietary and regurgitation) and mechanical factors.²⁹ National studies conducted during the 1990s have increasingly measured tooth wear as outlined below.

The dental component of the 1992/1993 NDNS reported that the prevalence of erosion increases with age in pre-school children with 13 per cent of older children (Table 3.27) having evidence of erosion into dentine or pulp compared with two per cent of younger children. There was no significant relationship with social class.

The 1993 survey of school children¹⁵ provided the first evidence that over half of 5- to 6-year-olds had some erosion present and almost one-quarter of this age had erosion into pulp. However, in older children it showed that erosion of permanent incisors was less common with only 12 per cent of 13- to 15-year-olds having some erosion present. The data showed that erosion of permanent incisors was mostly limited to enamel among older children.

In the 1997 NDNS for 4 to 18 years over half of those (Table 3.28) surveyed exhibited evidence of tooth wear on their front teeth (incisors) or their first permanent molars, which are the first adult teeth to emerge into the oral cavity. There was more evidence of erosion of the palatal surfaces than buccal surfaces for all age groups for both primary and permanent upper incisors.

Trauma

Children's anterior teeth (incisors) are most likely to suffer trauma. Data from national surveys show the level of trauma in pre-school and school children, where they relate to the primary and secondary dentitions respectively.

The National Diet and Nutrition Survey of children aged 1½ to 4½ years revealed that 15 per cent of all pre-school children (Table 3.29) had experienced trauma to their primary (baby) teeth. There was little variation by sex but pre-school children aged 2½ to 4½ years (18 per cent of those aged 2½ to 3½ years; 16 per cent of those aged 3½ to 4½ years) were more likely to experience trauma than younger children aged 1½ to 2½ (11 per cent).

The 1997 survey of children's dental health in the UK provided data on the prevalence of traumatised incisors.¹⁷ Trauma to the permanent incisors increases with age once the secondary dentition appears from seven or eight years of age. Whereas five per cent of 7- to 10-year-olds had experienced trauma, this had risen to 18 per cent among 15- to 18-year-olds. Boys were more likely than girls to have experienced trauma in their permanent incisors (front) teeth for all age groups between 7 and 18 years. Among 15- to 18-year-olds, 22 per cent of boys had experienced trauma in their permanent incisors (front) teeth compared with 13 per cent of girls in this age group.



The majority of traumatic injuries to incisor teeth identified were restricted to the outer enamel of the tooth structure and therefore required little intervention or repair. The prevalence of traumatized incisor (front) teeth would appear to be falling particularly in older children.¹⁵ This may be related to a reduction in rough play or sports and/or greater wearing of mouth guards in contact sports.

Physical Activity

Physical education lessons

Findings from the 1999 Young People and Sport Survey³⁹ commissioned by Sport England showed a reduction in physical activity in PE lessons at school since 1994⁴⁰ (Table 3.31). Table 3.31 shows that since 1994 there has been an increase in the proportion of all school children spending less than one hour per week for PE, from five per cent in 1994 to 18 per cent in 1999.

Participation in PE lessons lasting two hours or more was 46 per cent in 1994, but had fallen to 32 per cent in 1999. This decline in the amount of time spent in PE lessons was more pronounced among primary than among secondary schoolchildren: 37 per cent of all primary school children spent two hours or more a week in PE at school in 1994, drastically reduced to only 15 per cent in 1999.

Sport out of lessons

Although time spent in PE lessons decreased between 1994 and 1999, there was an increase over that period from 41 per cent to 47 per cent in the proportion of school children who had spent five hours or more on physical activity out of school lessons (Table 3.32). Looking more closely at primary and secondary level differences, Table 3.32 shows that in 1994, 42 per cent of primary and 41 per cent of secondary school children participated in physical activity out of lessons for five hours or more. In 1999, the proportion of primary school children participating in physical activity out of lessons had increased to 49 per cent, and the proportion of secondary school children participating had also increased, but only to 43 per cent.

A greater amount of time was also spent on physical activity during the summer holidays by school children in 1999 than in 1994. Table 3.33 shows that 61 per cent of school children spent five hours or more in a week on physical activity during the previous summer holiday for the 1994 survey, but this had risen to 66 per cent in 1999. In 1994, two-thirds (66 per cent) of primary school children surveyed said they spent five hours or more in a week on physical activity during summer holidays compared with only 56 per cent of secondary school children. The same pattern was evident in 1999, when 72 per cent of primary school children said they spent five hours or more in a week on physical activity compared with 62 per cent of secondary school children. It is clear from Table 3.33 that a greater proportion of primary school children spent 15 hours or more in a week on physical activity during the summer holidays than secondary school children.

The general trend appears to be that since 1994 school children have spent less time on PE in lessons, particularly in primary schools. However, since 1994 there has been an increase in physical activity out of lessons and during the summer holidays. Primary school children spend more time on physical activity outside school than secondary school children do.



These findings of less physical activity among secondary school children parallel the increased levels of overweight and obesity among children and adolescents of secondary school age in the 1990s, as evident from Tables 3.16 and 3.17 .

Other leisure activities

More time was spent on watching television or videos than any other leisure activity out of school. Table 3.34 shows that in 1999, an average of 11.4 hours was spent watching television or videos compared with 7.5 hours spent on physical activity. In 1994 the highest ranked extra curriculum activity was watching television or videos with physical activity being ranked fourth.

These figures show that school children spend more time in a week on sedentary activities such as watching television or videos than participating in sporting activities.

Mode of transport to school

There has been a considerable change in children's mode of transport to school during the period from 1992 to 2001. The proportion of primary school children walking to school has declined since 1992/1994 from 63 per cent to 54 per cent in 1999/2001 (Table 3.35). This may be largely due to increased fears about personal safety. The proportion of secondary school children walking to school is consistently lower than primary school children. A contributing factor to this pattern may be that secondary school children live further away from their schools, given that their average journey length to school is double the journey length of primary school children.

Conclusions

The National Diet and Nutrition Surveys^{1,2} of young people showed that all age groups had a preference for high fat-content diets given the high consumption of chips, snack foods, biscuits, chocolate confectionery and soft drinks. This is counteracted by the low consumption of fruits and vegetables among all age groups. There was also evidence of a relatively high proportion of children aged between 11 and 18 years having poor vitamin A intakes. This is reflected in the low consumption of vegetables. A high proportion of girls aged between 11 and 18 years had inadequate intakes (falling well below the LRNI) of riboflavin and iron. A high proportion of boys and girls aged between 11 and 18 years had inadequate intakes of a number of minerals, including calcium, magnesium, potassium and zinc.

There is clear evidence that inequalities exist in the consumption of fruit and vegetables, with lower consumption among children and adolescents from lower socio-economic households. Some children and adolescents are failing to meet the recommended consumption levels of five portions of fruit and vegetable per day. Two initiatives that have been introduced in an attempt to address this problem are the Minimum Nutrition Guidelines,⁵ which were introduced to promote new nutritional standards for school meals, and the National School Fruit Scheme,³ which entitles school children aged between four and six to a free piece of fruit each school day.

The view of professionals is that the prevalence of eating disorders such as anorexia nervosa and bulimia nervosa, which predominantly affect females, has increased in recent years. It is



clear from the GPRD data that bulimia nervosa is more prevalent than anorexia nervosa among 10- to 19-year-old females.

Overweight and obesity in children and adolescents of secondary school age are on the increase. Factors that may be contributing to this trend are the high consumptions of high fat content foods and an inactive lifestyle where more time is spent on sedentary activities outside school such as watching television or videos.⁴¹ Another factor that should be taken into consideration is that fewer children walk to school.

Although children are spending less time on physical activity in school, they are spending more time on physical activity out of school and during the summer holidays. It is evident from the Young People and Sport Surveys that primary school children were participating in physical activity more frequently than secondary school children outside of school. This is reflected in the increased prevalence of overweight and obesity among adolescents of secondary school age.

Data from the National and Diet Nutrition Surveys on dental health^{16,17} showed that the prevalence of dental caries increased with age. However, inequalities remain as children from families of a manual background and receiving benefits were more likely to experience dental caries than those from families of non-manual backgrounds and not receiving benefits. A significant relationship exists between the consumption of sugar confectionery and caries experience in children aged 7 to 10 years. In addition to this, young people aged 15 to 18 years in the upper range of non-milk extrinsic sugars intakes were more likely to have experienced dental caries.

This suggests that dietary control should also be taken into consideration, along with effective plaque removal and judicious use of fluoride as preventive measures to arrest the carious process³¹. The introduction of fluoridated toothpastes is widely accepted as being one of the most important preventive measures responsible for the downward shift in tooth decay in the UK across all socio-economic groups.^{14,15,32} There is evidence that the frequency of toothbrushing with a fluoride paste and post-brushing rinsing are very important in reducing caries.⁴²

A combination of an unhealthy diet and non-active lifestyle could have a significant impact on children's health and well-being. A well balanced diet during childhood that ensures sufficient intakes of vitamins and minerals are being consumed and non-sedentary behaviour will help to reduce the risk of developing diseases in adulthood.

References

1. Gregory J R, Collins D L, Davies P S W, Hughes J M and Clarke P C (1995) *National Diet and Nutrition Survey: children aged 1½ to 4½ years*, HMSO: London.
2. Gregory J, Lowe S, Bates C J, Prentice A, Jackson L V, Smithers G, Wenlock R and Farron M (2000) *National Diet and Nutrition Survey: young people aged 4 to 18 years*, HMSO: London.
3. Department of Health (2000) *The National School Fruit Scheme*, Department of Health: London.
4. Department of Health (1994) *Weaning and Weaning Diet*, Report on Health and Social



Subjects: 45, HMSO: London.

5. Local Authority Caterers Association (2000) New nutrition guidelines published by the DfEE.
6. Department for Health (1991) *Dietary Reference Values for Food Energy and Nutrients for the United Kingdom*, HMSO: London.
7. Meltzer H, Gatward R, Goodman R and Ford T (2000) *Mental health of children and adolescents in Great Britain*, TSO: London.
8. Royal College of Psychiatrists (2000) *Eating disorders in the UK: policies for service development and training*.
9. Eating Disorders Association (2000) *Eating disorders: The need for action in 2000 and beyond*.
10. Turnbull S, Ward A, Treasure J *et al* (1996) The demand for eating disorder care: An epidemiological study using the General Practice Research database. *British Journal of Psychiatry* **169**, 705–712.
11. Cole T J, Bellizzi M, Flegal K M and Dietz W H (2000) Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ* **320**, 1240.
12. Reilly J J, Dorosty A R and Emmett P M (1999) Prevalence of overweight and obesity in British children: cohort study. *BMJ* **319**, 1039.
13. Barlow S E and Dietz W H (1998) Obesity evaluation and treatment: expert committee recommendations. *Pediatrics* **102**, E29.
14. Downer M C (1998) The changing pattern of dental disease over 50 years. *British Dental Journal* **185**, 36–41.
15. O'Brien M (1994) *Children's dental health in the United Kingdom, 1993*, HMSO: London.
16. Hinds K and Gregory J (1995) *National diet and nutrition survey of children aged 1½ to 4½: Volume 2: report of the dental survey*, HMSO: London.
17. Walker A, Gregory J, Bradnock G, Nunn J and White D (2000) *National Diet and Nutrition Survey: young people aged 4 to 18 years. Volume 2: Report of the oral health survey*, TSO: London.
18. Pitts N B and Palmer J (1995) The dental caries experience of 5-year-old children in Great Britain. Surveys co-ordinated by the British Association for the Study of Community Dentistry in 1993/94. *Community Dental Health* **12**, 52–58.
19. Pitts N B and Evans D J (1997a) British Association for the Study of Community Dentistry (BASCD) co-ordinated National Health Service surveys of caries prevalence 1985/6–1995/6. *Community Dental Health* **14 Suppl 1**, 1–5.
20. Pitts N B and Evans D J (1997b) The dental caries experience of 5-year-old children in the United Kingdom. Surveys co-ordinated by the British Association for the Study of Community Dentistry in 1995/96. *Community Dental Health* **14**, 47–52.
21. Pitts N B, Evans D J and Pine C.M (1997c) British Association for the Study of Community Dentistry (BASCD) diagnostic criteria for caries prevalence surveys-1996/97. *Community Dental Health* **14 Suppl 1**, 6–9.
22. Pitts N B, Evans D J and Nugent Z.J (1998) The dental caries experience of 12-year-old children in the UK. Surveys coordinated by the British Association for the Study of Community Dentistry, 1996/97. *Community Dental Health* **15**, 49–54.
23. Pitts N B, Evans D J and Nugent Z.J (1999) The dental caries experience of 5-year-old children in the UK. Surveys coordinated by the British Association for the Study of Community Dentistry, 1997/98. *Community Dental Health* **16**, 50–56.
24. Pitts N B, Evans D J and Nugent Z J (2000) The dental caries experience of 14-year-old



- children in the UK. Surveys coordinated by the British Association for the Study of Community Dentistry, 1998/99. *Community Dental Health* 17, 48–53.
25. Pitts N B, Evans D J and Nugent Z J (2001) The dental caries experience of 5-year-old children in the UK. Surveys coordinated by the British Association for the Study of Community Dentistry, 1999/2000. *Community Dental Health* 18, 49–55.
26. Pitts N B, Evans D J, Nugent Z J and Pine C M (2002) The dental caries experience of 12-year-old children in England and Wales. Surveys coordinated by the British Association for the Study of Community Dentistry, 2000/2001. *Community Dental Health* 19, 46–53.
27. Pitts N B, Boyles J, Nugent Z J, Thomas N and Pine C M (2003) The dental caries experience of 5-year-old children in England and Wales. Surveys coordinated by the British Association for the Study of Community Dentistry, 2000/2001. *Community Dental Health* 20, 45–54.
28. Kelly M *et al* (2000) *Adult Dental Health Survey, Oral health in the United Kingdom, 199*, TSO: London.
29. Rugg-Gunn A (1997) Nutrition, dietary guidelines and food policy in oral health, in Pine C M (ed), 1997 *Community Oral Health*, Wright: Oxford, 206–220.
30. Health Education Authority (1999) *The Scientific Basis of Dental Health Education*, HEA: London.
31. Kidd E A M (1996) The carious lesion in enamel, in Murray J J (ed), *Prevention of Oral Disease* (pp 95–106), Oxford University Press: Oxford.
32. Watt R and Sheiham A (1999) Inequalities in oral health: a review of the evidence and recommendations for action. *British Dental Journal* 187, 6–12.
33. Bedi R and Uppal R (1996) The oral health of minority ethnic communities in the United Kingdom, in Bedi R, Bahl V and Rayan RR (eds), *Dentists, patients and ethnic minorities* (pp 23–33).
34. Gray M, Morris A J and Davies J (2000) The oral health of South Asian five-year-old children in deprived areas of Dudley compared with White children of equal deprivation and fluoridation status. *Community Dental Health* 17(4), 243–245.
35. Bedi R, Quarrell I and Kippen A (1991) The dental health of 10-year-old children attending multiracial schools in Greater Glasgow. *British Dental Journal* 170(5), 182–185.
36. Zoitopoulos L, Brailsford S R, Gelbier S, Ludford R W, Marchant S H and Beighton D (1996) Dental caries and caries-associated micro-organisms in the saliva and plaque of 3- and 4-year-old Afro-Caribbean and Caucasian children in south London. *Archives of Oral Biology* 41(11), 1011–1018.
37. Pilot T (1997) Periodontal Diseases, in. Pine C M (ed), *Community Oral Health* (pp 82–88), Wright: Oxford.
38. Johnson N W (Ed) (1991) *Periodontal Diseases Vol 3*, Cambridge University Press: Cambridge.
39. MORI (2001) *Young People and Sport in England, National Survey 1999*, research report commissioned by Sport England.
40. Mason V (1995) *Young People and Sport in England, 1994*, survey commissioned by Sports council.
41. Buttriss J (2002) Nutrition, health and schoolchildren. *British Nutrition Foundation Nutrition Bulletin* 27, 275–316.
42. Chestnutt I G, Schafer F, Jacobson A P M and Stephen K W (1998) The influence of toothbrushing frequency and post-brushing rinsing on caries experience in a caries clinical trial. *Community Dentistry Oral Epidemiology* 26(6), 406–411.

Table 3.1 Proportion of all children, aged 1½ to 4½ years consuming foods and drinks over 7-day period in 1992/1993 by sex

Great Britain		Percentages		
Food Group	Food	Boys	Girls	Total
Fruit and vegetables	Peas	52	52	53
	Baked beans	50	47	49
	Leafy green vegetables	34	37	39
	Carrots (not raw)	55	52	54
	Raw and salad vegetables	20	28	24
	Apples and pears	50	48	50
	Citrus fruits	24	28	26
Bread, other cereals and potatoes	Bananas	45	45	46
	Pasta	49	52	51
	Rice	18	18	18
	White bread	85	85	86
	Wholemeal bread	27	27	27
	Wholegrain and high fibre breakfast cereals	63	58	61
	Other breakfast cereals	66	64	66
	Chips	71	69	71
	Fried/roast potatoes	39	35	37
	Potatoes (boiled, mashed or jacket)	76	77	77
	Savoury snacks	77	77	78
Meat, fish and alternatives	Bacon and ham	36	43	40
	Beef, veal and dishes	44	48	47
	Burgers and kebabs	25	22	24
	Sausages	53	52	53
	Meat pies and pastries	29	26	28
	Chicken and turkey dishes	53	49	52
	Coated chicken	17	19	18
	Coated and fried white fish	40	36	38
Milk and dairy foods	Eggs and egg dishes	42	48	46
	Whole milk	84	80	83
	Semi-skimmed milk	31	32	32
	Cheese (excl. cottage cheese)	56	60	59
Fats and sugars	Yoghurt	40	38	40
	Biscuits	89	86	88
	Buns, cakes and pastries	56	53	55
	Ice cream	40	45	43
	Butter	31	28	30
	Polyunsaturated margarine	36	35	36
	Sugar confectionery	59	55	58
Drinks	Chocolate confectionery	73	73	74
	Fruit juice	35	36	36
	Diet soft drinks	50	46	49
	Other soft drinks	86	83	86
	<i>Base</i>	<i>848</i>	<i>827</i>	<i>1675</i>

Source: National Diet and Nutrition Survey: children aged 1½ to 4½ years

Table 3.2 Proportion of all children, aged 4 to 18 years consuming foods and drinks over 7-day period in 1997 by sex

Great Britain		Percentages	
Food Group	Food	Boys	Girls
Fruit and vegetables	Peas	50	49
	Baked beans	62	57
	Leafy green vegetables	39	44
	Carrots (not raw)	53	54
	Raw and salad vegetables	47	59
	Apples and pears	53	57
	Citrus fruits	24	28
	Bananas	38	38
Bread, other cereals and potatoes	Pasta	60	64
	Rice	42	40
	White bread	95	96
	Wholemeal bread	22	26
	Wholegrain and high fibre breakfast cereals	52	48
	Other breakfast cereals	74	64
	Chips	89	88
	Fried/roast potatoes	52	48
	Potatoes (boiled, mashed, jacket, canned, potato salad, instant, potato curry, cheese & potato pie)	83	80
	Savoury snacks	88	90
Meat, fish and alternatives	Bacon and ham	61	57
	Beef, veal and dishes	52	49
	Burgers and kebabs	41	35
	Sausages	64	55
	Meat pies and pastries	46	43
	Chicken and turkey dishes	75	73
	Coated chicken and turkey	46	48
	Coated and fried white fish	49	44
	Eggs	45	44
Milk and dairy foods	Whole milk	54	51
	Semi-skimmed milk	59	57
	Cheese (excl. cottage cheese)	65	69
	Yoghurt	40	44
Fats and sugars	Biscuits	84	84
	Buns, cakes and pastries	76	75
	Ice cream	51	50
	Butter	27	31
	Polyunsaturated reduced fat spread	36	38
	Sugar confectionery	63	66
	Chocolate confectionery	84	80
Drinks	Fruit juice	46	51
	Carbonated soft drinks not low calorie	78	75
	Concentrated soft drinks not low calorie	52	51
	<i>Base</i>	<i>856</i>	<i>845</i>

Source: National Diet and Nutrition Survey: young people aged 4 to 18 years

Table 3.3 List of food items consumed over a 7-day period where a significant difference exists across age groups

Great Britain						Percentages
	Whole milk	Semi-skimmed milk	Wholegrain and high fibre breakfast cereals	Other breakfast cereals	Biscuits	Buns, cakes and pastries
All (age in years)						
1½–2½	86	23	64	62	86	50
2½–3½	82	35	62	65	91	55
3½–4½	80	38	58	72	88	61
Boys (age in years)						
4–6	75	54	57	83	93	83
7–10	58	53	57	84	92	82
11–14	40	64	50	69	84	76
15–18	47	63	43	61	70	64
Girls (age in years)						
4–6	70	47	59	77	89	74
7–10	51	52	47	69	88	76
11–14	38	58	45	61	79	71
15–18	41	59	33	40	66	64
	Bacon and ham	Beef, veal and dishes	Sausages	Coated and fried white fish	Apples and pears	
All (age in years)						
1½–2½	34	48	51	39	48	
2½–3½	41	46	54	38	51	
3½–4½	46	46	54	38	49	
Boys (age in years)						
4–6	48	43	71	65	70	
7–10	62	52	69	54	59	
11–14	67	48	61	41	48	
15–18	66	63	57	39	39	
Girls (age in years)						
4–6	58	43	65	59	66	
7–10	59	52	62	50	61	
11–14	52	46	48	32	47	
15–18	48	45	37	29	44	

Sources: National Diet and Nutrition Survey: children aged 1½ to 4½ years; National Diet and Nutrition Survey: young people aged 4 to 18 years

Table 3.4 Proportion of young people consuming food items over a 7-day period by socio-economic characteristics of household

Great Britain									
Percentages									
Socio-Economic characteristics	Pasta	Wholegrain and high fibre breakfast cereals	Buns, cakes and pastries	Whole milk	Semi-skimmed milk	Butter	Bacon and ham	Chicken and turkey dishes	Burgers and kebabs
1½ – 4½ years (all)									
Non-manual	56	67	61	83	33	34	44	56	19
Manual	47	57	51	83	31	25	37	48	27
4–18 years (boys)									
Non-manual	61	55	81	46	66	32	64	76	39
Manual	60	50	72	61	53	22	63	73	42
Parents receiving benefits ¹	52	49	69	70	45	21	44	70	42
Parents not receiving benefits ¹	62	53	79	49	63	29	67	76	40
Gross weekly household income ¹									
Bottom quintile (<£160)	55	47	72	72	43	23	44	73	45
Top quintile (£600+)	65	52	85	45	66	41	67	73	35
4–18 years (girls)									
Non-manual	68	51	77	46	61	35	59	76	32
Manual	64	47	70	54	56	27	57	73	40
Parents receiving benefits ¹	58	45	75	64	52	28	56	66	41
Parents not receiving benefits ¹	66	49	75	47	59	32	58	75	33
Gross weekly household income ¹									
Bottom quintile (<£160)	59	44	74	67	50	24	52	71	33
Top quintile (£600+)	70	51	78	39	74	39	60	80	25
	Other raw and salad vegetables	Chips	Apples and pears	Citrus fruits	Bananas	Sugar	Sugar confectionery	Fruit juice	
1½ to 4½ years (all)									
Non-manual	28	63	54	31	53	48	54	48	
Manual	21	77	46	22	40	59	62	26	
4–18 years (boys)									
Non-manual	52	87	59	26	44	65	68	56	
Manual	43	90	47	23	33	73	58	37	
Parents receiving benefits ¹	38	92	47	21	31	77	56	33	
Parents not receiving benefits ¹	49	88	55	25	40	66	65	50	
Gross weekly household income ¹									
Bottom quintile (<£160)	39	95	51	25	30	79	62	35	
Top quintile (£600+)	59	87	53	22	42	62	68	62	
4–18 years (girls)									
Non-manual	63	86	58	33	43	57	63	58	
Manual	57	91	53	25	34	68	69	46	
Parents receiving benefits ¹	47	92	58	20	31	72	74	41	
Parents not receiving benefits ¹	63	86	57	31	40	60	63	54	
Gross weekly household income ¹									
Bottom quintile (<£160)	54	92	58	25	37	71	73	35	
Top quintile (£600+)	72	82	60	35	43	58	60	69	

Sources: National Diet and Nutrition Survey: children aged 1½ to 4½ years; National Diet and Nutrition Survey: young people aged 4 to 18 years

Note:

1. Data only available for 4- to 18-year-olds.

Table 3.5 Average daily energy and macronutrient intakes of children by sex and age, 1997

Great Britain

	Average Daily Energy Intake (MJ)	Intake as % of EAR	Average Daily Protein Intake (g)	Intake as % of RNI	% with average intakes of protein below the RNI	Average Daily Carbohydrate Intake (g)	Average Daily Total Sugar Intake (g)	Average Daily Starch Intake (g)	Average Daily Total Fat intake (g)
Boys (age in years)									
4–6 years	6	89	49	249	1	209	98	110	60
7–10 years	7	91	55	194	1	248	115	133	70
11–14 years	8	89	64	152	7	271	122	149	77
15–18 years	10	83	77	139	14	301	129	172	89
Girls (age in years)									
4–6 years	6	91	45	226	1	191	95	96	56
7–10 years	7	92	51	181	2	218	101	117	64
11–14 years	7	89	53	128	18	228	99	129	67
15–18 years	7	77	55	121	26	214	92	122	64

Sources: 1997 National Diet and Nutrition Surveys; Dietary Reference Values for Food, Energy and Nutrients for the United Kingdom

Table 3.6 Average daily energy intakes of children aged 4 to 18 years by region, 1997

Regions	Average Daily Energy Intake (MJ)	Intake as % of EAR
Boys 4–18		
Northern	7.99	88
London and South East	7.98	88
Central, South West and Wales	8.07	89
Scotland	7.88	87
Girls 4–18		
Northern	6.78	89
London and South East	6.51	85
Central, South West and Wales	6.72	88
Scotland	6.36	83

Sources: 1997 National Diet and Nutrition Surveys; Dietary Reference Values for Food, Energy and Nutrients for the United Kingdom

Table 3.7 Average daily energy intakes of children aged 4 to 18 years by socio-economic characteristics, 1997

Great Britain

Socio-Economic characteristics	Average Daily Energy Intake (MJ)	Intake as % of EAR
4 – 18 years (boys)		
Non-manual	8.14	90
Manual	8.01	89
Parents receiving benefits	7.22	80
Parents not receiving benefits	8.27	91
Gross weekly household income		
Bottom quintile (<£160)	7.39	82
Top quintile (£600+)	8.27	91
4 – 18 years (girls)		
Non-manual	6.77	89
Manual	6.59	86
Parents receiving benefits	6.64	87
Parents not receiving benefits	6.66	87
Gross weekly household income		
Bottom quintile (<£160)	6.53	86
Top quintile (£600+)	6.77	89

Source: National Diet and Nutrition Survey: young people aged 4 to 18 years

Table 3.8 Average daily macronutrient intakes of children aged 1½ to 18 years by socio-economic characteristics

Great Britain

Social Economic characteristics	Average Daily Protein Intake (g)	Average Daily Total Carbohydrate Intake (g)	Average Daily Total Sugar Intake (g)	Average Daily Starch Intake (g)	Average Daily Total Fat Intake (g)		
1½ – 4½ years (all)							
Non-manual	38	154	88	66	45		
Manual	36	156	87	70	46		
Parents receiving benefits	37	157	83	74	47		
Parents not receiving benefits	37	154	89	66	45		
4 – 18 years (all)							
Non-manual	58	242	113	129	75	4 – 18 years (boys)	4 – 18 years (girls)
Manual	56	237	104	132	75		
Parents receiving benefits	52	224	96	129	68		
Parents not receiving benefits	58	242	111	131	77		
Gross weekly household income ¹							
Bottom quintile (<£160)	53	226	96	130	70		
Top quintile (£600+)	60	243	115	128	76		

Sources: National Diet and Nutrition Survey: children aged 1½ to 4½ years, National Diet and Nutrition Survey: young people aged 4 to 18 years

Note:

1. Data only available for 4- to 18-year-olds.

Table 3.9 Average daily vitamin intakes from food sources per MJ food energy by sex and age, 1997

Great Britain

	Average Daily intake of Vitamin A as % of RNI	% with average intakes of Vitamin A below the RNI	% with average intakes of Vitamin A below the LRNI	Average Daily intake of Vitamin B6 as % of RNI	% with average intakes of Vitamin B6 below the RNI	% with average intakes of Vitamin B6 below the LRNI	Average Daily intake of Vitamin B12 as % of RNI	% with average intakes of Vitamin B12 below the RNI
Boys (age in years)								
4-6	114	48	8	189	3	0	499	0
7-10	101	62	9	194	1	0	395	0
11-14	93	67	13	182	3	1	372	1
15-18	88	70	12	180	5	0	330	1
Girls (age in years)								
4-6	112	47	6	169	5	0	446	0
7-10	96	64	10	174	4	1	347	2
11-14	78	76	20	190	3	1	270	4
15-18	91	71	12	150	18	5	225	10
	% with average intakes of Vitamin B12 below the LRNI	Average Daily intake of Vitamin C as % of RNI	% with average intakes of Vitamin C below the RNI	% with average intakes of Vitamin C below the LRNI	Average Daily intake of Thiamin B1 as % of RNI	% with average intakes of Thiamin B1 below the RNI	% with average intakes of Thiamin B1 below the LRNI	Average Daily intake of Riboflavin B2 as % of RNI
Boys (age in years)								
4-6	0	223	8	0	181	6	0	194
7-10	0	243	9	0	202	1	0	162
11-14	0	218	14	0	189	6	0	144
15-18	0	208	20	0	173	7	0	148
Girls (age in years)								
4-6	0	217	9	0	163	8	0	175
7-10	1	245	10	0	182	2	0	137
11-14	1	202	20	1	200	3	1	120
15-18	2	185	26	0	172	13	2	118
	% with average intakes of Riboflavin B2 below the RNI	% with average intakes of Riboflavin B2 below the LRNI	Average Daily intake of Niacin B3 as % of RNI	% with average intakes of Niacin B3 below the RNI	% with average intakes of Niacin B3 below the LRNI	Average Daily intake of Folate as % of RNI	% with average intakes of folate below the RNI	% with average intakes of folate below the LRNI
Boys (age in years)								
4-6	10	0	207	2	0	191	4	0
7-10	12	1	216	0	0	141	13	0
11-14	25	6	200	4	0	123	33	1
15-18	28	6	203	0	0	152	18	0
Girls (age in years)								
4-6	7	0	186	2	0	169	6	0
7-10	21	1	195	2	0	126	23	2
11-14	41	22	205	2	0	102	51	3
15-18	42	21	180	5	1	105	53	4

Sources: 1997 National Diet and Nutrition Surveys ; Dietary Reference Values for Food, Energy and Nutrients for the United Kingdom

Table 3.10 Average daily mineral intakes from food sources by sex and age, 1997

Great Britain

	Average Daily intake of Iron as % of RNI	% with average intakes of Iron below the RNI	% with average intakes of Iron below the LRNI	Average Daily intake of Calcium as % of RNI	% with average intakes of Calcium below the RNI	% with average intakes of Calcium below the LRNI	Average Daily intake of Phosphorus as % of RNI	% with average intakes of Phosphorus below the RNI
Boys (age in years)								
4-6	134	14	0	157	10	3	263	1
7-10	111	40	1	135	19	2	224	0
11-14	95	61	3	80	79	12	146	10
15-18	111	44	2	88	68	9	172	5
Girls (age in years)								
4-6	119	28	1	146	15	2	242	1
7-10	96	59	3	119	29	5	203	2
11-14	60	98	45	80	79	24	149	10
15-18	58	94	50	82	76	19	153	9
	Average Daily intake of Magnesium as % of RNI	% with average intakes of Magnesium below the RNI	% with average intakes of Magnesium below the LRNI	Average Daily intake of Sodium as % of RNI	% with average intakes of Sodium below the RNI	Average Daily intake of Potassium as % of RNI	% with average intakes of Potassium below the RNI	% with average intakes of Potassium below the LRNI
Boys (age in years)								
4-6	143	11	3	296	0	177	5	0
7-10	97	56	2	200	1	107	43	0
11-14	78	86	28	168	6	77	88	10
15-18	85	75	18	204	1	81	85	15
Girls (age in years)								
4-6	129	13	1	265	0	161	5	0
7-10	89	75	5	180	2	101	46	1
11-14	65	97	51	142	12	68	97	19
15-18	64	97	53	143	14	62	99	38
	Average Daily intake of Zinc as % of RNI	% with average intakes of Zinc below the RNI	% with average intakes of Zinc below the LRNI	Average Daily intake of Copper as % of RNI	% with average intakes of Copper below the RNI	Average Daily intake of Iodine as % of RNI	% with average intakes of Iodine below the RNI	% with average intakes of Iodine below the LRNI
Boys (age in years)								
4-6	86	80	12	117	38	156	19	2
7-10	88	73	5	116	33	140	24	1
11-14	79	84	14	112	35	124	37	3
15-18	92	69	9	106	50	139	33	1
Girls (age in years)								
4-6	77	91	26	106	52	143	27	2
7-10	81	83	10	105	49	119	39	3
11-14	66	97	37	98	60	92	61	13
15-18	87	73	10	80	78	96	61	10

Sources: 1997 National Diet and Nutrition Surveys ; Dietary Reference Values for Food, Energy and Nutrients for the United Kingdom

Table 3.11 Incidence rates per 100,000 population for anorexia nervosa, 1993

England and Wales

Age (years)	Females			Males		
	Number	Population	Incidence (95% C.I.)	Number	Population	Incidence (95% C.I.)
0-9	1	153,349	0.7 (0, 1.9)	0	159,992	0
10-19	49	143,828	34.1 (24.5, 43.6)	2	148,176	1.3 (0, 3.2)
20-39	46	382,457	12.0 (0.8, 15.5)	1	376,504	0.3 (0, 0.8)
40 and over	4	584,658	0.7 (0.1, 13.5)	0	518,311	0
Total	100	1,264,292	7.9 (6.4, 9.5)	3	1,202,983	0.2 (0, 0.5)

Age (years)	Total		
	Number	Population	Incidence (95% C.I.)
0-9	1	313,341	0.3 (0, 0.9)
10-19	51	292,004	17.5 (12.7, 22.3)
20-39	47	758,961	6.2 (4.4, 8.0)
40 and over	4	1,102,969	0.4 (0.1, 0.7)
Total	103	2,467,275	4.2 (3.4, 5.0)

*Source: Turnbull et al, (1996) using GPRD***Table 3.12** Incidence rates per 100,000 population for bulimia, 1993

England and Wales

Age (years)	Females			Males		
	Number	Population	Incidence (95% C.I.)	Number	Population	Incidence (95% C.I.)
0-9	0	153,349	0	0	159,992	0
10-19	59	143,828	41.0 (30.6, 51.5)	1	148,176	0.7 (0, 2.0)
20-39	217	382,457	56.7 (49.2, 64.3)	5	376,504	1.3 (0.6, 2.5)
40 and over	19	584,658	3.2 (1.8, 4.7)	0	518,311	0
Total	295	1,264,292	23.3 (20.7, 26.0)	6	1,202,983	0.5 (0.1, 0.9)

Age (years)	Total		
	Number	Population	Incidence (95% C.I.)
0-9	0	313,341	0
10-19	60	292,004	20.5 (15.3, 25.7)
20-39	222	758,961	29.3 (25.4, 33.1)
40 and over	19	1,102,969	1.7 (0.9, 2.5)
Total	301	2,467,275	12.2 (10.8, 13.6)

Source: Turnbull et al, (1996) using GPRD

Table 3.13 Clinics seeing children and adolescents: medical/non medical staff available

United Kingdom							Percentages
Region	Total number of clinics	Consultant Psychiatrist	Trainee Psychiatrist	Psychologist	Nurse	Occupational therapist	
Anglia & Oxford	7	6	3	5	5	3	
North Thames	6	6	5	3	5	2	
North West	2	2	2	0	2	0	
Northern & Yorkshire	2	2	1	0	2	0	
South & West	3	3	3	1	1	1	
South Thames	6	6	2	3	5	3	
West Midlands	1	1	1	1	1	0	
Trent	0	-	-	-	-	-	
Wales	0	-	-	-	-	-	
Scotland	0	-	-	-	-	-	
Northern Ireland	0	-	-	-	-	-	
Total	27	26	17	13	21	9	

	Dietician	Psychotherapist	Physiotherapist	Social Worker
Anglia & Oxford	6	3	4	3
North Thames	1	4	1	4
North West	2	0	0	1
Northern & Yorkshire	1	0	0	1
South & West	1	0	1	0
South Thames	5	2	1	2
West Midlands	1	0	0	0
Trent	-	-	-	-
Wales	-	-	-	-
Scotland	-	-	-	-
Northern Ireland	-	-	-	-
Total	17	9	7	11

Source: *The Royal College of Psychiatrists (2000)*

Note:

- No specialist service provided.

Table 3.14 Clinics seeing children and adolescents: range of therapies

United Kingdom						
Region	Counselling	Cognitive Behaviour Therapy	Family Therapy	Out-patient	In-patient	Day patient
Anglia & Oxford	6	7	5	7	6	4
North Thames	6	6	6	6	6	4
North West	2	2	2	2	2	1
Northern & Yorkshire	2	2	2	2	2	1
South & West	2	2	2	2	2	1
South Thames	5	5	5	4	5	3
West Midlands	1	1	0	1	1	1
Trent	-	-	-	-	-	-
Wales	-	-	-	-	-	-
Scotland	-	-	-	-	-	-
Northern Ireland	-	-	-	-	-	-
Total	24	25	22	24	24	15

Source: *The Royal College of Psychiatrists (2000)*

Note:

- No specialist service provided.

Table 3.15 Prevalence of overweight and obesity in children aged 24, 49 and 61 months, 1990

United Kingdom

		Age (in months)					
		24		49		61	
		Number	%	Number	%	Number	%
Boys	Overweight	78	13.9	112	19.9**	97	18.2**
	Obese	33	5.9	42	7.5**	43	8.1**
	Base	562		562		532	
Girls	Overweight	85	18.1	94	20.8**	85	19.3**
	Obese	29	6.2	35	7.8**	27	6.1**
	Base	469		451		440	
Both	Overweight	163	15.8*	206	20.3**	182	18.7**
	Obese	62	6.0	77	7.6**	70	7.2**
	Base	1031		1013		972	

Source: Reilly J, Dorosty A et al (1999) Prevalence of overweight and obesity in British children: cohort. *BMJ* 319, pp 1039

Notes:

* $P < 0.05$, significantly different from expected frequency of 15% (body mass index above 85th centile)

** $P < 0.001$, significantly different from expected frequency of 5% (body mass index above 95th centile)

Table 3.16 Proportion of overweight in children and adolescents by sex and age

England											Percentages
	2	3	4	5	6	7	8	9	10	11	
Boys											
1995	19.1	14.5	17.0	18.9	11.7	13.4	17.2	23.4	13.5	21.4	
1996	19.5	18.8	19.2	12.7	18.1	18.9	14.6	20.5	14.9	23.6	
1997	12.2	15.4	14.7	14.2	15.0	14.7	16.4	15.7	16.7	20.0	
1998	15.2	18.3	21.4	16.3	16.8	22.6	21.5	17.9	24.2	25.8	
1999	23.4	24.1	24.1	19.6	19.4	30.8	16.7	28.8	19.0	36.5	
2000	32.7	18.3	15.1	9.1	14.5	26.2	15.8	22.1	23.3	31.1	
Girls											
1995	21.8	18.0	17.6	23.7	18.8	29.2	26.5	21.1	28.8	35.3	
1996	16.1	16.8	25.9	23.1	24.1	20.4	18.4	26.2	22.1	21.2	
1997	14.4	21.2	24.7	19.1	21.5	18.2	25.1	25.8	18.2	29.0	
1998	19.1	18.5	25.6	18.8	23.0	27.7	25.4	27.9	24.6	32.1	
1999	23.0	22.0	21.9	31.1	24.2	29.3	38.7	29.6	24.1	25.0	
2000	9.3	21.8	20.3	16.4	21.4	40.4	23.4	22.4	32.1	35.7	
	12	13	14	15	16	17	18	19	All aged 2-19	Base	
Boys											
1995	17.5	19.8	21.1	22.3	16.3	26.2	18.3	29.2	18.6	2083	
1996	21.4	20.3	20.6	21.2	23.1	22.3	17.6	22.1	19.3	2329	
1997	21.6	25.8	22.9	24.2	19.7	23.4	16.7	25.0	17.7	3709	
1998	20.9	26.5	18.6	24.4	22.1	22.3	21.7	25.9	21.1	2147	
1999	20.9	19.6	20.8	26.2	19.6	16.7	20.4	23.8	23.0	1052	
2000	23.1	17.3	29.2	16.1	19.0	18.5	11.4	27.5	20.3	1065	
Girls											
1995	21.9	20.0	27.8	25.0	25.2	19.0	19.3	23.2	23.5	2109	
1996	29.9	23.3	27.3	26.9	19.4	21.9	20.4	28.1	22.7	2230	
1997	24.1	28.8	27.8	22.7	26.6	25.7	22.0	25.0	22.9	3719	
1998	28.4	30.9	23.6	25.7	21.0	22.9	32.5	31.3	25.5	2077	
1999	20.5	26.4	27.7	9.3	30.4	19.6	28.1	18.2	25.2	1033	
2000	28.8	37.3	26.3	23.4	32.4	36.0	27.7	27.3	26.6	1013	

Source: Unpublished analysis of Health Survey for England statistics

Table 3.17 Proportion of obesity in children and adolescents by sex and age

England											Percentages
	2	3	4	5	6	7	8	9	10	11	
Boys											
1995	3.6	2.9	5.0	3.8	5.8	2.4	3.0	3.6	4.8	3.6	
1996	5.5	3.6	2.6	3.0	3.1	5.6	3.6	4.7	3.0	1.6	
1997	3.0	3.4	4.0	3.1	2.4	3.0	5.0	2.9	3.7	4.2	
1998	2.4	2.5	2.4	3.5	4.8	7.5	6.3	3.7	6.5	5.8	
1999	6.4	5.6	8.9	7.1	1.5	13.8	1.5	4.5	4.8	9.5	
2000	4.1	5.0	3.8	1.5	2.6	3.3	5.3	4.4	4.1	4.9	
Girls											
1995	1.8	4.5	4.7	5.3	5.5	12.4	6.1	3.5	6.4	8.4	
1996	5.4	6.1	5.9	7.7	9.5	8.8	2.6	6.5	5.1	8.0	
1997	4.5	5.6	5.7	4.7	5.6	5.2	9.7	6.7	5.8	6.3	
1998	0.9	5.6	8.3	9.4	5.9	4.2	7.6	8.5	5.3	9.2	
1999	3.3	1.7	7.8	8.2	8.1	13.8	14.5	3.7	5.6	8.9	
2000	0.0	9.1	1.6	4.9	9.5	7.7	6.3	10.3	8.9	5.4	
	12	13	14	15	16	17	18	19	All aged 2-19	Base	
Boys											
1995	1.7	2.3	3.7	1.8	5.1	6.0	3.7	5.2	3.7	2083	
1996	4.6	5.3	4.8	3.8	4.5	6.3	5.5	3.2	4.1	2329	
1997	4.8	3.5	3.8	7.7	3.3	10.6	5.0	5.4	4.0	3709	
1998	5.2	1.8	2.0	1.7	5.3	5.8	3.3	4.7	4.2	2147	
1999	3.0	5.9	8.3	7.7	3.9	6.3	1.9	4.8	5.9	1052	
2000	9.2	9.6	6.3	3.6	3.2	5.6	2.3	10.0	4.8	1065	
Girls											
1995	2.6	4.8	4.3	6.5	7.1	5.7	4.8	9.1	5.7	2109	
1996	7.9	4.2	9.1	1.0	3.7	4.4	3.7	5.6	5.9	2230	
1997	3.6	4.2	6.8	6.3	3.1	5.4	8.0	3.8	5.8	3719	
1998	5.9	3.6	6.5	8.3	6.7	7.6	9.6	12.5	7.0	2077	
1999	4.5	5.7	8.5	0.0	8.7	8.9	9.4	3.6	7.1	1033	
2000	9.6	6.8	8.8	6.3	8.1	6.0	4.3	6.1	6.8	1013	

Source: Unpublished analysis of Health Survey for England statistics

Table 3.18 Surveys of the Oral Health of Children and Young People from 1973 to present

Survey	Year	Geographic coverage	Age range	Sample size	Reference
National Decennial Surveys of children	1983	United Kingdom including England Wales Scotland N Ireland	5- to 15-year-olds	17,000 exams and 5,000 interviews	Todd and Dodd, 1985
National Decennial Surveys of children	1993	United Kingdom including England Wales Scotland N Ireland	5- to 15-year-olds	17,000 exams and 5,500 postal interviews	O'Brien, 1994
National Diet and Nutrition Survey:	1993	Great Britain	1½–4½ years	1,658 dental interviews 1,532 exams	Hinds and Gregory, 1993
National Diet and Nutrition Survey	1997	Great Britain	4–18 years	1943 dental interviews 1726 oral exams	Walker <i>et al</i> , 2000
BASCD co-ordinated surveys	1985/1986 to 1995/1996	Great Britain	5-year-olds, 12-year-olds, 14-year-olds	101,000-250,000	Nugent and Pitts, 1997
BASCD co-ordinated surveys	1993/1994	Great Britain	5-year-olds	191,770 exams	Pitts and Palmer, 1995
BASCD co-ordinated surveys	1995/1996	United Kingdom	5-year-olds	172,659 exams	Pitts and Evans, 1997
BASCD co-ordinated surveys	1997/1998	United Kingdom	5-year-olds	176,781	Pitts <i>et al</i> , 1999
BASCD co-ordinated surveys	1999/2000	Great Britain	5-year-olds	199,440	Pitts <i>et al</i> , 2001
BASCD co-ordinated surveys	2001/2002	England and Wales	5-year-olds	171,719	Pitts <i>et al</i> , 2003
BASCD co-ordinated surveys	1996/1997	United Kingdom	12-year-olds	129,941	Pitts <i>et al</i> , 1998
BASCD co-ordinated surveys	2000/2001	England and Wales	12-year-olds	106,694	Pitts <i>et al</i> , 2002
BASCD co-ordinated surveys	1994/1995		14-year-olds	127,481	http://www.dundee.ac.uk/dhsru/bascd/bascd.htm
BASCD co-ordinated surveys	1998/1999	United Kingdom	14-year-olds	125,880	Pitts <i>et al</i> , 2000
Adult Dental Health Survey	1998	United Kingdom	16-to 19-year-olds	N/A	Kelly <i>et al</i> , 2000

Table 3.19 Proportion of children with any active decay, filled teeth, teeth missing due to decay and any decay experience by age, 1992/1993

Great Britain

	Active decay	Filled teeth	Type of decay Teeth missing due to decay	Any decay experience	Base
Age (in years)					
1½–2½	4	-	0	4	451
2½–3½	13	1	1	14	544
3½–4½	28	4	4	30	537
All (1½–4½)	16	2	2	17	1532

Source: 1992/1993 National Diet and Nutrition Survey aged 1½ to 4½ - Volume 2: report of the dental survey

Table 3.20 Prevalence of total caries experience in the primary or permanent dentition by sex, region, socio-economic characteristics and age, 1997

Great Britain

Percentages

	4–6 years	7–10 years	11–14 years	15–18 years	All
Sex					
Boys	40	55	51	70	55
Girls	33	55	51	63	51
Region					
Scotland	50	75	54	82	66
Northern	41	63	61	65	59
Central, South West and Wales	37	55	53	65	54
London and South East	29	42	37	65	44
Social class of head of household					
Non-manual	30	45	40	65	46
Manual	42	60	58	67	57
Whether parents in receipt of certain benefits?					
Receiving benefits	41	66	69	74	63
Not receiving benefits	35	51	45	64	50
All	37	55	51	67	53

Source: 1997 National Diet and Nutrition Survey: young people aged 4 to 18 years - Volume 2: Report of the oral health survey

Table 3.21 Proportion of children with some gum inflammation by age and country, 1993

United Kingdom					Percentages
Age (in years)	England	Wales	Scotland	Northern Ireland	United Kingdom
5	26	16	40	11	26
6	38	22	48	21	37
7	54	37	59	31	53
8	58	43	69	40	58
9	63	48	67	45	62
10	64	49	68	50	63
11	64	50	66	43	63
12	61	49	64	48	60
13	60	44	60	43	58
14	56	45	64	37	55
15	52	39	63	38	52

Source: *Children's Dental Health in the United Kingdom, 1993*

Table 3.22 Proportion of children with some plaque by age and country, 1993

United Kingdom					Percentages
Age (in years)	England	Wales	Scotland	Northern Ireland	United Kingdom
5	46	32	56	27	45
6	54	39	61	40	53
7	70	54	73	58	69
8	70	63	80	58	70
9	71	65	77	65	71
10	74	60	76	63	73
11	70	60	74	51	69
12	69	56	71	65	68
13	64	57	66	58	64
14	58	54	66	52	59
15	57	45	68	52	57

Source: *Children's Dental Health in the United Kingdom, 1993*

Table 3.23 Proportion of children with some calculus by age and country, 1993

United Kingdom						Percentages
Age (in years)	England	Wales	Scotland	Northern Ireland	United Kingdom	
5	5	2	2	3	5	
6	8	4	4	1	7	
7	11	8	4	8	10	
8	17	12	11	7	16	
9	19	16	10	14	18	
10	21	11	14	12	20	
11	23	13	16	14	22	
12	21	24	14	15	20	
13	18	23	14	19	18	
14	27	22	15	13	25	
15	34	24	26	33	32	

Source: *Children's Dental Health in the United Kingdom, 1993*

Table 3.24 Proportion of 15-year-olds with pocketing and gingivitis by country, 1993

United Kingdom							Percentages
	Pocketing		Gingivitis		Pocketing and gingivitis		
	1983	1993	1983	1993	1983	1993	
England	9	10	47	44	7	8	
Wales	9	16	41	62	7	15	
Scotland	7	10	56	50	6	9	
Northern Ireland	11	11	60	39	10	5	
United Kingdom	9	10	48	45	7	8	

Source: *Children's Dental Health in the United Kingdom, 1993*

Table 3.25 Proportion of children with unhealthy gums; plaque; calculus by age and sex, 1997

Great Britain		Percentages		
	Boys	Girls	All	
Unhealthy gums				
Age (in years)				
4-6	18	15	16	
7-10	30	36	33	
11-14	47	42	44	
15-18	54	34	44	
All	38	32	35	
Plaque				
4-6	27	24	26	
7-10	41	47	44	
11-14	56	46	51	
15-18	50	34	43	
Calculus				
4-6	3	4	4	
7-10	13	14	13	
11-14	21	22	22	
15-18	34	34	34	

Source: 1997 National Diet and Nutrition Survey: young people aged 4 to 18 years - Volume 2: Report of the oral health survey

Table 3.26 Proportion of 15- to 18-year-olds with bleeding gums; periodontal pocketing by sex, 1997

Great Britain		Percentages	
	Bleeding gums	Periodontal pocketing	
Boys	41	23	
Girls	38	11	
All	40	17	

Source: 1997 National Diet and Nutrition Survey: young people aged 4 to 18 years - Volume 2: Report of the oral health survey

Table 3.27 Proportion of children with erosion on buccal or palatal surfaces of individual deciduous teeth by age and type of erosion, 1992/1993

Great Britain		Percentages							
Age (in years)	Buccal surface				Palatal surface				
	Central incisor		Lateral incisor		Central incisor		Lateral incisor		
	Any erosion	Erosion into dentine or pulp	Any erosion	Erosion into dentine or pulp	Any erosion	Erosion into dentine or pulp	Any erosion	Erosion into dentine or pulp	
1½-2½	7	1	6	0	9	3	7	2	
2½-3½	9	2	6	1	17	5	12	3	
3½-4½	13	3	12	3	28	12	17	5	
All (1½-4½)	9	2	7	1	19	7	12	3	

Source: 1992/1993 National Diet and Nutrition Survey: children aged 1½ to 4½ years - Volume 2: Report of the dental survey

Table 3.28 Proportion of children with erosion on buccal or palatal surfaces of primary and permanent incisors by age and type of erosion, 1997

Great Britain		Percentages			
	Buccal surface		Palatal surface		
	Any erosion	Erosion into dentine or pulp	Any erosion	Erosion into dentine or pulp	
4-6 ¹	38	4	58	19	
7-10 ¹	33	9	57	18	
4-6 ²	9	-	10	-	
7-10 ²	9	-	25	1	
11-14 ²	23	0	42	3	
15-18 ²	36	0	56	2	

Source: 1997 National Diet and Nutrition Survey: young people aged 4 to 18 years - Volume 2: Report of the oral health survey

Notes:

1. Erosion of primary incisors.
2. Erosion of permanent incisors.

Table 3.29 Proportion of children with experience of trauma to the incisors by sex and age, 1992/1993

Great Britain		Percentages					
Age (in years)	Boys		Girls		All		
	Experience of trauma	No experience of trauma	Experience of trauma	No experience of trauma	Experience of trauma	No experience of trauma	
1½-2½	13	87	9	91	11	89	
2½-3½	19	81	17	83	18	82	
3½-4½	18	82	15	85	16	84	
All	17	83	14	86	15	85	

Source: 1992/1993 National Diet and Nutrition Survey: children aged 1½ to 4½ years - Volume 2: Report of the dental survey

Table 3.30 Proportion of children with experience of trauma to permanent incisors by sex and age, 1997

Great Britain		Percentages		
Age (in years)	Experience of trauma			All
	Male	Female		
7-10	7	4		5
11-14	19	9		14
15-18	22	13		18
All	14	8		11

Source: 1997 National Diet and Nutrition Survey: young people aged 4 to 18 years - Volume 2: Report of the oral health survey

Table 3.31 Percentage of children undertaking physical activity in PE lessons during term by age, 1994, 1999

England		Percentages					
Average time spent per week in PE lessons during term	Primary: 6- to 11-year-olds		Secondary: 11- to 16-year-olds		Total: 6- to 16-year-olds		
	1994	1999	1994	1999	1994	1999	
30–59 minutes	7	30	3	6	5	18	
1 hour–1 hour 29 minutes	26	31	18	13	22	22	
1 hour 30 minutes– 1 hour 59 minutes	29	24	24	29	27	26	
2 hours–2 hours 29 minutes	26	9	42	38	34	22	
2 hours 30 minutes– 2 hours 59 minutes	6	3	6	7	6	5	
3 hours or more	5	3	7	8	6	5	
<i>Base: All young people in schools where teachers provided data on time spent in PE</i>	1924	1350	1984	1241	3908	2591	

Source: *Young People and Sport in England 1994, 1999*

Table 3.32 Percentage of children undertaking physical activity out of lessons during term by age, 1994, 1999

England		Percentages					
Time spent per week on sport out of lessons during term	Primary: 6- to 11-year-olds		Secondary: 11- to 16-year-olds		Total: 6- to 16-year-olds		
	1994	1999	1994	1999	1994	1999	
Usually no time	6	5	10	11	8	8	
Up to 1 hour	11	8	13	13	12	10	
1 hour up to 5 hours	42	39	37	33	40	36	
5 hours up to 10 hours	22	25	20	21	21	23	
10 hours up to 15 hours	10	12	11	11	10	12	
15 hours or more	10	12	10	11	10	12	
<i>Base: All young people¹</i>	2123	1339	1822	1971	3945	3319	

Source: *Young People and Sport in England 1994, 1999*

Note:

1. For comparability between 1994 and 1999, base excludes cases where no answer was given, or where answer was ticked 'Don't know/can't work it out'

Table 3.33 Percentage of children undertaking physical activity in previous summer holiday by age, 1994, 1999

England		Percentages					
Time spent per week on sport in previous summer holiday	Primary: 6- to 11-year-olds		Secondary: 11- to 16-year-olds		Total: 6- to 16-year-olds		
	1994	1999	1994	1999	1994	1999	
	Usually no time	4	3	5	4	4	3
Up to 1 hour	5	4	9	10	7	7	
1 hour up to 5 hours	26	22	30	24	28	23	
5 hours up to 10 hours	23	21	23	22	23	21	
10 hours up to 15 hours	15	17	14	16	14	16	
15 hours or more	28	34	19	24	24	29	
<i>Base: All young people¹</i>	<i>2083</i>	<i>1233</i>	<i>1828</i>	<i>1668</i>	<i>3911</i>	<i>2901</i>	

Source: Young People and Sport in England 1994, 1999

Note:

1. For comparability between 1994 and 1999, base excludes cases where no answer was given, or where answer was ticked 'Don't know/can't work it out'

Table 3.34 Amount of time spent in a week on each activity out of school lessons, 1999

England		Percentages
Activity	Average time (in hours)	
Watch tv, video	11.4	
Part-time job ¹	8.3	
Take part in sports/exercise	7.5	
Look after younger children/relatives	4.9	
Play computer games	4.4	
Read books, magazines, comics	4.2	
School homework	3.8	
Play musical instrument	2.6	
Other hobby	5.4	
<i>Base: All young people</i>	<i>3319</i>	
<i>Year 7-11 only</i>	<i>1971</i>	

Source: Young People and Sport in England, 1999

Note:

1. Refers to Year 7-11 only.

Table 3.35 Percentage of journeys to school: by length and main mode in Great Britain, 1992-2001

Great Britain		Percentages and average length (miles)					
		Ages 5-10					
		1992/1994	1995/1997	1996/1998	1997/1999	1998/2000	1999/2001
Walk		61	54	55	53	56	54
Bicycle		1	-	-	-	-	1
Car/Van		30	37	36	38	36	39
Private Bus		4	3	3	3	3	3
Local Bus		4	4	4	4	4	3
Rail		-	-	-	-	-	-
Other		1	2	2	2	1	1
All modes		100	100	100	100	100	100
Average length (miles)		1.2	1.3	1.3	1.5	1.5	1.4
		Ages 11-16					
Walk		44	42	43	42	43	43
Bicycle		4	2	2	2	2	2
Car/Van		16	21	21	21	19	19
Private Bus		8	7	7	8	8	9
Local Bus		24	25	25	24	24	23
Rail		1	1	1	1	2	2
Other		2	2	2	3	2	2
All modes		100	100	100	100	100	100
Average length (miles)		3.1	3.1	3.1	3.3	3.0	2.9

Source: National Travel Surveys, 1992-2001