



**The Childhood Obesity Surveillance Initiative (COSI)
in the Republic of Ireland:**

Descriptives of childhood obesity risk factors

The Childhood Obesity Surveillance Initiative (COSI) in the Republic of Ireland: Descriptives of childhood obesity risk factors

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Foreword

The Childhood Obesity Surveillance Initiative (COSI) in the Republic Of Ireland: Descriptives of childhood obesity predictors

In 2014, the HSE published The Childhood Obesity Surveillance Initiative (COSI) in the Republic of Ireland: Findings from 2008, 2010 and 2012. In that report, prepared by the National Nutrition Surveillance Centre (NNSC) in University College Dublin, the first indications that obesity rates had remained stable amongst Irish nine year olds and that the incidence had reduced across the three waves of research amongst Irish seven year olds emerged. However, this reduction was not experienced by all seven year old children. In the cohort of children attending DEIS (Delivering Equality of Opportunity in Schools) designated schools, no improvement in overweight and obesity rates was observed over time.

This report, The Childhood Obesity Surveillance Initiative (COSI) in the Republic of Ireland: Descriptives of childhood obesity predictors, details the findings from the analysis of the Family Questionnaire carried out in 2010 and 2012. The Family Questionnaire was designed to collect data on possible predictors of childhood obesity – child's diet, physical activity pattern, their family's socioeconomic characteristics and co-morbidities. The analysis includes a comparison between those attending DEIS schools and other schools.

While the possible risk factors contributing to childhood obesity were similar across both groups of children, some significant differences were observed between children attending DEIS designated schools compared with other schools. Although the numbers for comparison were rather small, the findings provide some insight and contextualisation to the general COSI survey results, where no improvement in the rates of overweight and obesity amongst children attending DEIS schools was observed.

Parents of children attending DEIS designated schools reported that:

- **their children were less likely to be a member of a sports club or visit a sports club regularly;**
- **spent more time watching television;**
- **were more likely to live near their school; and**
- **walked or cycled to school more often.**

In terms of diet, parents of children attending DEIS designated schools reported that their children:

- **were less likely to have been breastfed;**
- **consumed chocolate, crisps and biscuits more frequently;**
- **ate fruit and vegetables less often; and**
- **ate breakfast less often.**

In families of children attending DEIS designated schools, parents reported that they were:

- **less likely to have attained a bachelor degree or higher;**
- **less likely to live in detached houses or bungalows; and**
- **more likely to live in rented accommodation.**

Healthy Ireland, a Framework for Improved Health and Wellbeing 2013 – 2025 seeks a whole of government and whole of society involvement to proactively improve the health and wellbeing of the population. Reducing health inequalities is one of Healthy Ireland's goals.

We know that disadvantaged communities have a higher incidence of obesity than their more affluent peers and this applies to both adults and children. The results of this research provide a description of childhood obesity risk factors specific to the Republic of Ireland, and will strengthen the rationale for future investment in programmes across government and society as a whole to target disadvantage in a bid to reduce health inequalities.

I would like to thank the NNSC, who were commissioned to carry out this research and especially the parents of children who took part in the COSI and who completed the family questionnaire, which gave us this invaluable insight into their lifestyle and challenges they face in seeking the best health and wellbeing for their children.

A handwritten signature in black ink, reading 'Stephanie O'Keeffe'.

Dr Stephanie O'Keeffe

National Director of Health and Wellbeing
Health Service Executive

July 2016

Contents

| | |
|--|-----------|
| Executive Summary | 6 |
| Introduction | 9 |
| Study Design | 12 |
| Methods | 13 |
| Results | |
| Response rates | 16 |
| Results on birth cohorts | 17 |
| Results on type of school | 33 |
| Conclusion | 59 |
| References | 60 |
| Acknowledgements | 63 |
| Appendices | |
| Appendix 1: Missing values for each question in the Family Questionnaire | 66 |
| Appendix 2: Characteristics of third class children who attended third class during the third round of data collection in 2010 | 72 |
| Appendix 3: Example of the Family Questionnaire used in the third round of data collection in 2012 | 77 |

Executive Summary

The prevalence of obesity in children has been rising rapidly, leading to many serious health consequences worldwide. It is important in trying to combat childhood obesity, to investigate factors that might contribute to this epidemic. These factors include amongst others, diet, physical activity, family's socioeconomic characteristics, birth weight and breastfeeding.

In 2008, the World Health Organisation (WHO) Regional Office for Europe issued recommendations and guidelines for regular collection of data on weight, height, and waist and hip circumference in children worldwide in order to monitor prevalence trends of growth, overweight and obesity. Furthermore, data collection on possible risk factors contributing to childhood obesity was also encouraged. The Department of Health and the Health Service Executive commissioned the National Nutrition Surveillance Centre, based at the School of Public Health, Physiotherapy and Population Science in University College Dublin, to carry out this surveillance work in the Republic of Ireland. This Irish survey is affiliated with the WHO European Childhood Obesity Surveillance Initiative, which was set up in 2006 by the WHO Regional Office for Europe, with an initial 13 Member States participating.

In two previous reports, the data on anthropometric measurements of this Irish surveillance work, collected over three time points in primary schoolchildren, was described. The current report presents findings of possible risk factors contributing to childhood obesity. These were collected during the second data collection round in 2010 for first class and third class children and during the third round of data collection in 2012 for first class children only. This data was collected through the Family Questionnaire completed by the parents of the children who had been measured. First, we investigated whether there were differences between both first class cohorts. Secondly, we investigated whether there were differences between children who attended the Department of Education and Skills designated disadvantaged schools (the so called DEIS schools) and children in other schools.

Key findings

- **Of the parents whose children attended first class and were measured in 2010 (n=2018), 85.1% gave consent to complete the Family Questionnaire; in 2012, 68.2% of 1929 parents did likewise. In 2010, 1008 parents (response rate: 58.7%) returned the questionnaire for their first class child and 1012 (77.0%) were returned in 2012. Of all first class children for whom a completed questionnaire was received, 136 children attended a DEIS school.**
- **Of the parents whose children attended third class and were measured in 2010 (n=2007), 85.1% gave consent to complete the Family Questionnaire. Of these, 969 parents (response rate: 56.7%) returned the completed questionnaire for their third class child. Of the third class children for whom a questionnaire was completed, 62 children attended a DEIS school.**
- **First class children were approximately 7 years of age and third class children were 9 years. For both first class and third class children, 57% of the questionnaires were completed for girls and 43% for boys. The average birth weight was approximately 3500 grams, although the birth weights of first class children in DEIS schools were significantly lower (mean: 3235 g; $F=6.61$, $p=0.0111$) than of children in other schools. Parents reported that approximately 55-60% of the children had ever been breastfed with one-third being breastfed for two months or less and up to 40% was breastfed for six months or more.**
- **Over 75% of children were brought to school by motorised vehicles. Significantly more first class children in DEIS schools walked or cycled to school ($\chi^2=18.5$, $p=0.0494$); however no difference was observed for third class children. In addition, significantly more DEIS schoolchildren lived closer to school than children attending other schools (first class: $\chi^2=23.6$, $p=0.0002$; third class: $\chi^2=14.1$, $p=0.0015$). Significantly more parents of first class children in DEIS schools considered routes to school to be safe than parents whose children attended other schools (47.9% vs 27.4%; $\chi^2=20.4$, $p=0.0022$).**
- **Over 80% of the children in other schools were members of at least one sports club, whereas significantly less DEIS schoolchildren were members (first class: 70.5%, $\chi^2=16.5$, $p=0.0001$; third class: 77.0%, $\chi^2=6.2$, $p<0.0001$). Also, DEIS schoolchildren visited sports clubs less frequently than children in other schools (first class: $\chi^2=15.0$, $p=0.0179$; third class: $\chi^2=12.1$, $p=0.0047$).**

- ■ **Parents reported that over one-third of the children played outdoors for two hours or more daily during the week in 2010 and less than one-third in 2012, which was statistically significantly different ($\chi^2=43.4$, $p=0.0013$). First class children who attended DEIS schools in 2010 spent more time playing outdoors per day than children in other schools (week: $\chi^2=28.4$, $p=0.0014$; weekend: $\chi^2=36.5$, $p=0.0002$). Regarding playing computer games, over half in 2010 and almost half in 2012 did not play computer games during the week. A small but significant difference was observed between 2010 and 2012 ($\chi^2=33.7$, $p=0.0064$) with more children spending time on a computer and for a longer duration in 2012 than in 2010. Moreover, first class or third class children who attended DEIS schools in 2010 spent significantly more time during the week playing computer games than children in other schools (first class: $\chi^2=104.7$, $p=0.0067$; third class: $\chi^2=17.9$, $p=0.0244$). One-third of the children watched television on a daily basis for two hours or more during the week. However, DEIS schoolchildren spent significantly more time watching television during the week and at weekends than children in other schools (week: $p<0.0001$; weekend: $p<0.05$). It must be borne in mind that the questionnaires were completed during autumn-winter, which is likely to have influenced the responses to these questions.**

- ■ **Regarding diet, parents reported that most children had breakfast on a daily basis in both rounds of data collection. Furthermore, two-thirds of the children ate fruit and only half of them ate vegetables on a daily basis. DEIS schoolchildren ate vegetables significantly less frequently than children in other schools (first class: $\chi^2=23.1$, $p=0.0048$; third class: $\chi^2=9.0$, $p=0.0005$). Less first class children in DEIS schools had breakfast on a daily basis ($\chi^2=5.5$, $p=0.0260$) and third class children in DEIS schools ate fruit significantly less frequently ($\chi^2=6.2$, $p=0.0031$). The majority of children consumed sugar-sweetened soft drinks and diet soft drinks “sometimes or never”. Significant differences between 2010 and 2012 were observed for consumption of sugar-sweetened soft drinks ($\chi^2=26.1$, $p=0.0095$) and diet soft drinks ($\chi^2=19.1$, $p=0.0057$), with children consuming these products less frequently in 2012 than in 2010. Foods such as pizza, biscuits, chocolate and crisps were eaten “sometimes or never” by the majority of children. A minority of children ate these types of products on a “daily basis” or on “most days” with less than 10% eating products such as pizza, 25% biscuits, 20% chocolate and only 10% crisps. DEIS schoolchildren consumed products such as chocolate and crisps significantly more often (chocolate: $\chi^2=19.9$ [$p=0.0015$] for first class and $\chi^2=12.9$ [$p=0.0013$] for third class; crisps: $\chi^2=11.3$ [$p=0.0473$] for first class and $\chi^2=17.7$ [$p<0.0001$] for third class) than children in other schools. Third class children in DEIS schools consumed products such as biscuits more often ($\chi^2=15.0$, $p=0.0078$).**

- ■ **A diagnosis of hypertension, diabetes mellitus or having high cholesterol levels in the previous 12 months was reported by less than 10% of participating households. In both rounds of data collection, approximately 60% of mothers reported a bachelor degree or higher as their highest attained education level; for fathers this was approximately 50%. For parents of children in DEIS schools, these numbers were significantly lower (first class: $p<0.01$; third class: $p<0.05$). The majority of the fathers were non-government employed or self-employed and one-third of the mothers were homemakers. A minority were unemployed but able to work: approximately 3% of mothers and 9-10% of fathers in both rounds. The majority (>60%) of families lived in detached houses or bungalows, with families of children in DEIS schools being less likely to live in a detached house (first class: $\chi^2=22.8$, $p=0.0020$; third class: $\chi^2=6.0$, $p=0.0532$). In addition, over 80% of the families with children in other schools owned the accommodation they lived in, while significantly less families with children in DEIS schools were owner-occupiers (first class: 56.9%, $\chi^2=42.8$, $p=0.0001$; third class: 50.3%, $\chi^2=83.4$, $p<0.0001$).**

To conclude, it seems that children became a little less physically active in 2012 than in 2010, while their diet slightly improved over time. A different pattern, however, was observed among children in DEIS schools, with several possible risk factors more pronounced in this group than in children attending other schools.

Introduction

The prevalence of obesity in children has been rising rapidly. The World Health Organisation (WHO) estimated that in 2010, 43 million children aged 0-5 years were overweight or obese, reflecting a global prevalence of 6.7%. In 1990, this figure was 4.2% and according to current trends, is estimated to increase to 9.1% in 2020 [1]. For Ireland, the National Taskforce on Obesity (2005) [2], reported that over 300,000 children were estimated to be overweight and obese and this was projected to increase annually by 10,000.

The increased rates in obesity have led to many serious health consequences globally. For the Republic of Ireland (ROI), the direct and indirect costs of overweight and obesity in 2009 were estimated at €1.13 billion [3]. There is an alarming emergence of pre-diabetes, type 2 diabetes, hypertension and sleep apnoea in children where previously these conditions were seen predominantly in older populations [4-7]. Obesity also affects children's psychological well-being and inter-personal relations [8]. In the long-term, overweight and obesity status track into adulthood [9] and are associated with an increased risk of developing chronic diseases as well as an increased risk of mortality [10-17]. Furthermore, observational study data has linked obesity in pregnancy with both adverse maternal and child outcomes [18, 19].

It is clear from the above that it is important to combat the childhood obesity epidemic and strategic objectives are key to doing so: optimising diet and increasing physical activity. Several studies have been conducted on these topics, showing both positive and negative predictors of childhood obesity. Missing breakfast always or sometimes is associated with higher obesity prevalence in 5-year-old children in the Millennium Cohort study [20] and higher overweight or obesity prevalence in children aged 5-11 years in a French cross-sectional study [21]. Studies on sugar-sweetened beverages show a positive association with obesity risk, including a US cohort study of children in kindergarten [22], a Spanish case-control study in children and adolescents aged 6-18 years [23] and a Greek case-control study in children aged 7-15 years [24]. An Australian cohort study showed that the intake of meat at 18 months was a significant predictor of body mass index (BMI) and waist circumference at 8 years [25] and a German cross-sectional study showed that high intakes of meat and sausages was associated with obesity in children and adolescents aged 3-17 years [26]. Evidence for protective food items have also been found, including higher fruit intake in a US cohort study of children in kindergarten [22], higher vegetables intake in an Australian cross-sectional survey among 12-year-old boys [27] and a higher intake of cereals in two Australian cohort studies of 8-year-old children [25, 28].

Regarding physical inactivity, several studies showed that sedentary behaviour was associated with higher overweight and obesity levels, including a prospective cohort study in children aged 9-15 years [29], the Millennium Cohort study of 5-year-olds [20], a Greek cross-sectional study in children aged 10-12 years [30] and a French cross-sectional study in children aged 5-11 years [21]. The prospective Irish Growing Up in Ireland (GUI) study showed that high levels of sedentary behaviour was implicated in the risk of overweight and obesity in 9-year-old boys but not in girls [31]. One of the sedentary activities is watching television, which has been linked with higher obesity levels in several studies including the 1958 British birth cohort study in 11-year-old girls [32], an Australian cohort in 8-year-old children [28], a Spanish case-control study in children and adolescents aged 6-18 years [23], a Greek case-control study in children aged 7-15 years [24] and an Australian cross-sectional survey among 12-year-old boys [27]. On the other hand, being physically active has been proved to be a protective factor against childhood obesity in an Australian cohort of 8-year-olds [28], the 1958 British birth cohort among 11-year-olds [32], a Spanish case-control study among children and adolescents aged 6-18 years [23], a Greek case-control study in children aged 7-15 years [24] and an Australian cross-sectional survey among 12-year-olds [27]. The Irish GUI study showed that low levels of physical activity was increasing the risk of overweight and obesity in 9-year-old boys [31].

Next to optimising diet and increasing physical activity levels, other factors might also be associated with obesity. Birth weight has been shown to be a positive predictor of overweight or obesity in several studies, including two Australian cohort studies of 8-year-olds [25, 28], the Millennium Cohort study among 5-year-olds [20], a US cohort study of 5-year-olds [33], and a German cross-sectional study of children aged 5-7 years [34]. Moreover, among Irish overweight and obese children in the Lifeways Cross-Generation Cohort Study, Murrin et al (2013) observed that a child's overweight or obesity level was associated with a high (≥ 4 kg) infant birth weight [35]. Another positive predictor is low socio-economic status (SES). An Australian cohort study of children aged 7-12 years showed that low SES status predicted obesity risk and this trend became stronger as children entered adolescence [36]. The Millennium Cohort study showed that 5-year-old children from families with low income or low educational attainment were more likely to be obese regardless of ethnicity [20]. Two cross-sectional studies showed that low SES was associated with obesity in French children aged 5-11 years [21] and in German children aged 5-7 years [34]. Analysis of 9-year-olds in the GUI cohort study, showed that one parent families, lower maternal education and lower household class increased the odds of childhood obesity [37]. On the other hand, a protective effect of a longer duration of breastfeeding has been observed in some studies, including in a Greek case-control study of children aged 7-15 years [24] and the GUI study among 9-year-olds [38].

The growing problem of obesity in children is not unique to Ireland and in 2008 the WHO Regional Office for Europe has issued recommendations and guidelines for regular collection of data on weight, height, and waist and hip circumference in children worldwide [39]. Furthermore, data collection on possible predictors of childhood obesity was also encouraged. In 2008, the Department of Health and the Health Service Executive (HSE) commissioned the National Nutrition Surveillance Centre (NNSC) based at the School of Public Health, Physiotherapy and Population Science in University College Dublin (UCD) to carry out this surveillance work in ROI.

In a recent report, the data on anthropometric measurements of this Irish surveillance work collected over three time points (2008, 2010 and 2012) was described. In summary, the prevalences of overweight and obesity in 7-year-old boys during the first, second and third rounds of data collection were 18.3%, 16.2% and 14.4%, respectively and 26.4%, 25.7% and 21.4% in girls [40]. The prevalences of overweight and obesity in 9-year-old boys during the data collection rounds in 2010 and 2012 were 19.7% and 20.0%, respectively. For girls, these percentages were 23.2% and 22.0%, respectively. This Irish survey is affiliated with the WHO European Childhood Obesity Surveillance Initiative (COSI), which was set up in 2006 by the WHO Regional Office for Europe and an initial 13 Member States.

Aims and objectives

The Irish part of the COSI study mentioned above has not only collected anthropometric data, but also data on possible predictors of childhood obesity; these include dietary factors, physical activity/inactivity patterns of the child, family's socioeconomic characteristics and co-morbidities.

The aim of the current report was to describe the possible predictors of childhood obesity in primary schoolchildren who attended first and third class in ROI.

Study design

The European COSI is a collaborative study with principal investigators from all participating European countries co-operating in relation to survey content, methodology and timing using the WHO European COSI protocol. The Irish surveillance system is based on this protocol and the Irish representative is Dr Nazih Eldin, HSE lead on obesity. Strict adherence to this protocol was required for inclusion in the European database and this procedure was achieved with the current study.

Two previous reports describe the study design in detail and results on anthropometric findings [40, 41]. In summary, the first round of data collection was conducted in 2008 during which 163 primary schools participated and anthropometric measurements were conducted among first class pupils. The same 163 schools were contacted again for the second and third rounds of data collection in 2010 and 2012, respectively. One of the goals of the subsequent rounds was to follow up the children measured in 2008. Therefore, in the second round of data collection (Round 2 in 2010) not only first class was included, but also third class and in the third round of data collection (Round 3 in 2012), first, third and fifth class were included. For all rounds, only one class from each grade was selected per school. Information on childhood obesity predictors was collected only during Rounds 2 and 3 and not during the first round in 2008. Therefore, from here on in, this report will merely focus on Rounds 2 (in 2010) and 3 (in 2012).

Subjects

Originally, the children in first, third and fifth classes were chosen because these classes include children within the age ranges 5-12 years. These age groups precede puberty [42] and at these ages the identification of obesity is of value to predict the condition in adulthood [43].

Methods

Ethical Considerations

On both occasions (2010 and 2012), ethical approval was obtained from the Research Ethics Committee, Human Research Sub Committee, UCD.

Consent for the survey was obtained on two separate levels: at school and at parent level. Prior to data collection in 2010, an initial letter and a consent form were sent to principals in which the objectives of the study were explained. After a school had agreed to participate, all parents from the sampled classes in these participating schools were subsequently given a letter explaining the survey. Two informed consent forms were also given to parents: one for the anthropometric measurements and one for completing the Family Questionnaire on several predictors of childhood obesity. Parents could choose which part they wanted their child to participate in: the anthropometric measurements only or for both the anthropometric measurements and the questionnaire. Parents were fully informed about all study procedures and their informed consent was obtained on a voluntary basis prior to the child's enrolment to the study. The exact same procedure was followed for Round 3 (in 2012).

To ensure confidentiality for all collected and archived data, unique identification (ID) numbers were assigned to each child and each register refers only to these numbers. The research team alone has access to the full list of ID numbers and corresponding names of the children sampled, which is held separately from the survey data. The original hardcopy records are anonymised and stored in locked cabinets in UCD and used only for reference if required. These hardcopy records will be destroyed after seven years.

All information and consent forms for parents/guardians were approved by the Irish National Adult Literacy Agency (NALA). They were also available in Irish and this translation was conducted by a professional translator.

Family Questionnaire

Data on the child's diet, physical activity pattern, family's socioeconomic characteristics and co-morbidities were obtained via the Family Questionnaire. These data enable the NNSC to investigate possible associations between these factors and childhood obesity in ROI. This questionnaire was completed by one of the parents or together with their child. The Family Questionnaire was also approved by NALA.

During Round 2 in 2010, all parents from the sampled classes, i.e. first and third class, were asked if they would like to complete the Family Questionnaire as part of the study. During Round 3 in 2012, only parents of the first class cohort were asked to complete this Family Questionnaire, since data on the third and fifth class cohorts were already measured in 2010 when these children attended first and third class, respectively.

After obtaining consent from the parents for completing the Family Questionnaire, the questionnaire was sent to the parents' home address, together with a return envelope to UCD. Round 2 took place in autumn 2010 and Round 3 took place during autumn-winter period in 2012 and the beginning of 2013. During Round 2 (in 2010), no reminders were sent for the questionnaires. During the Round 3 (in 2012), reminders were sent within approximately 1-2 months after sending out the first questionnaire. After being returned to UCD, data from the questionnaires were entered in Microsoft Excel by data clerks.

Information regarding the following items were collected (see Appendix 3 for an example of the questionnaire used in Round 3 in 2012): physical activity/inactivity data, dietary data, family's co-morbidities, socio-economic factors and other factors such as birth weight, amount of sleep and data on breastfeeding.

Data Analysis

The dataset used for the current analysis on predictors of childhood obesity included children with informed consent, complete information on age, sex and anthropometric data and with a completed Family Questionnaire. The 'svyset' procedure in STATA (Intercooled STATA, version 13) was used to adjust for the multi-stage stratified cluster-sampling procedure. No adjustment for confounding variables was carried out. Cross-sectional data (i.e. data collected at one point in time) on first class children in primary schools were collected in two different birth cohorts, once in children who attended first class in 2010 and once in children who attended first class in 2012. This gave us the opportunity to compare the collected data between these two birth cohorts. Third class children were measured only once in 2010 and therefore no comparison between birth cohorts could be done for this age group. Stratified analyses were carried out by disadvantaged schools and tested whether there was a difference between children who attended these disadvantaged schools and children in other schools. The School Support Programme under the DEIS (Delivering Equality of Opportunity in Schools) action plan for educational inclusion, run by the Department of Education and Skills have identified disadvantaged schools as those schools that are at a social or economic disadvantage, which prevents students from deriving appropriate benefit from education in school. The definition of these disadvantaged schools is based upon the "educational disadvantage" in the Education Act (1998) as: "...the impediments to education arising from social or economic disadvantage which prevent students from deriving appropriate benefit from education in schools" [44]. The identification of disadvantaged schools for DEIS was based on the following variables: unemployed parents, Local Authority accommodation, lone parenthood, Travellers, free book grants and large families (i.e. ≥ 4 siblings) [45]. To test for differences between the two birth cohorts (measured in 2010 and 2012, respectively) or between DEIS schools and other schools, Pearson's chi-squared tests (χ^2) were performed on categorical data and Wald tests on continuous data. All p-values in this report were based on two-sided tests and considered statistically significant if $p\text{-value} < 0.05$. This means that a result is only statistically significant if the probability of its occurrence purely by chance is less than 5%. Throughout this report, no corrections were done for multiple testing.



Results

Response rates

FIRST CLASS

Of the parents whose children attended first class and were measured during Round 2 in 2010 (n=2018), 1718 gave consent to complete the Family Questionnaire (response rate: 85.1%); during Round 3 (in 2012), 1315 (of 1929; response rate: 68.2%) parents did likewise. In 2010, 1008 (response rate: 58.7%) parents returned the questionnaire for their first class child and 1012 (77.0%) were returned in 2012. Of all first class children for whom a questionnaire was completed, 136 children attended a DEIS school (41.2% in 2010 and 58.8% in 2012).

THIRD CLASS

Of the parents whose children attended third class and were measured during Round 2 in 2010 (n=2007), 1708 gave consent to complete the Family Questionnaire (response rate: 85.1%). Of these, 969 parents (response rate: 56.7%) returned the completed questionnaire for their third class child. Of the third class children for whom a questionnaire was completed, 62 children attended a DEIS school.

Results on birth cohorts

DESCRIPTIVES

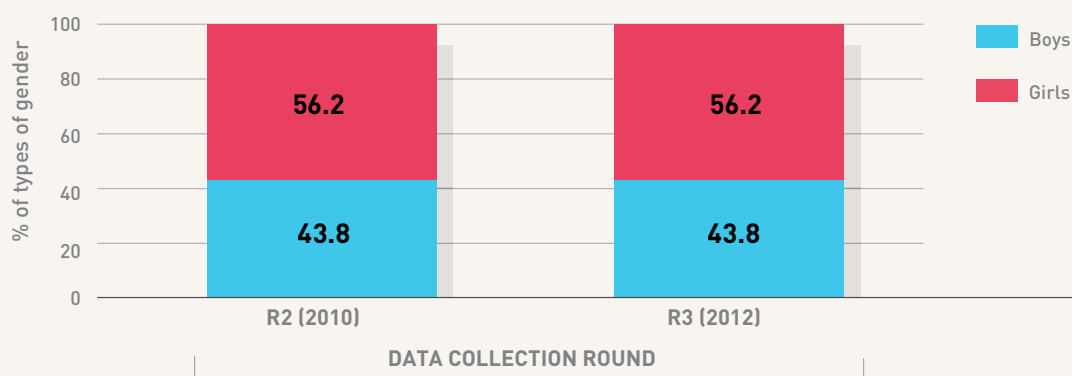
In this section only the results of the 7-year-olds are presented, showing the differences between the 7-year-old children who attended first class in 2010 and the ones who attended first class in 2012. The overall results on the 9-year-olds are presented in Appendix 2.

The mean age of first class children included in the analyses was 7.0 years during Round 2 (in 2010; 95% confidence interval [95% CI]: 6.9-7.0 y) and 7.1 years during Round 3 (in 2012; 95% CI: 7.0-7.1 y). Even though mean age was very similar over the two rounds, still a significant difference was observed between the two birth cohorts ($F=10.68$, $p=0.0014$).

Figure 1 presents the gender distribution of first class children.

Figure 1

Gender distribution of first class children in 2010 (n=1008) and 2012 (n=1012).



The percentages of boys and girls were similar between both data collection rounds.

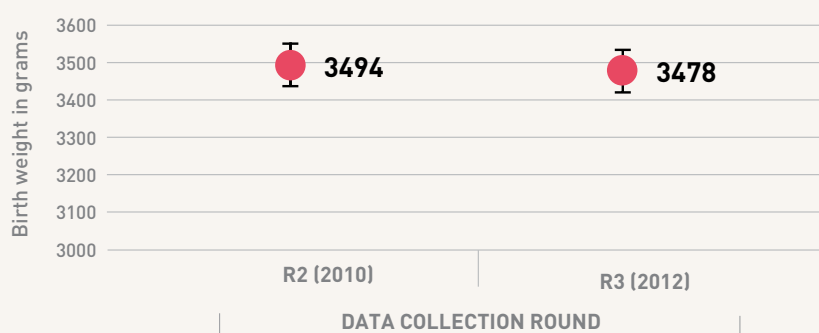
The amount of sleep children got was also very similar over the two rounds; in 2010 this was approximately 633.4 minutes (10 h and 33 min; range=7-14.5 h; n=997) and in 2012 this was 631.2 minutes (10 h and 31 min; range: 7.5-14 h; n=1002).

BIRTH WEIGHT AND BREASTFEEDING

Figure 2 presents the mean birth weight.

Figure 2

Mean birth weight (in grams) of first class children in 2010 (n=974) and 2012 (n=968).



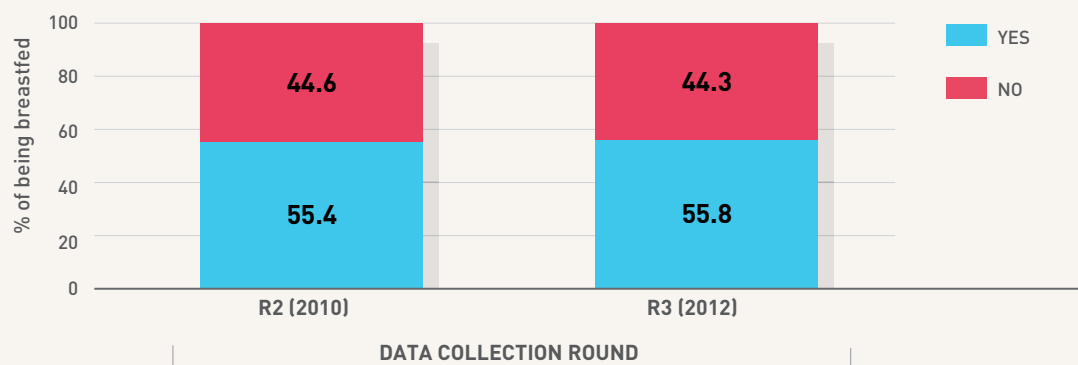
There was no difference between the birth weight in 2010 and 2012.

During Round 3 (in 2012), an additional question was asked whether the child was born full term. Of the examined children (n=1001), 92.4% were born full term, 7.1% were not and for 0.6% the parents did not know. A reason for the latter was that the majority of these children were adopted and this information was unknown to the adoptive parents.

Figure 3 presents data on the percentages of children being breastfed as reported by the parents.

Figure 3

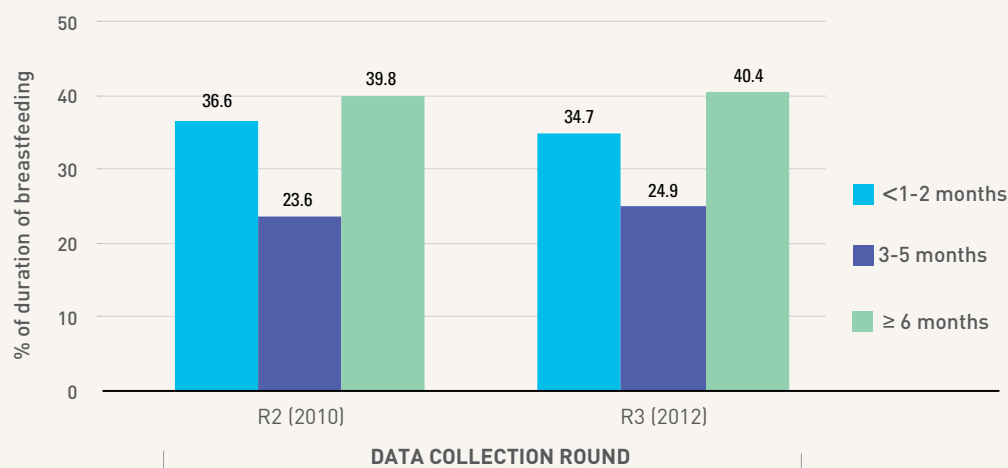
Distribution of children who had ever been breastfed and attended first class in 2010 (n=1003) and 2012 (n=996).



Again, similar percentages of children from both birth cohorts had ever been breastfed. Figure 4 presents the duration of breastfeeding (n=587 in 2010 and n=571 in 2012).

Figure 4

Duration of breastfeeding (in months) in first class children in 2010 (n=587) and 2012 (n=571).



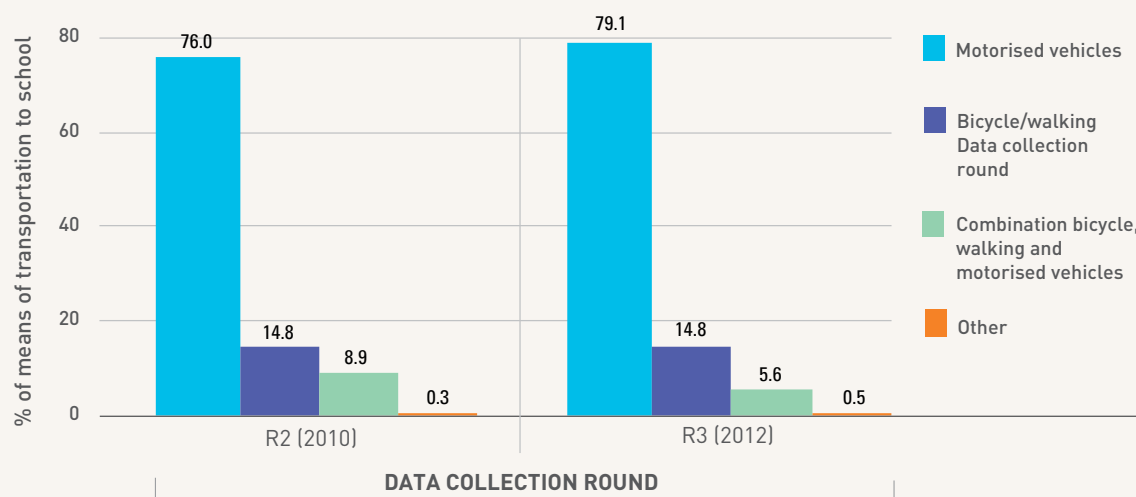
The duration of children being breastfed was similar for Rounds 2 and 3, with over one-third being breastfed for two months or less and up to 40% being breastfed for six months or over.

PHYSICAL ACTIVITY/INACTIVITY PATTERNS

Figure 5 presents the means of transportation to and from school.

Figure 5

Means of transportation to and from school for first class children in 2010 (n=1008) and 2012 (n=1011).



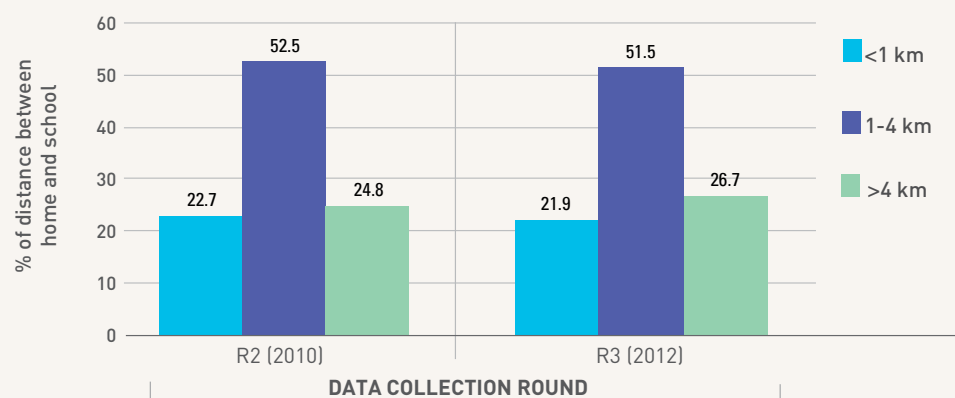
There was no difference in means of transportation between 2010 and 2012, with approximately three-quarter of the children being brought to school by motorised vehicles. In this group, the car is the most often used means of transportation (68.9% in 2010 and 70.6% in 2012). Other means of transportation included children being transported on the crossbar of a bike, whereas a number of parents ticked the option 'other' but did not explain what other means of transportation was used.

The majority of parents believed that routes to school were unsafe for children in both rounds (72.8% of 1000 parents in 2010 and 70.3% of 1005 parents in 2012).

Figure 6 presents the distance between home and school.

Figure 6

Distribution of the distance between home and school for first class children in 2010 (n=980) and 2012 (n=981).

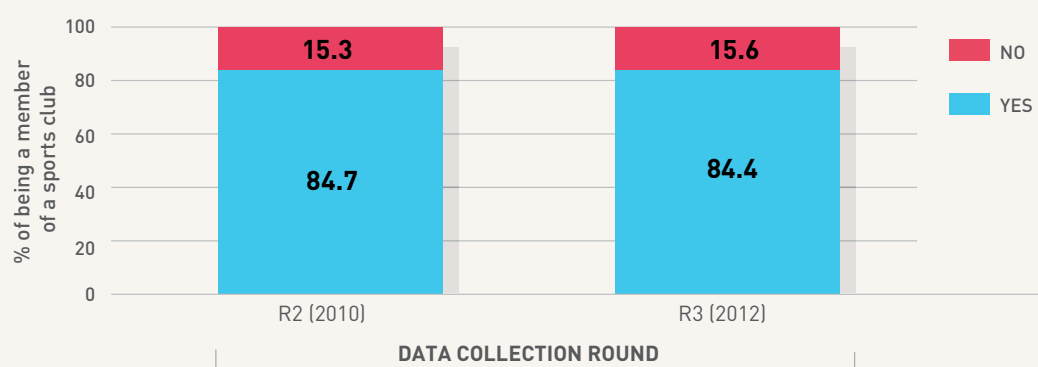


For both Rounds 2 (in 2010) and 3 (in 2012), half of the schools were located between 1-4 km from home and about one-quarter of schools were located >4 km from home.

Figure 7 presents the distribution of children being a member of at least one sports club.

Figure 7

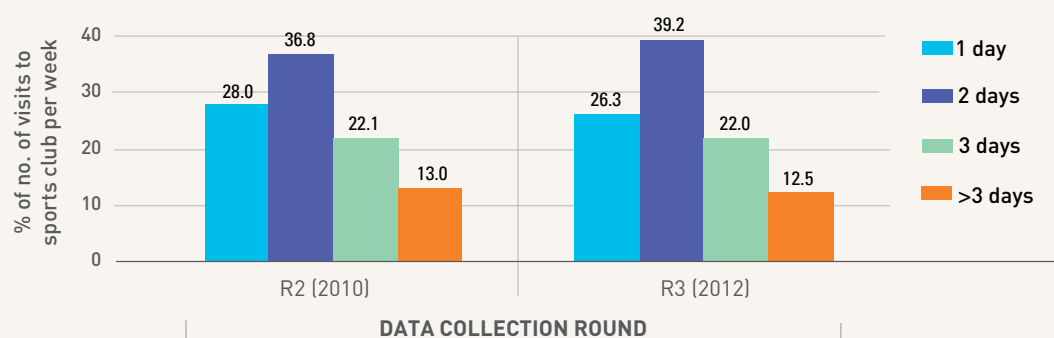
Distribution of first class children being a member of at least one sports club in 2010 (n=1004) and 2012 (n=1006).



Approximately 84% of children were members of at least one sports club in both 2010 and 2012. Figure 8 presents the number of visits to sports clubs per week for children who were members (n=866 in 2010 and n=829 in 2012).

Figure 8

Number of visits to sports clubs per week by first class children in 2010 (n=866) and 2012 (n=829).

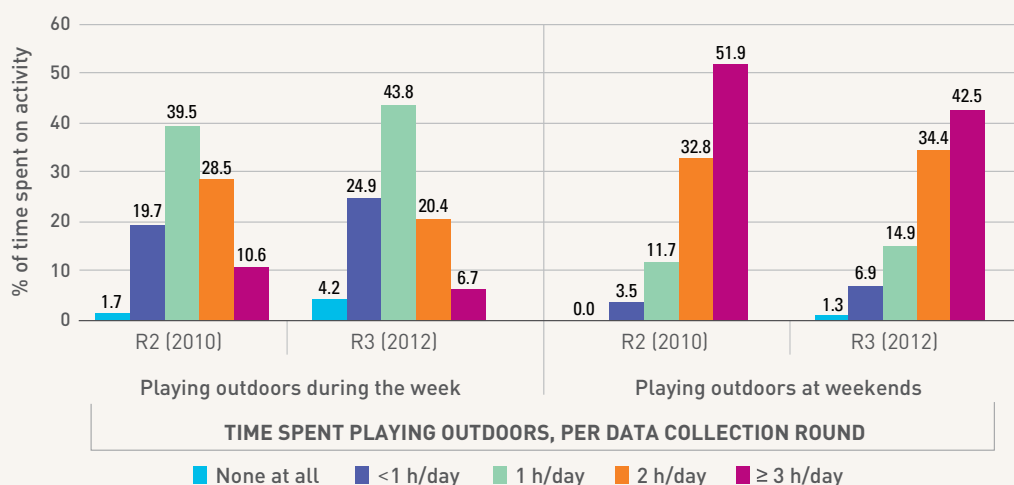


For both Rounds 2 (in 2010) and 3 (in 2012), about one-quarter of the children visited sports clubs once a week, just below 40% visited sports clubs twice a week and the remainder visited clubs three days or more.

The average time that children spent playing outdoors on weekdays or at the weekend is presented in figure 9.

Figure 9

Average outdoor playtime spent per day during the week and at weekends by first class children in 2010 and 2012. See Appendix 1 for number of missing values for each category.

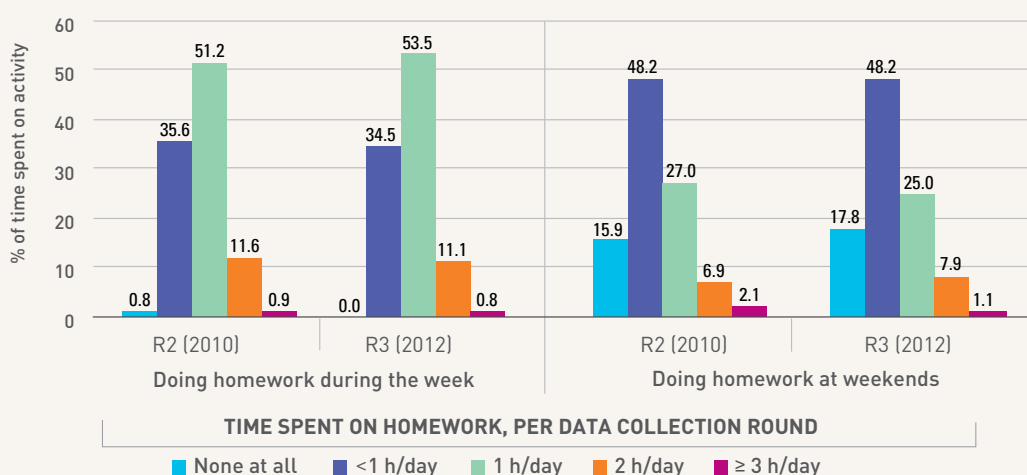


A small but significant difference was observed between 2010 and 2012 for playing outdoors during the week ($\chi^2=42.0$, $p=0.0023$) and at weekends ($\chi^2=36.1$, $p=0.0010$), with less children spending two hours or more per day playing outdoors in 2012 than in 2010. The questionnaires were completed in winter by the parents, which is likely to have influenced the response to outdoor play. Some answered these questions separately for both seasons. In these incidences, the answers concerning the winter season were used.

The average time that children spent on homework during the week and at weekends is presented in figure 10.

Figure 10

Average time spent per day on homework by first class children during the week and at weekends in 2010 and 2012. See Appendix 1 for number of missing values for each category.

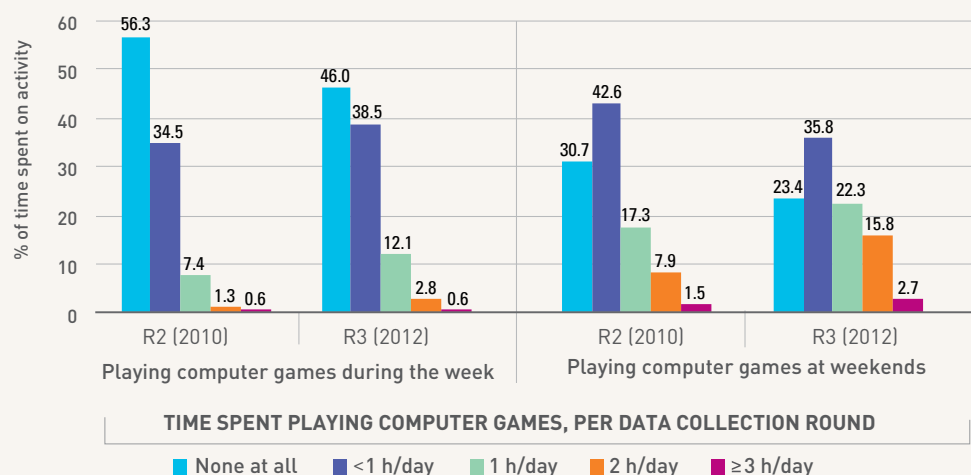


Approximately half of the children spent one hour per day on homework during the week in both 2010 and 2012. As expected, less homework was done at the weekend with approximately half of the children spending <1 hour a day doing homework in both 2010 and 2012.

The average time that children spent playing computer games on weekdays and at the weekend is presented in figure 11.

Figure 11

Average time spent playing computer games per day by first class children during the week and at weekends in 2010 and 2012. See Appendix 1 for number of missing values for each category.

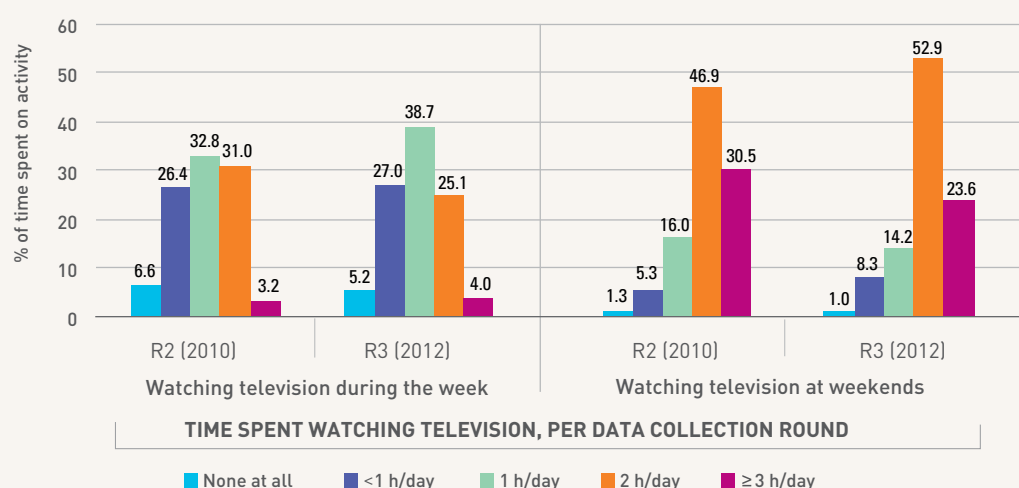


Almost all of the participating households (n=1004 in 2010 and n=1006 in 2012) had a computer in the house: 94.2% in 2010 and 96.0% in 2012 (data not shown). Regarding playing computer games, over half in 2010 and almost half in 2012 did not play computer games during the week, while over one-third spent less than one hour daily on a computer. For the weekend, this percentage was lower with about one third not playing games in 2010 and about one quarter in 2012. A small but significant difference was observed between 2010 and 2012 for both weekdays ($\chi^2=29.9$, $p=0.0198$) and at the weekend ($\chi^2=50.4$, $p=0.0001$) with more children spending time on a computer and for a longer duration in 2012 than in 2010.

The average time that children spent watching television on weekdays and at the weekend is presented in figure 12.

Figure 12

Average time spent per day watching television by first class children during the week and at weekends in 2010 and 2012. See Appendix 1 for number of missing values for each category.



No differences were observed between Rounds 2 (in 2010) and 3 (in 2012) for watching television during the week, with one-third of the children watching <1 hour of television per day, one-third watched one hour per day and one-third two hours or more. Children were watching more television at the weekend, with half of the children watching two hours per day and one-third three hours or more, but no differences were observed between 2010 and 2012.

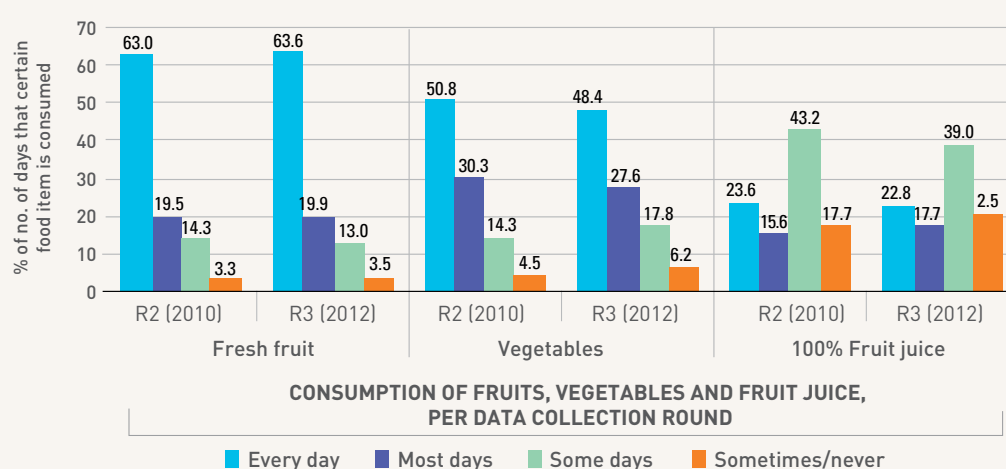
DIET

The parents reported that most children had breakfast daily (94.9% in 2010 and 93.4% in 2012) and very few children had never breakfast (0.0% in 2010 and 0.1% in 2012; data not shown). Data on dietary items was collected by asking parents the question: "Over a usual week, how often does your child have the following kinds of foods or drinks?". The parents were able to choose from the following answer options: "Every day", "Most days (4-6 days)", "Some days (1-3 days)" and "Never". Several parents did not tick a box, but commented that a certain type food or drink was only consumed sometimes (e.g. once a month). These instances were recoded into the category "Never" and this category has been renamed "Sometimes or never".

Figure 13 presents how many times per week children consumed fresh fruit, vegetables and 100% fruit juices.

Figure 13

Number of days per week that first class children consumed fresh fruit, vegetables and 100% fruit juices in 2010 and 2012. See Appendix 1 for number of missing values for each category.

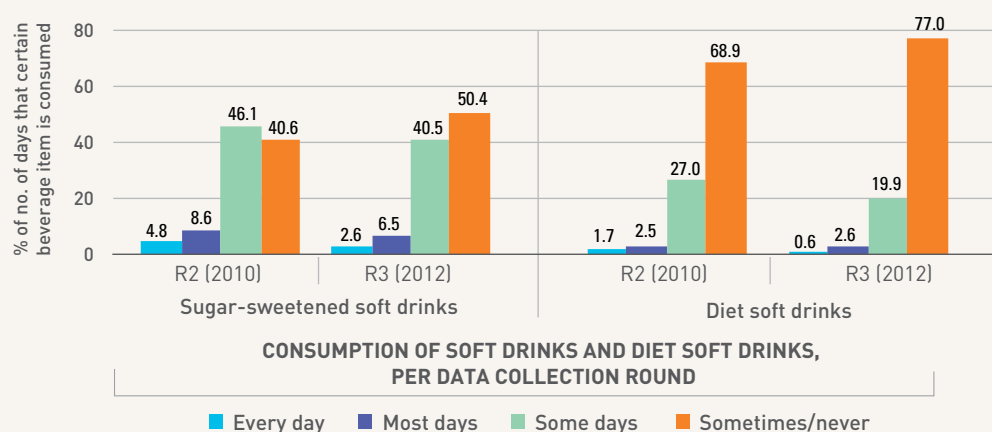


About two-thirds of the children ate fresh fruit daily, while only half ate vegetables daily in both 2010 and 2012. About 60% of the children consumed 100% fruit juices "some days" of the week or less in both Rounds 2 (in 2010) and 3 (in 2012).

Figure 14 presents how many times per week children consumed sugar-sweetened soft drinks and diet soft drinks.

Figure 14

Number of days per week that first class children consumed sugar-sweetened soft drinks and diet soft drinks in 2010 and 2012. See Appendix 1 for number of missing values for each category.

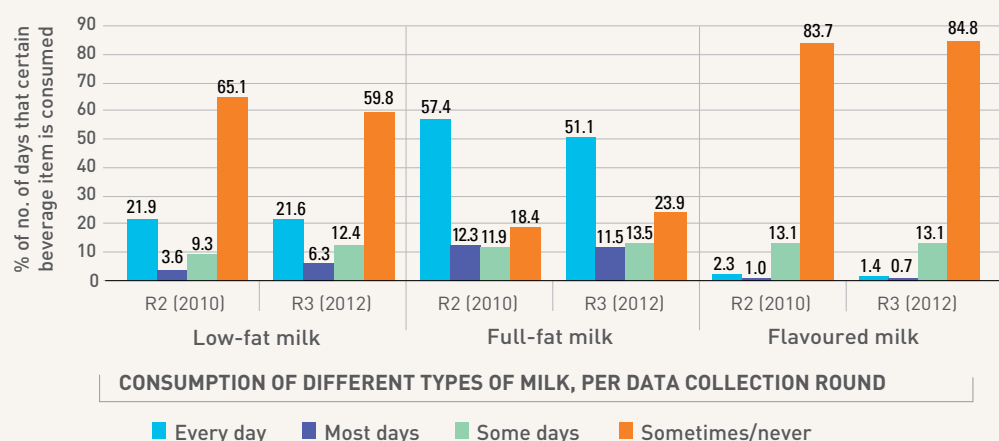


Parents reported that most children consumed sugar-sweetened soft drinks or diet soft drinks “sometimes or never”. Significant differences between 2010 and 2012 were observed for consumption of sugar-sweetened soft drinks ($\chi^2=23.4$, $p=0.0176$) and diet soft drinks ($\chi^2=20.4$, $p=0.0042$), with children consuming these products less frequently in 2012 than in 2010.

Figure 15 presents the number of times and type of milk consumed by children per week.

Figure 15

Number of days per week and type of milk consumed by first class children in 2010 and 2012. See Appendix 1 for number of missing values for each category.

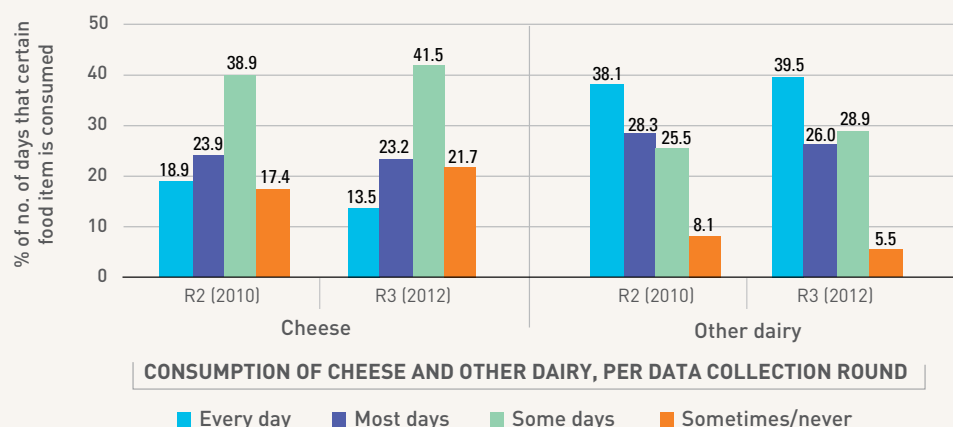


Only about 20% consumed low-fat milk on a daily basis and the majority of children consumed this “sometimes or never”. Over half of the children consumed full-fat milk on a daily basis in both rounds. Over 80% of the children consumed flavoured milk “sometimes or never”.

Figure 16 presents how many times per week children consumed cheese and other dairy.

Figure 16

Number of days per week that first class children consumed cheese and other dairy (including yoghurt, milk pudding and cream cheese) in 2010 and 2012. See Appendix 1 for number of missing values for each category.

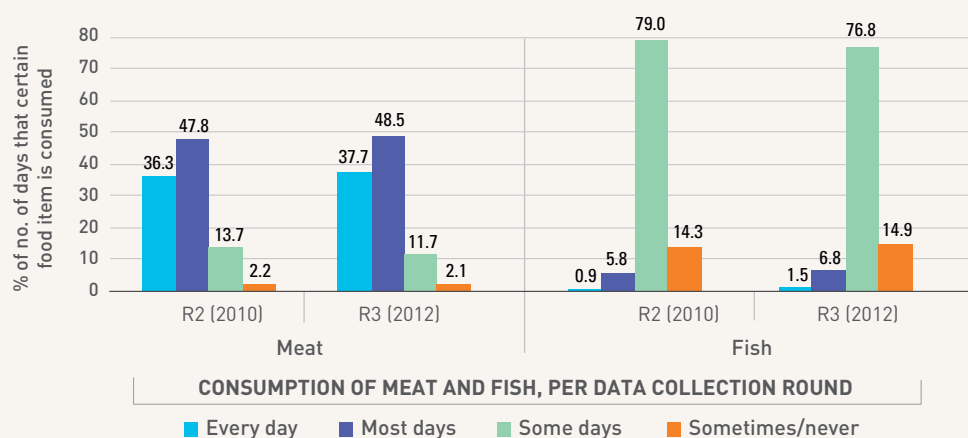


Less than half of the children were consuming cheese on a daily basis in both Rounds 2 (in 2010) and 3 (in 2012). Other dairy, including yoghurt, milk pudding and cream cheese, was consumed on a daily basis by just over one-third of the children and by almost one-third for “most days”.

Figure 17 presents how many times per week children consumed fish and meat.

Figure 17

Number of days per week that first class children consumed fish and meat in 2010 and 2012. See Appendix 1 for number of missing values for each category.

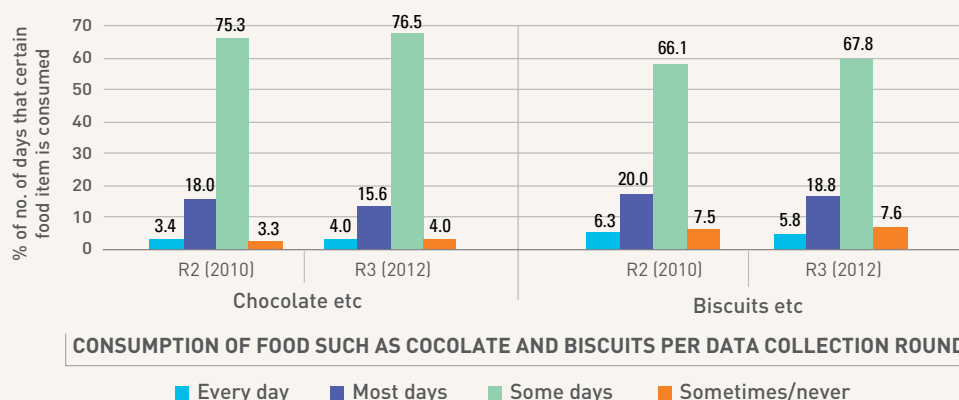


Meat was consumed by just over one-third of the children on a daily basis and about half consumed meat “most days” in both rounds. Fish was consumed on “some days” by approximately three-quarters of the children.

Figure 18 presents how many times per week children consumed foods such as chocolate and biscuits.

Figure 18

Number of days per week that first class children consumed foods such as biscuits, cake, doughnuts or pie and foods such as chocolate in 2010 and 2012. See Appendix 1 for number of missing values for each category.

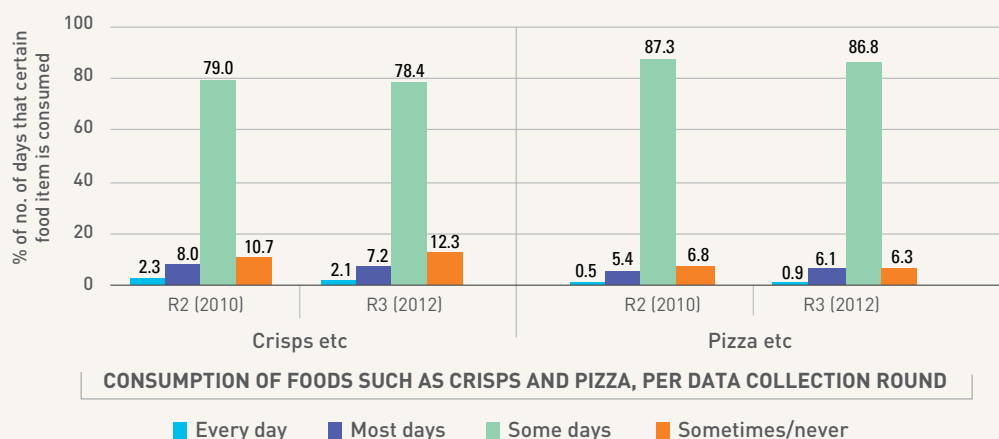


The majority of children in both rounds consumed products such as chocolate on “some days” and approximately 20% ate these products on “most days” or daily. Biscuits, cake, doughnuts or pie was consumed on a daily basis by approximately 6% of the children, about 20% on “most days” and for over 65% on “some days” in both Rounds 2 (in 2010) and 3 (in 2012).

Figure 19 presents how many times per week children consumed foods such as crisps and pizza.

Figure 19

Number of days per week that first class children consumed foods such as crisps, popcorn or peanuts and foods such as pizza, French fries, fried potatoes, hamburger, sausage or meat pies in 2010 and 2012. See Appendix 1 for number of missing values for each category.



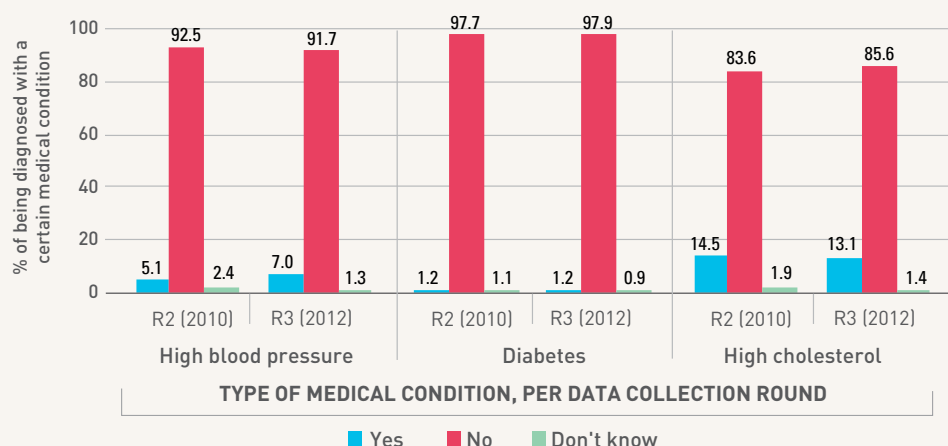
Crisps, popcorn or peanuts were eaten by approximately 10% on a daily basis or on “most days” in both rounds, while the majority ate these products on “some days”. Products such as pizza, French fries, fried potatoes, hamburger, sausage or meat pies, were consumed on “some days” by the majority of children and approximately 6% consumed these products on “most days” in both 2010 and 2012.

MEDICAL CONDITIONS

Households were asked to report whether there was a medical diagnosis in the previous 12 months. The results are presented in figure 20.

Figure 20

Distribution of diagnosis of a medical condition in the previous 12 months in households with children who attended first class in 2010 and 2012. See Appendix 1 for number of missing values for each category.



Few households had been diagnosed with a medical condition. In both Rounds 2 (in 2010) and 3 (in 2012), less than 7% had a high blood pressure, 1.2% or less had diabetes and approximately 14% had high cholesterol levels.

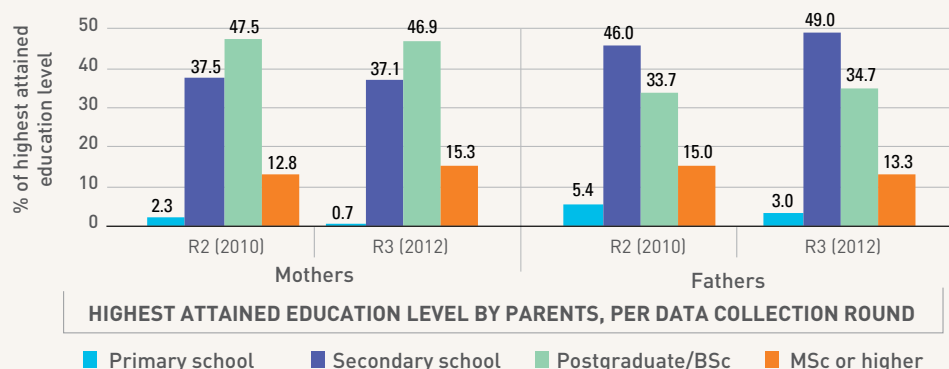
SOCIAL, ECONOMIC AND HOUSING

The median number of adults (aged 18 years or older) was two persons in both rounds (range is 1-7 adults in 2010 and 1-10 in 2012) and the median number of persons aged less than 18 was three persons for both rounds (range is 1-6 persons aged less than 18 in 2010 and 1-8 in 2012).

The highest attained education level by parents is presented in figure 21.

Figure 21

Distribution of highest attained education level by parents of participating first class children in 2010 (936 fathers and 978 mothers) and 2012 (939 fathers and 991 mothers).



Almost half of the fathers and just over one-third of the mothers have finished secondary school. More mothers than fathers reported they had attained a bachelor degree or a "master's degree or higher": approximately 60% of mothers and approximately 50% of fathers in both rounds. There were many missing values for this question among the fathers, as some parents may be separated. In these cases, it was mainly the mother who completed the questionnaire.

Figures 22 and 23 present the main type of employment done by the father or the mother, respectively in the previous 12 months.

Figure 22

Distribution of the father's main type of employment done in the previous 12 months for participating first class children in 2010 (n=946) and 2012 (n=944).

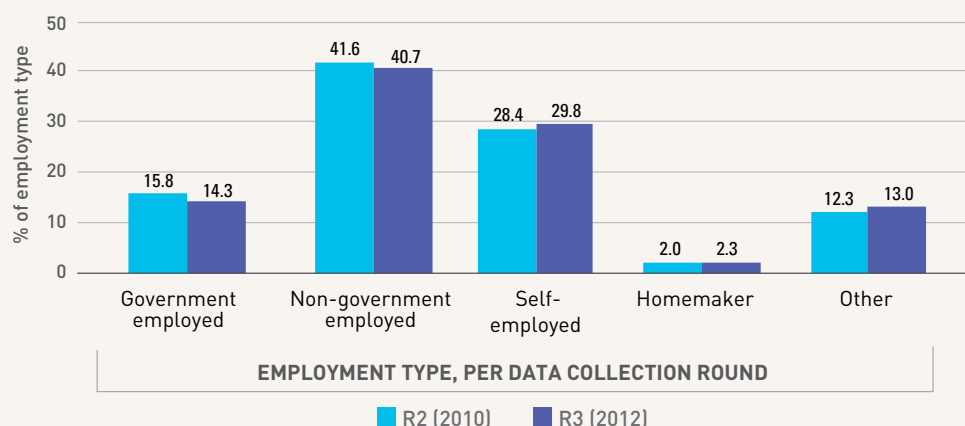
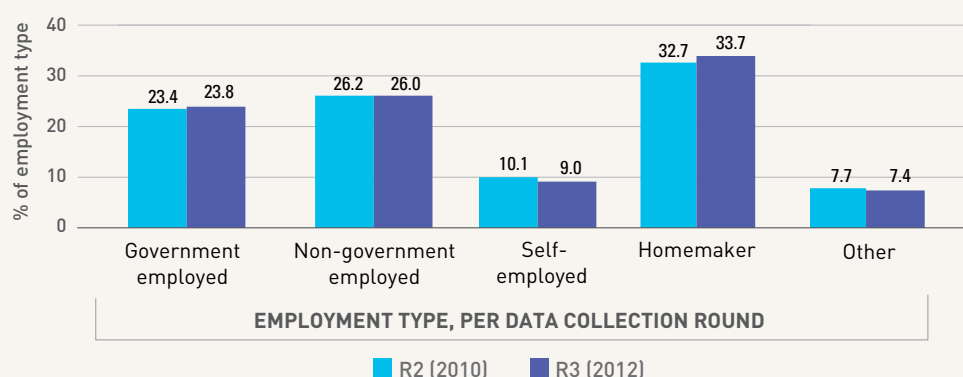


Figure 23

Distribution of mother's main type of employment done in the previous 12 months for participating first class children in 2010 (n=998) and 2012 (n=991).

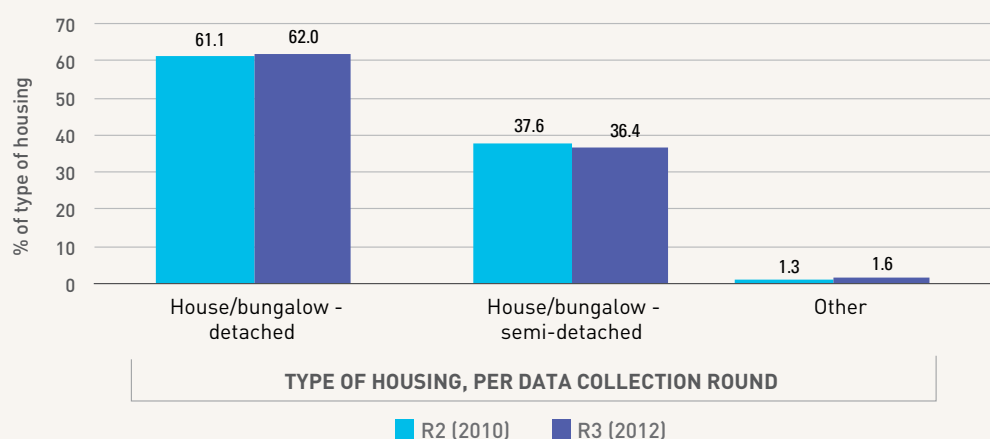


There were no differences between 2010 and 2012 for type of employment done by both fathers and mothers. The majority of the fathers were non-government employed or self-employed. Again, there were many missing values in this question for the fathers, for the same reason as mentioned above for education levels. For the mothers, one-third were homemakers, one-quarter government employed (i.e. Civil Service) and another one-quarter non-government employed. A minority were "unemployed but able to work": approximately 3% of mothers and 9-10% of fathers for both rounds. One reason for the lower figures of unemployed mothers might be that these mothers answered that their main type of employment is homemaker. Only five mothers ticked both "unemployed but able to work" and a "homemaker"; these five cases were recoded to homemaker. The "other" category included parents who were students, unemployed or retired.

Figure 24 presents the type of housing that the family lived in.

Figure 24

Distribution of type of housing that family of participating first class children lived in for 2010 (n=1004) and 2012 (n=1008).

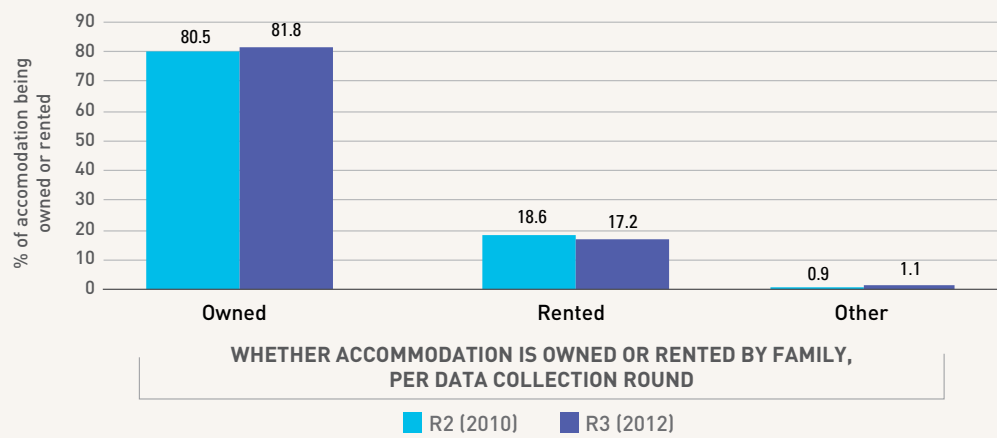


The majority (>60%) lived in a detached house or bungalow and just over one-third lived in a semi-detached house or bungalow.

Figure 25 presents whether the accommodation that the family lived in was either owned or rented by them.

Figure 25

Percentages of accommodation owned or rented by families of participating first class children in 2010 (n=1005) and 2012 (n=1008).



Approximately 80% of the families owned their accommodation, while about 15-20% rented.



Results on type of school

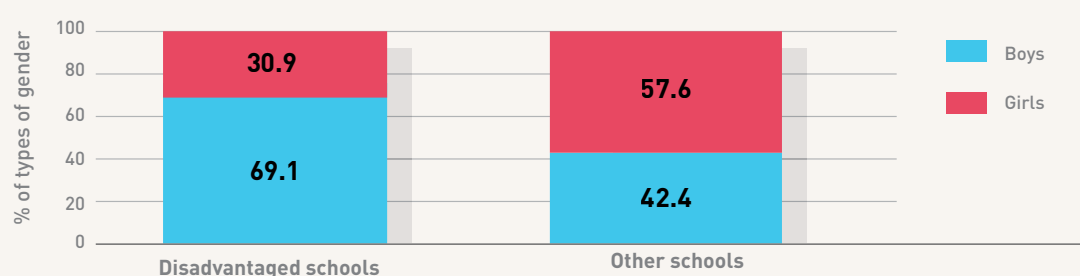
DESCRIPTIVES

The mean age of first class children did not differ between the type of schools (overall mean, 7.0 y; 95% CI, 7.0-7.1 y). The mean age of third class children did significantly differ ($F=6.94$, $p=0.0095$), with a mean age of 9.0 years (95% CI, 8.9-9.0 y) for DEIS schoolchildren and a mean age of 9.2 years (95% CI, 9.0-9.3 y) for children in other schools. Figure 26 presents the gender distribution of children in DEIS or other schools.

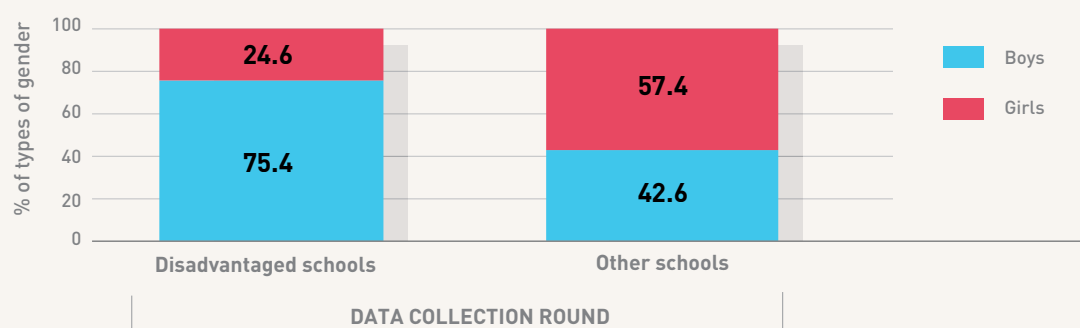
Figure 26

Gender distribution of children.

A: Children from first class DEIS (n=136) or other (n=1884) schools in 2010 and 2012.



B: Children from third class DEIS (n=62) or other (n=907) schools in 2010.



The percentages of boys was higher in DEIS schools than in other schools for first class (panel A; 69.1% vs 42.4%; $\chi^2=28.3$, $p=0.0588$) and third class (panel B; 75.4% vs 42.6%; $\chi^2=19.3$, $p=0.0556$) children.

The amount of sleep children got did not differ between children in DEIS schools and other schools for both first (10 hrs. and 32 minutes) and third (10 hrs. and 11 minutes) class.

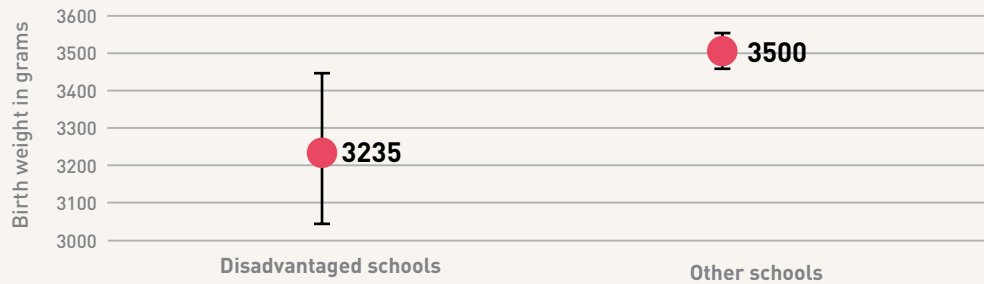
BIRTH WEIGHT AND BREASTFEEDING

Figure 27 presents the children's mean birth weight.

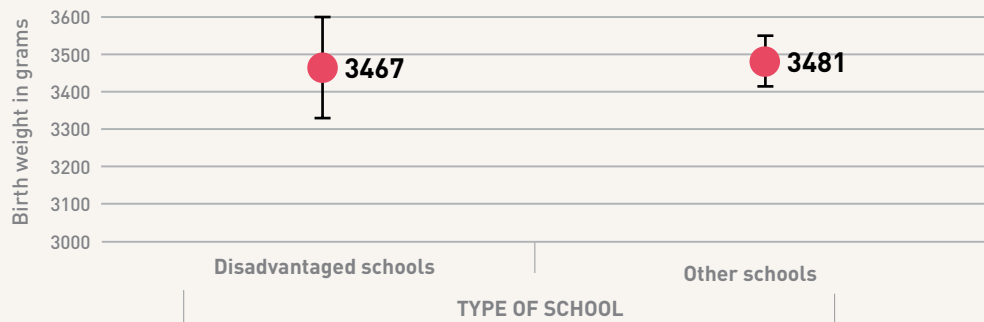
Figure 27

Children's mean birth weight (in grams).

A: Children from first class DEIS (n=132) or other (n=1810) schools in 2010 and 2012.



B: Children from third class DEIS (n=56) or other (n=873) schools in 2010.



Children from first class DEIS schools had a significantly lower birth weight than children in other schools (panel A; $F=6.61$, $p=0.0111$). For third class children no difference was observed (panel B).

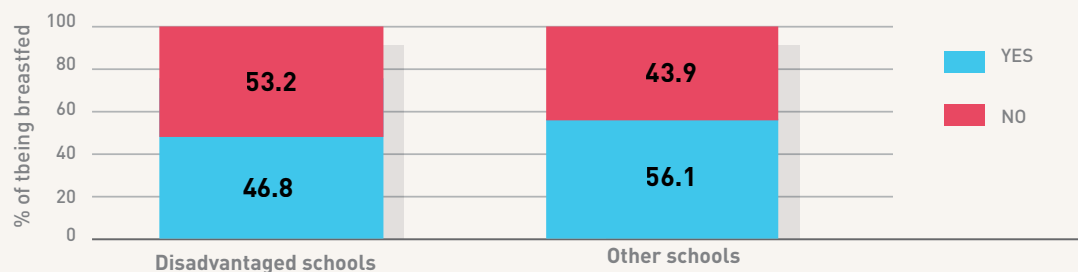
In 2012, an additional question was included whether the child was born full term. For first class children, 87.6% who attended DEIS schools were born full term and 92.6% children in other schools. These percentages were not statistically significantly different.

Figure 28 presents the percentages of children who were ever breastfed as reported by parents.

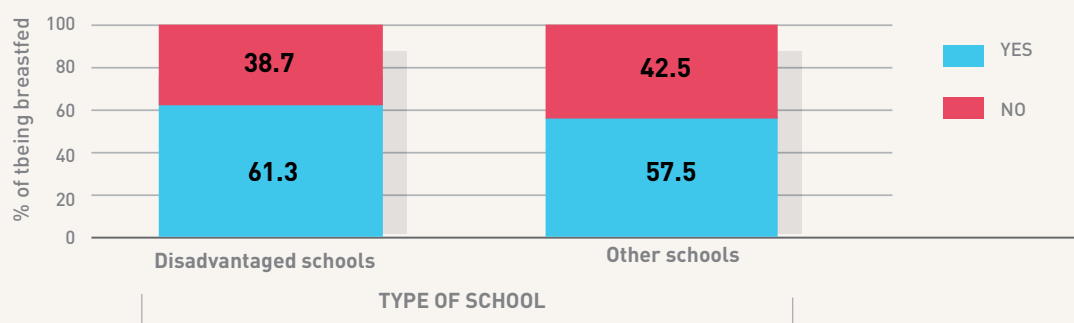
Figure 28

Distribution of children who were ever breastfed.

A: Children from first class DEIS (n=136) or other (n=1863) schools in 2010 and 2012.



B: Children from third class DEIS (n=61) or other (n=904) schools in 2010.



Less children from first class DEIS schools have ever been breastfed compared to children in other schools, although this difference was not statistically significant (panel A; 46.8% vs 56.1%, respectively; $\chi^2=3.44$, $p=0.0825$). No difference was observed for third class children (panel B).

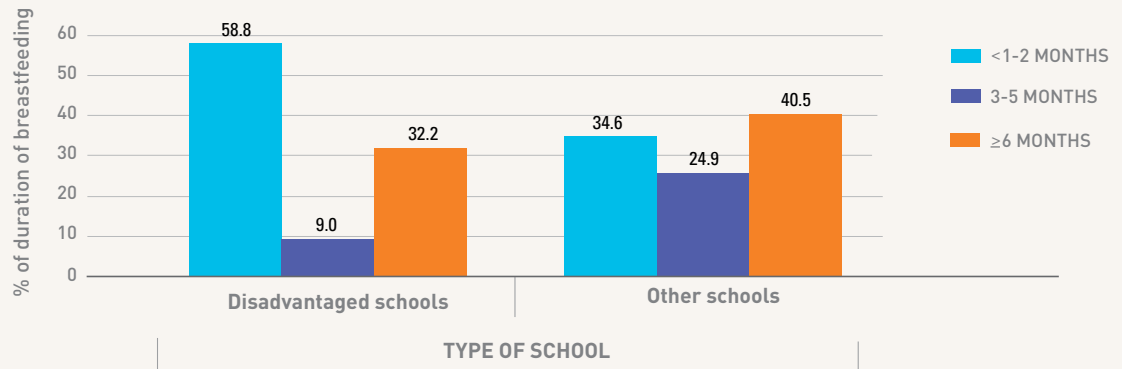


Figure 29 presents the duration of breastfeeding.

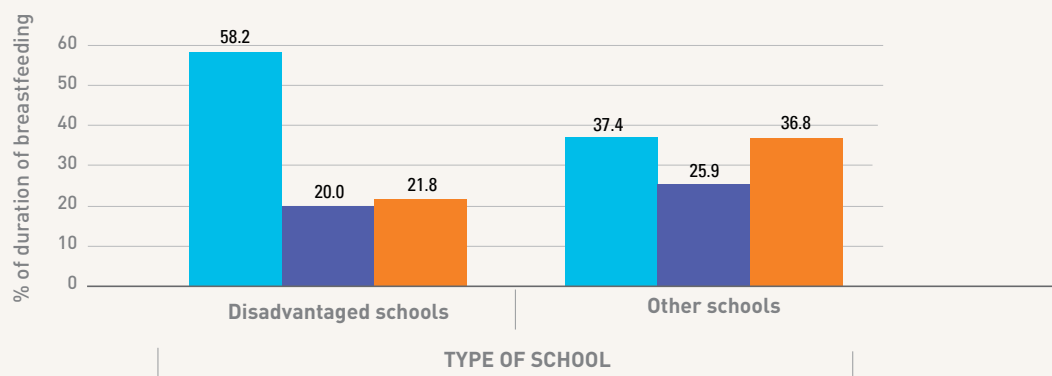
Figure 29

Duration of breastfeeding (in months) in children.

A: Children from first class DEIS (n=57) or other (n=1101) schools in 2010 and 2012.



B: Children from third class DEIS (n=33) or other (n=535) schools in 2010.



It seems that DEIS schoolchildren were breastfed for a shorter period of time than children in other schools but this was not statistically significant for either first class ($\chi^2=13.9$, $p=0.0802$) or third class ($\chi^2=5.2$, $p=0.2485$) children.

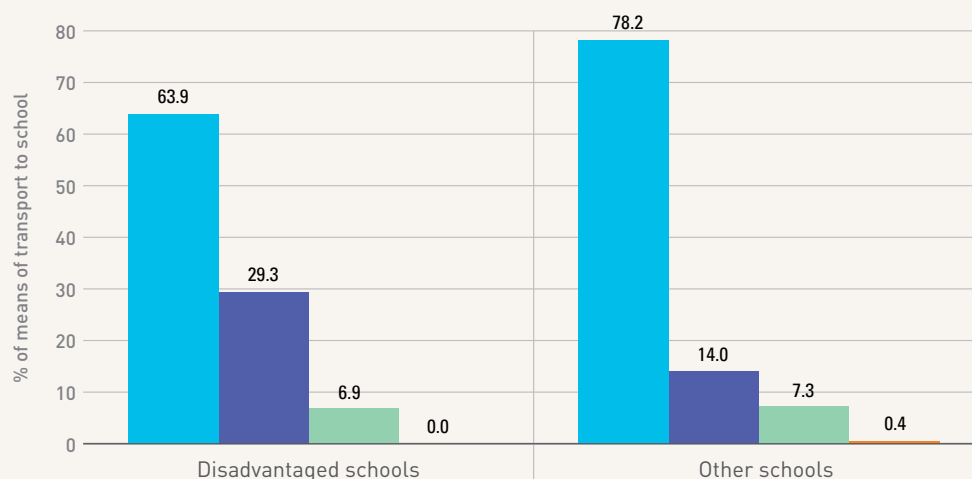
PHYSICAL ACTIVITY/INACTIVITY PATTERNS

Figure 30 presents means of transportation to and from school.

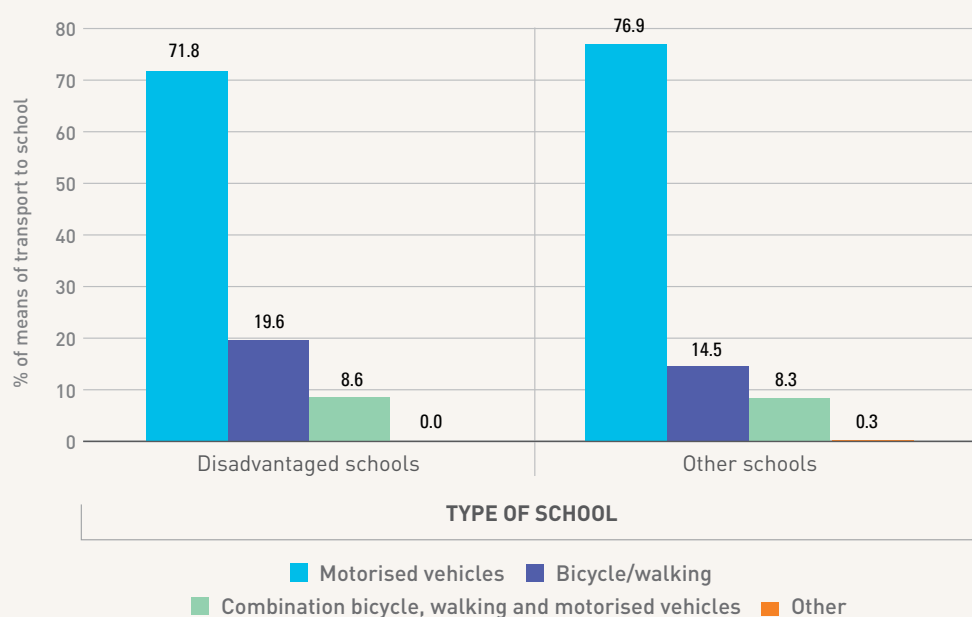
Figure 30

Children's means of transportation to and from school.

A: Children from first class DEIS (n=136) or other (n=1883) schools in 2010 and 2012.



B: Children from third class DEIS (n=62) or other (n=907) schools in 2010.



There was a significant difference in means of transportation to school between first class children in DEIS schools and other schools (panel A; $\chi^2=18.5$, $p=0.0494$). Compared to children in other schools, DEIS schoolchildren cycled or walked to school more often (14.0% vs 29.3%, respectively) and motorised vehicles were used less (78.2% vs 63.9%, respectively). No difference was observed for third class children (panel B).

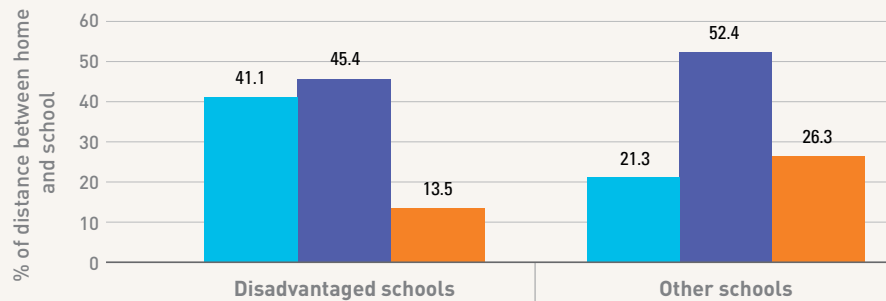
More parents of first class children in DEIS schools believed that routes to school were unsafe for children compared to parents of children who attended other schools (47.9% vs 27.4%; $\chi^2=20.4$, $p=0.0022$). For third class children, no significant difference was observed between parents considering routes to school to be safe for children who attended DEIS (35.6%) and other (29.7%) schools.

Figure 31 presents the distance between home and school.

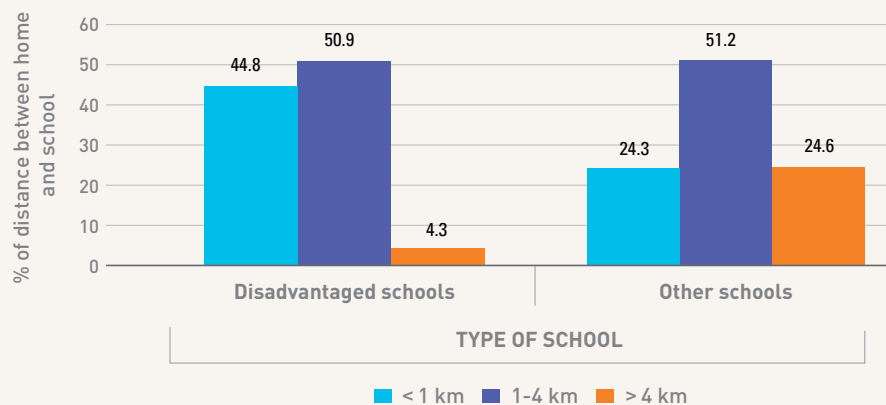
Figure 31

Distribution of the distance between children's home and school.

A: Children from first class DEIS (n=130) or other (n=1831) schools in 2010 and 2012.



B: Children from third class DEIS (n=57) or other (n=881) schools in 2010.



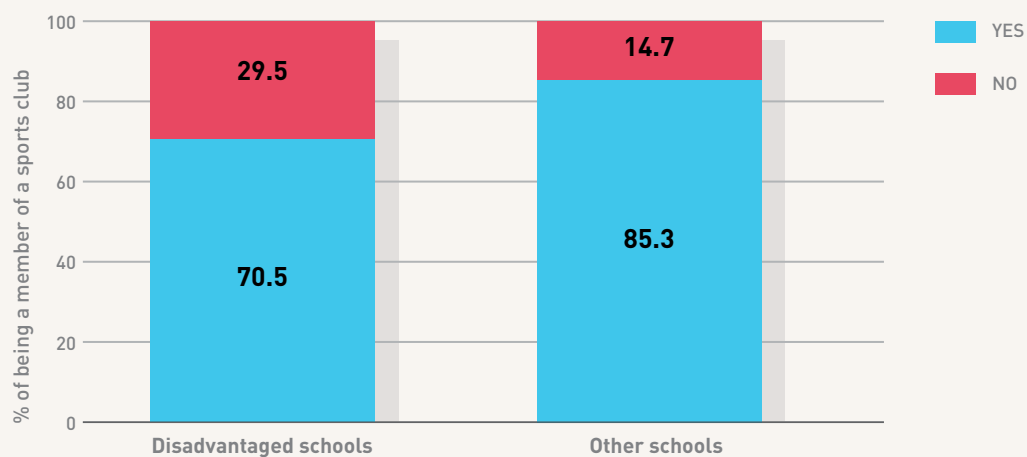
Children in DEIS schools lived closer to school than children in other schools for both first class (panel A; ≤ 4 km: 86.5% vs 73.7%; $\chi^2=23.6$, $p=0.0002$) and third class (panel B; ≤ 4 km: 95.7% vs 75.7%; $\chi^2=14.1$, $p=0.0015$) children.

Figure 32 presents the distribution of children who were members of at least one sports club.

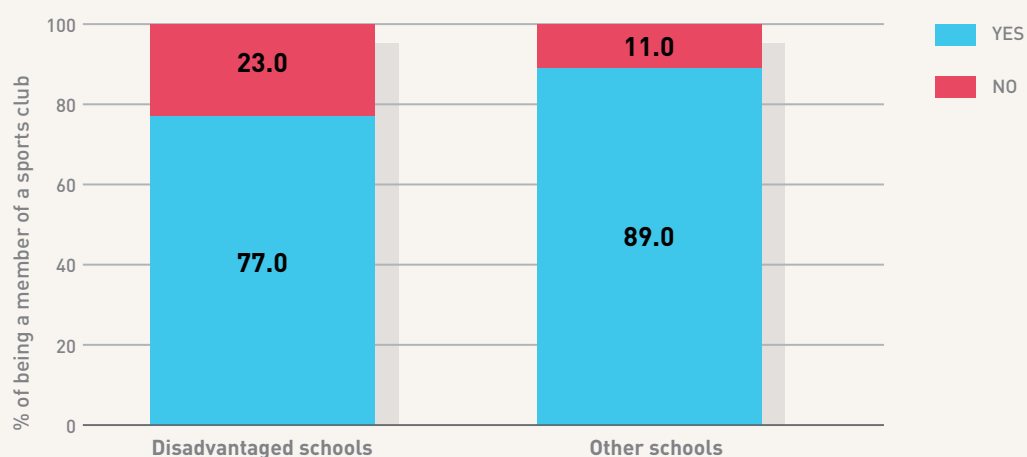
Figure 32

Distribution of children being a member of at least one sports club.

A: Children from first class DEIS (n=136) or other (n=1874) schools in 2010 and 2012.



B: Children from third class DEIS (n=62) or other (n=901) schools in 2010.



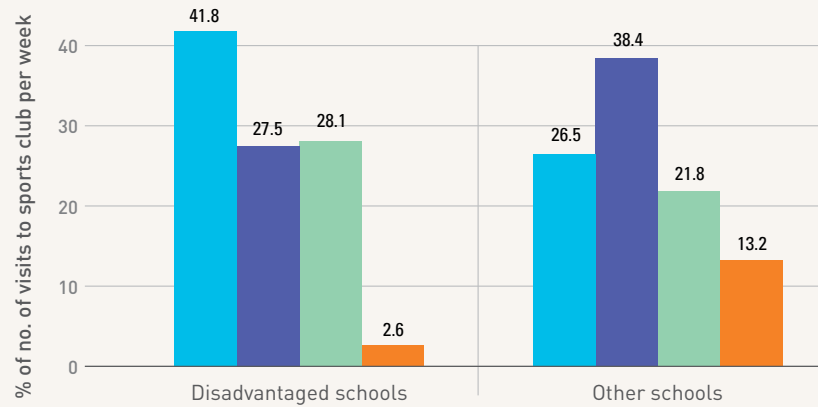
Children in DEIS schools were less likely to be a member of at least one sports club than children in other schools for both first (panel A; 70.5% vs 85.3%; $\chi^2=16.5$, $p=0.0001$) and third (panel B; 77.0% vs 89.0%; $\chi^2=6.2$, $p<0.0001$) class.

Figure 33 presents the number of visits to sports clubs per week.

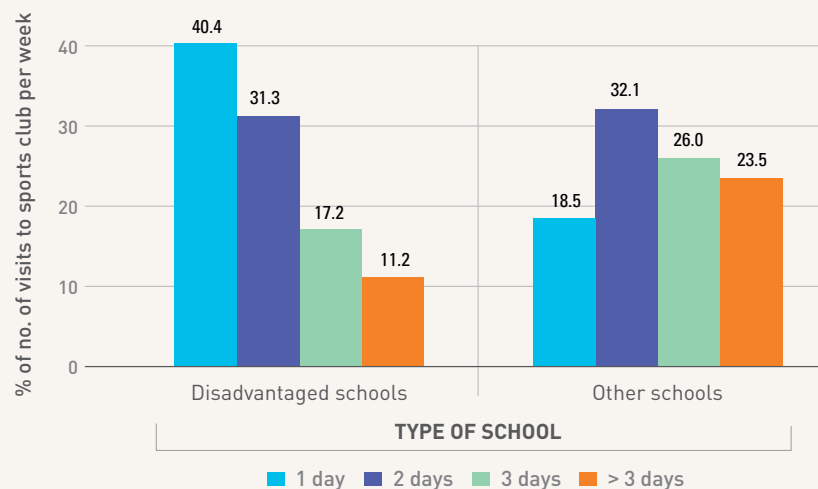
Figure 33

Children's number of visits to sports clubs per week.

A: Children from first class DEIS (n=92) or other (n=1603) schools in 2010 and 2012.



B: Children from third class DEIS (n=46) or other (n=817) schools in 2010.



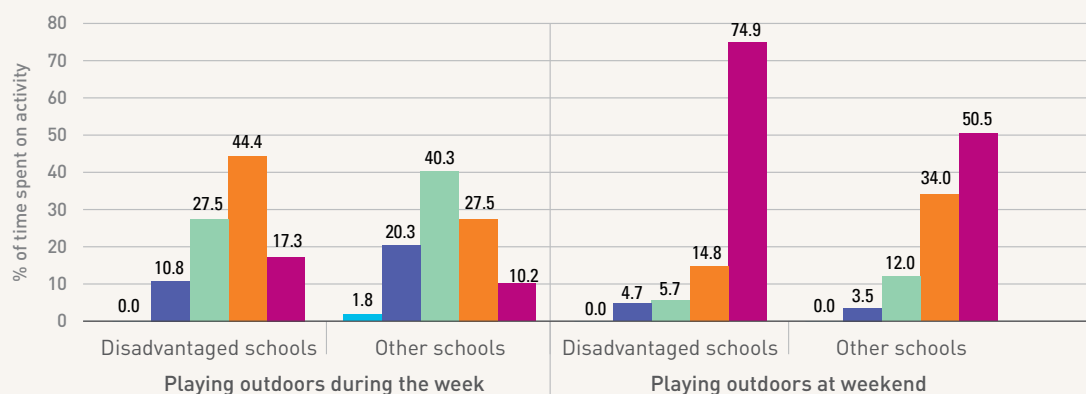
Children in DEIS schools visited sports clubs less frequently than children in other schools for both first class ($\chi^2=15.0$, $p=0.0179$) and third class ($\chi^2=12.1$, $p=0.0047$) children.

Figure 34 presents the average time that children spent playing outdoors as reported by parents. Since we observed a significant difference between first class children in 2010 and in 2012 (see previous Results section on the two birth cohorts data), the distribution is presented separately for 2010 (panel A) and 2012 (panel B). Panel C presents the distribution for third class children in 2010.

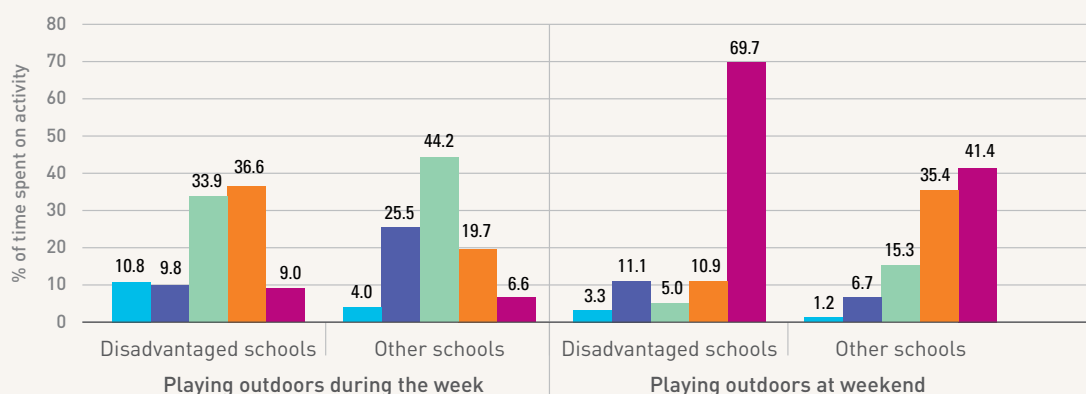
Figure 34

Average time spent per day playing outdoors by children during the week and at weekends.
See Appendix 1 for number of missing values for each category.

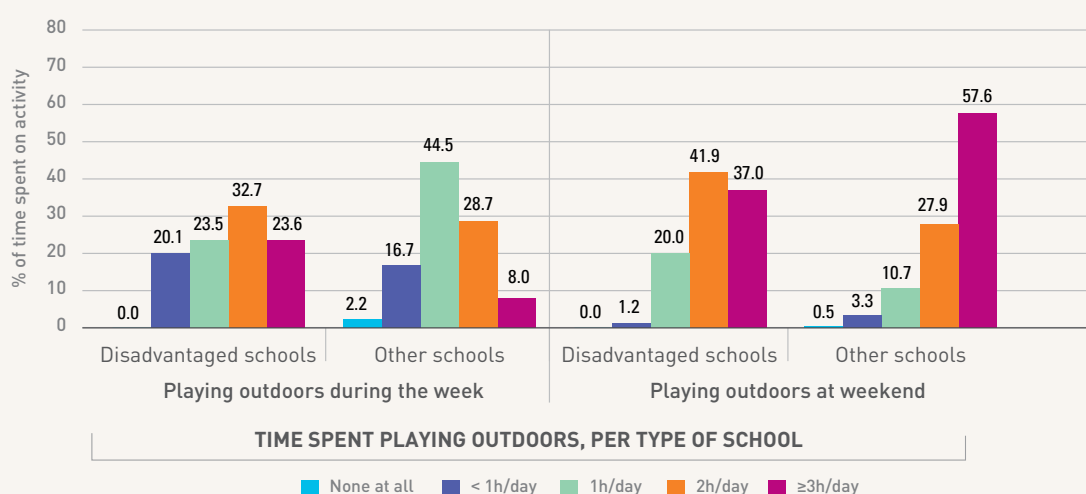
A: Children from first class DEIS or other schools in 2010.



B: Children from first class DEIS or other schools in 2012.



C: Children from third class DEIS or other schools in 2010.



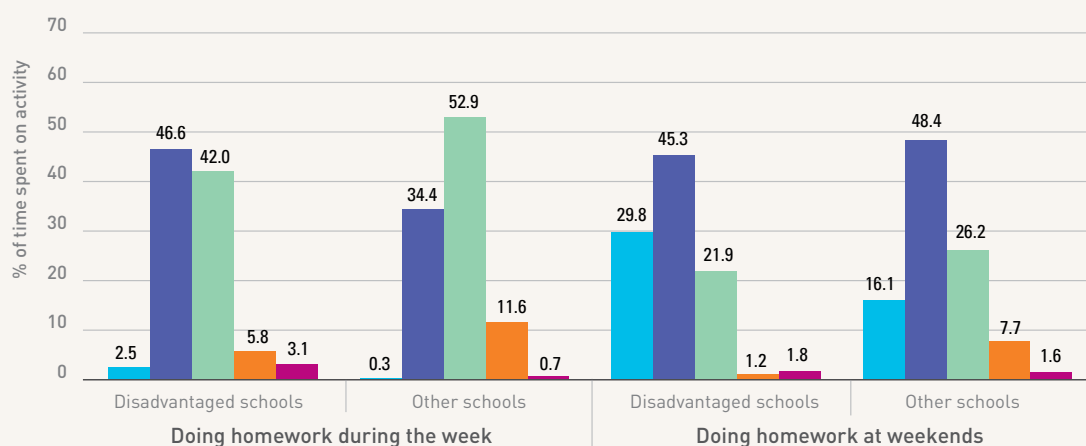
No significant differences were observed for playing outdoors during the week and at weekends for children who attended either first (panel A) or third (panel C) class in 2010. For first class children in 2012, a significant difference was observed for playing outdoors both on weekdays and at the weekend (panel B; week: $\chi^2=28.4$, $p=0.0014$; weekend: $\chi^2=36.5$, $p=0.0002$), with DEIS schoolchildren spending more time per day playing outdoors than children in other schools.

Figure 35 presents the average time reported by parents that children spent on homework on weekdays and at the weekend.

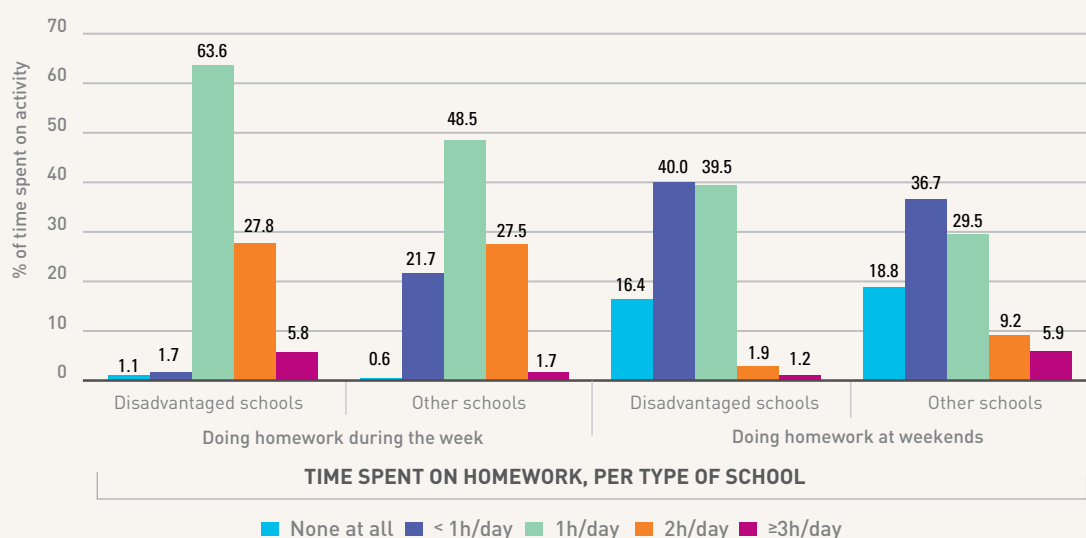
Figure 35

Average time spent per day on homework by children during the week and at weekends. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other school in 2010.



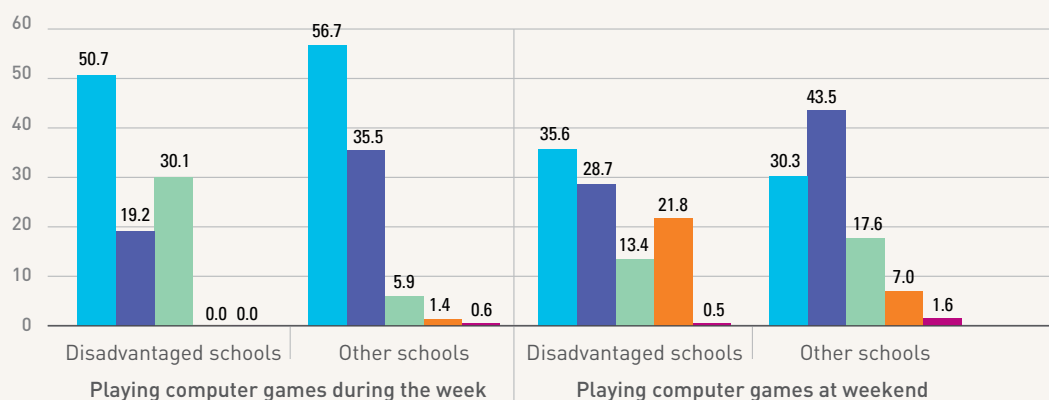
Children from first class DEIS schools spent less time on homework during the week and at weekends (panel A; week: $\chi^2=25.8$, $p=0.0092$; weekend: $\chi^2=16.7$, $p=0.0016$). For third class children a different pattern emerged with more children in DEIS schools spending about 1 h/day on homework during the week compared to children attending other schools (panel B; 63.6% vs 48.5%; $\chi^2=14.7$, $p=0.0241$). No differences were however, observed for children spending over 1 h/day on homework during the week and no significant differences were observed for doing homework at the weekend.

Figure 36 presents the average time spent playing computer games. Since we observed a significant difference between first class children in 2010 and in 2012 (see previous Results section on both birth cohorts data), the distribution is presented separately for 2010 (panel A) and 2012 (panel B). Panel C presents the distribution for third class children in 2010.

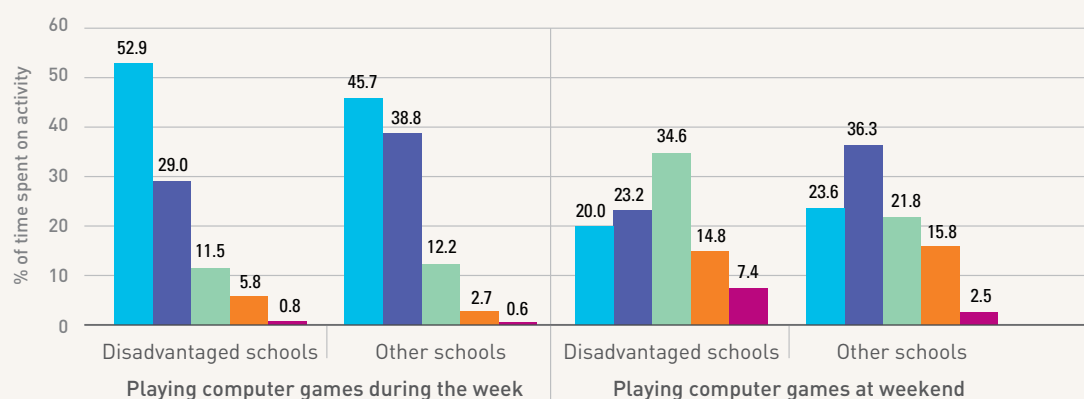
Figure 36

Average time spent per day playing computer games by children during the week and at weekends. See Appendix 1 for number of missing values for each category.

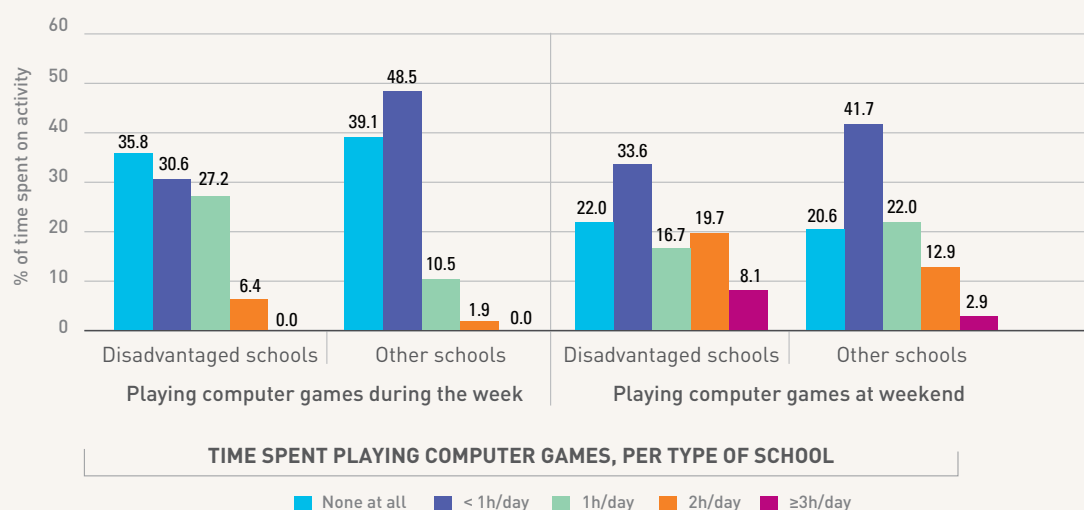
A: Children from first class DEIS or other schools in 2010.



B: Children from first class DEIS or other schools in 2012.



C: Children from third class DEIS or other schools in 2010.



First class children from DEIS schools were significantly less likely to have a computer at home than children who attended other schools (83.5% vs 95.7%, respectively; $\chi^2=30.6$, $p<0.0001$).

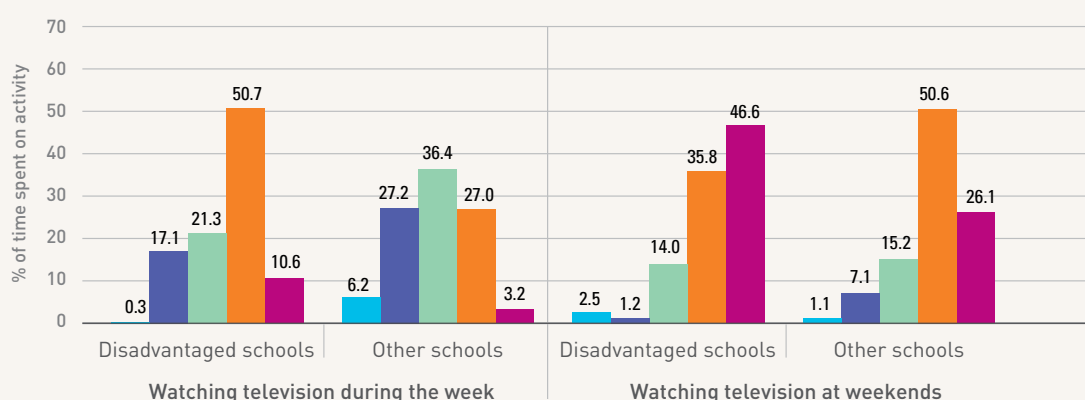
For third class children, no differences were observed between children in DEIS schools and other schools (97.2% vs 95.5% that had a computer at home, respectively). Regarding playing computer games, children from first class DEIS schools in 2010 spent more time on a computer daily than children in other schools for both weekdays and at the weekend (panel A; week: $\chi^2=104.7$, $p=0.0067$; weekend: $\chi^2=41.3$, $p=0.0022$). No significant differences were observed for first class children in 2012 (panel B). For third class children, significantly more time was spent weekdays on a computer by DEIS schoolchildren compared to children in other schools (panel C; $\chi^2=17.9$, $p=0.0244$). No differences were observed for the weekend.

Figure 37 presents the average time that children spent watching television on weekdays and at the weekend.

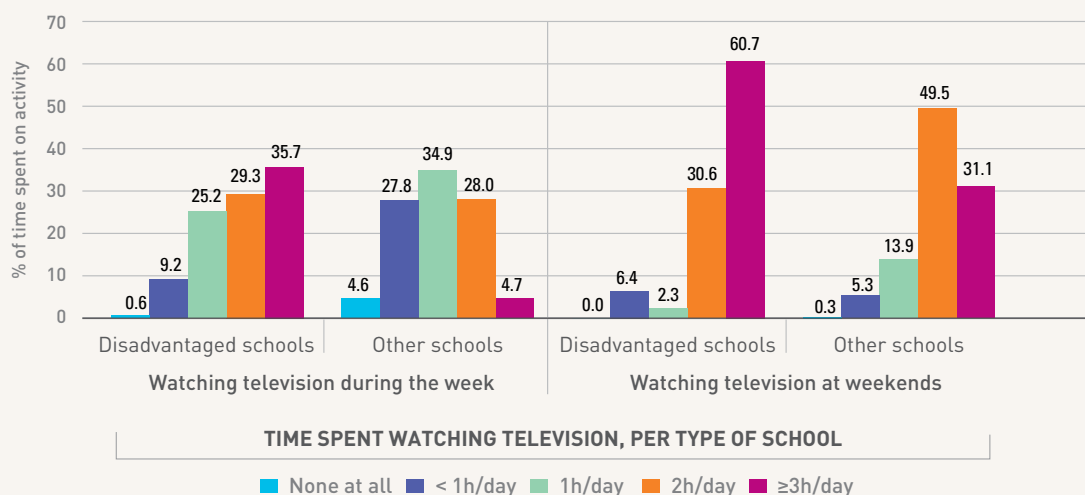
Figure 37

Average time spent per day watching television by children during the week and at weekends. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



Children from first class DEIS schools spent more time watching television than children in other schools on both weekdays and at the weekend (panel A; week: $\chi^2=49.1$, $p<0.0001$; weekend: $\chi^2=26.0$, $p=0.0046$). Similar patterns were observed for third class children (panel B; week: $\chi^2=76.7$, $p<0.0001$; weekend: $\chi^2=19.8$, $p=0.0441$).

DIET

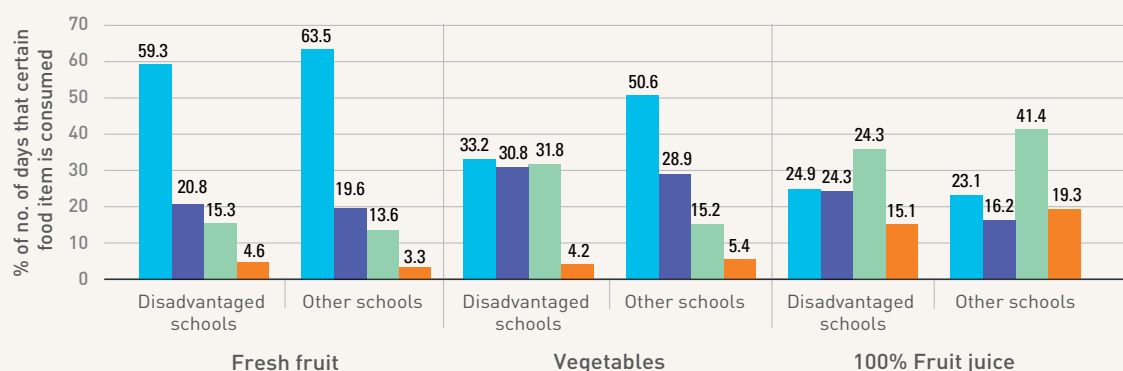
For first class children, a small but significant difference was observed for the number of days that children had breakfast, with less DEIS schoolchildren having a daily breakfast compared to children in other schools (90.1% vs 94.4%, respectively; $\chi^2=5.5$, $p=0.0260$; data not shown). None of the first class children in DEIS schools skipped breakfast completely and just five children (0.0008%) attending other schools skipped breakfast. For third class children, no significant differences were observed with 92.5% of children in DEIS schools and 93.2% of children in other schools having a daily breakfast as reported by parents (data not shown). None of the third class children in DEIS schools skipped breakfast completely and just two children (0.3%) attending other schools.

Figure 38 presents how many times per week children consumed fresh fruit, vegetables and 100% fruit juices.

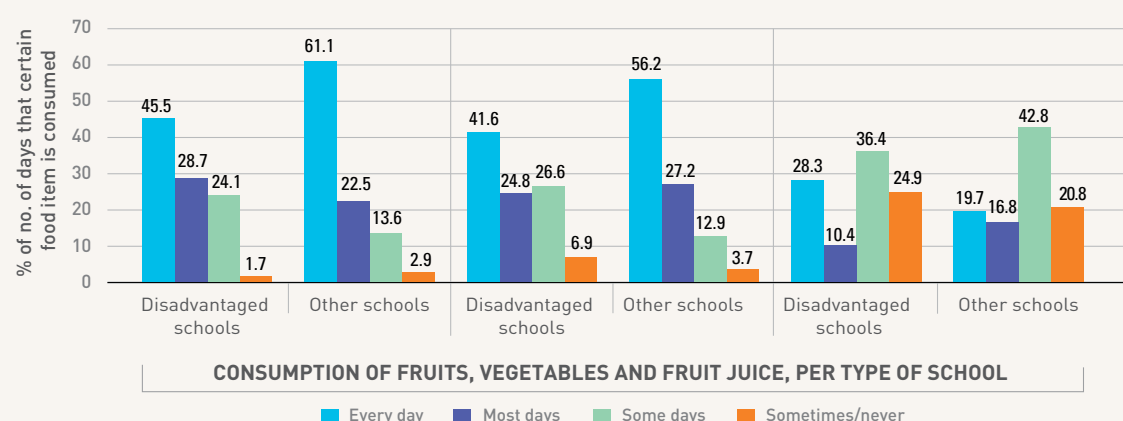
Figure 38

Number of days per week that children consumed fresh fruit, vegetables and 100% fruit juices. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



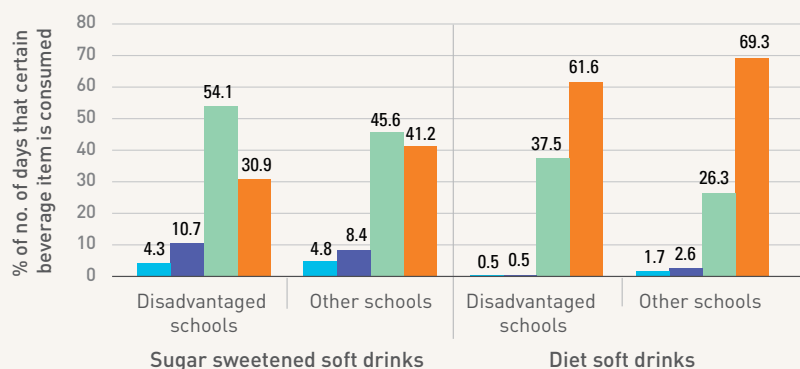
No difference in type of school attendance and either fruit or fruit juice consumption was observed for first class children (panel A). Third class children in DEIS schools consumed fruit less frequently than third class children who attended other schools (panel B; $\chi^2=6.2$, $p=0.0031$). Children in DEIS schools ate vegetables significantly less frequently than children in other schools for both first (panel A; $\chi^2=23.1$, $p=0.0048$) and third (panel B; $\chi^2=9.0$, $p=0.0005$) class.

Figure 39 presents how many times per week children consumed sugar-sweetened soft drinks and diet soft drinks. As we observed a significant difference between first class children in 2010 and in 2012 (see previous Results section on both birth cohorts data), the distribution is presented separately for 2010 (panel A) and 2012 (panel B). Panel C presents the distribution for third class children in 2010.

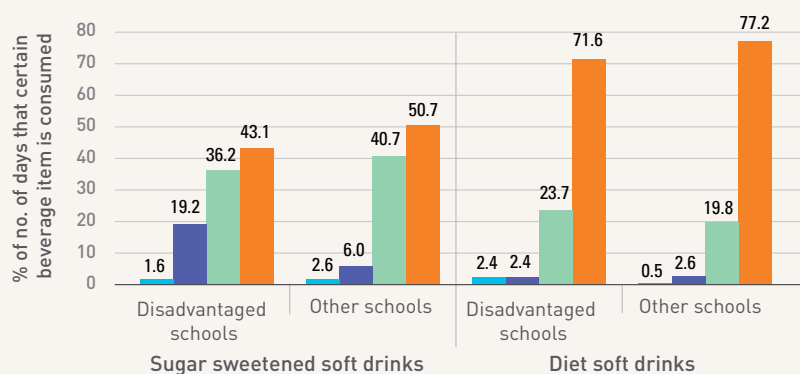
Figure 39

Number of days per week that children consumed sugar-sweetened soft drinks and diet soft drinks. See Appendix 1 for number of missing values for each category.

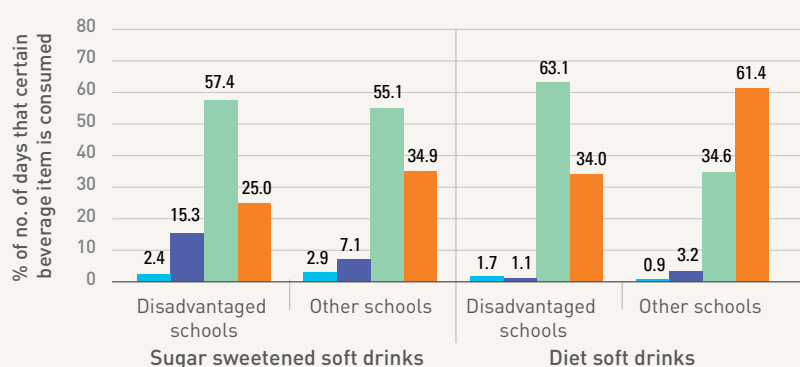
A: Children from first class DEIS or other schools in 2010.



A: Children from first class DEIS or other schools in 2012.



C: Children from third class DEIS or other schools in 2010.



CONSUMPTION OF SOFT DRINKS AND DIET SOFT DRINKS, PER TYPE OF SCHOOL

■ Every day ■ Most days ■ Some days ■ Sometimes/never

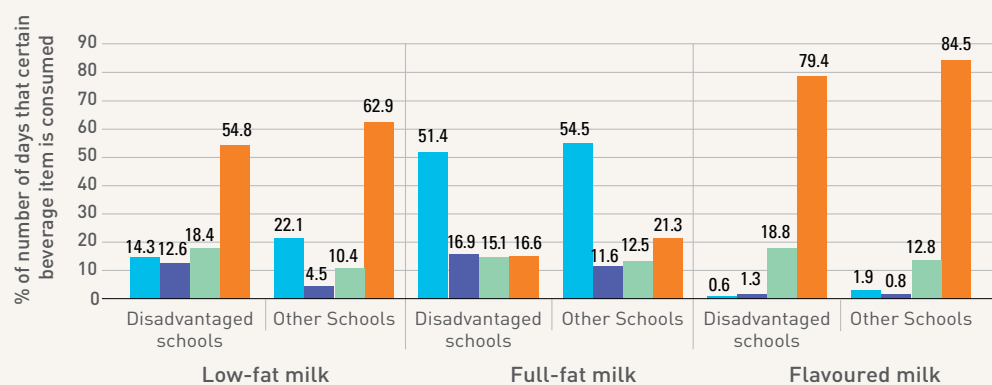
There were no significant differences observed between type of school attendance and the consumption of either sugar-sweetened soft drinks or diet soft drinks. Although it seems that children from third class DEIS schools consumed diet soft drinks more frequently than children in other schools (panel C); however, this was a non-significant difference ($\chi^2=16.4$, $p=0.0884$).

Figure 40 presents number of times and type of milk that children consumed per week.

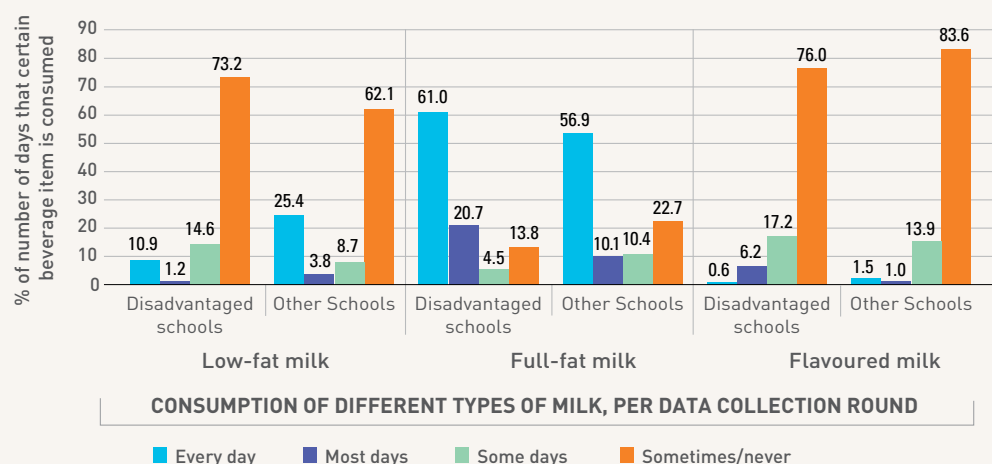
Figure 40

Number of days per week and type of milk consumed by children. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



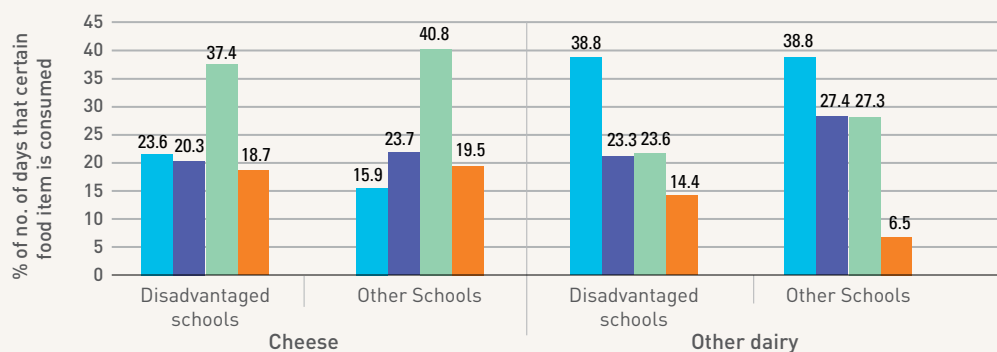
No significant differences were observed between number of times that milk was consumed by first class children in DEIS schools and other schools (panel A). For third class children, a significant difference was observed for full-fat milk (panel B; $\chi^2=7.9$, $p=0.0430$). Children in DEIS schools consumed full-fat milk more often than children in other schools.

Figure 41 presents how many times per week consumed cheese and other dairy.

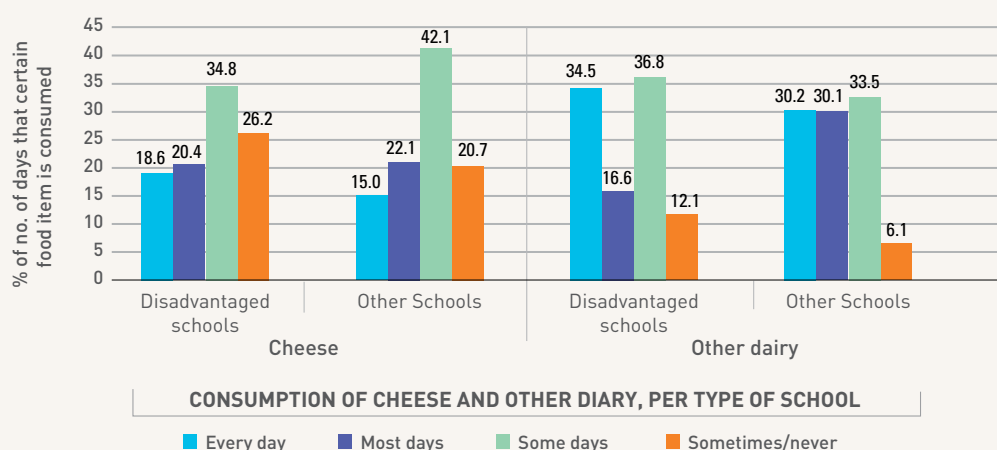
Figure 41

Number of days per week that children consumed cheese and other dairy (including yoghurt, milk pudding and cream cheese). See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



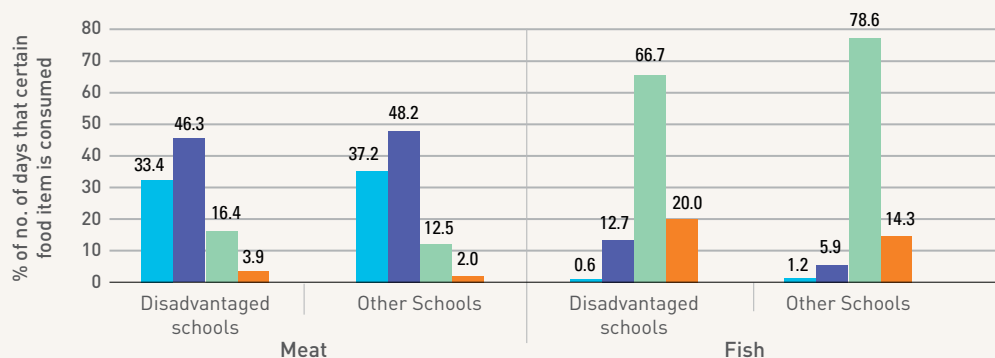
No significant differences were observed for the number of days that DEIS schoolchildren ate cheese or other dairy compared to children in other schools for both first (panel A) and third (panel B) class.

Figure 42 presents how many times per week children consumed fish and meat.

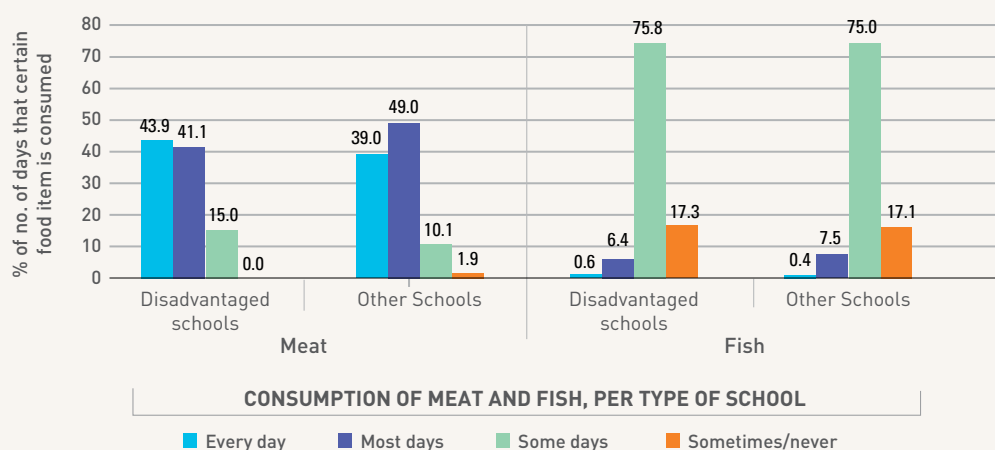
Figure 42

Number of days per week that children consumed fish and meat. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



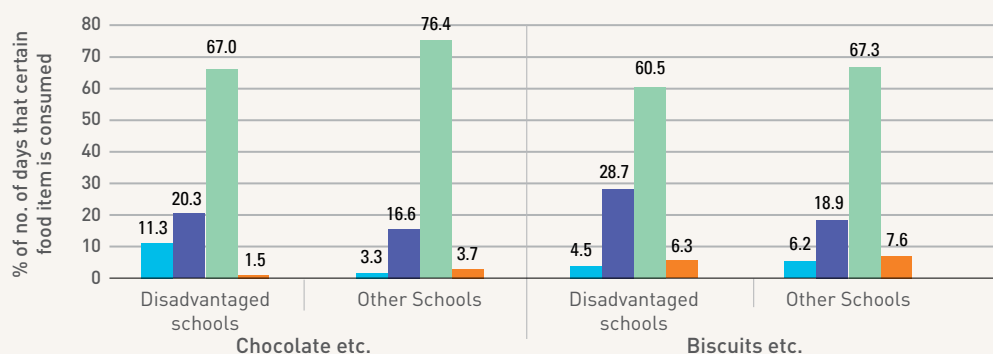
No differences in frequencies of meat consumption were observed between children in DEIS schools and other schools for both first (panel A) and third (panel B) class. For fish, a significant different pattern was observed, with children from first class DEIS schools eating fish less frequently than children in other schools (panel A; $\chi^2=11.4$, $p=0.0041$), but no differences were observed for third class children (panel B).

Figure 43 presents how many times per week children consumed foods such as chocolate and biscuits.

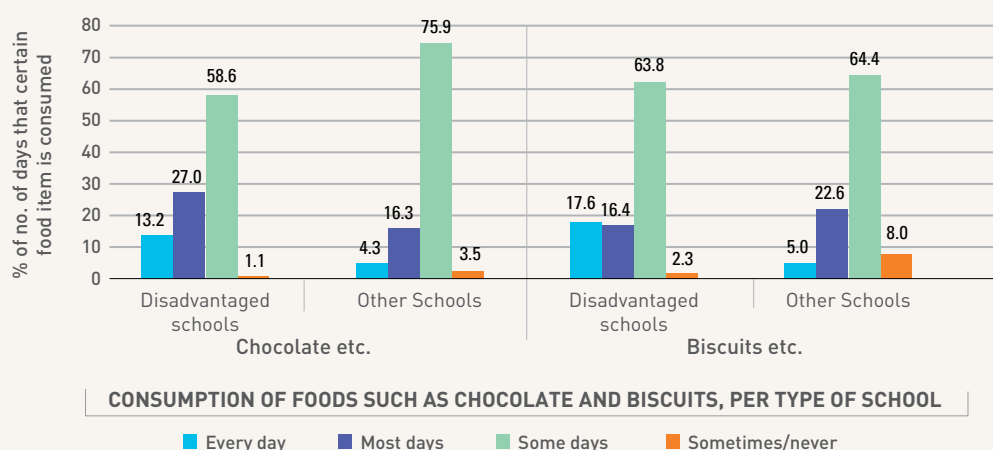
Figure 43

Number of days per week that children consumed foods such as biscuits cake, doughnuts or pie and foods such as chocolate. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



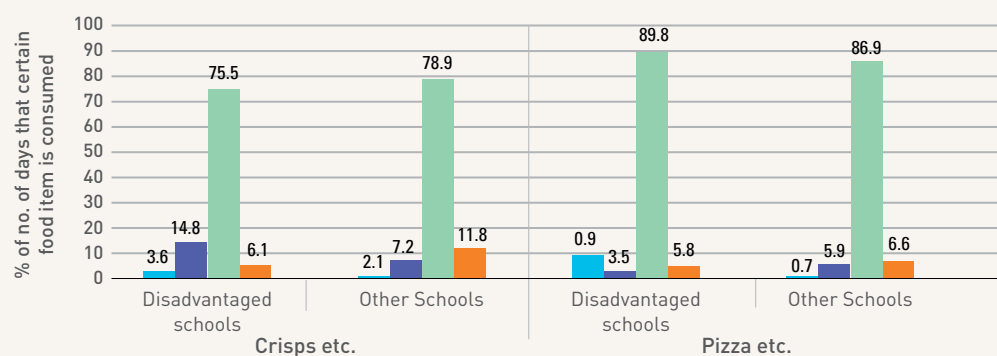
Products such as chocolate were consumed significantly more frequently by children in DEIS schools than children in other schools for both first (panel A; $\chi^2=19.9$, $p=0.0015$) and third (panel B; $\chi^2=12.9$, $p=0.0013$) class. More children from third class DEIS schools consumed products such as biscuits daily while less children consumed these “sometimes or never” than children in other schools (panel B; $\chi^2=15.0$, $p=0.0078$). There was no significant difference between number of times that first class children consumed biscuits and type of school attendance (panel A).

Figure 44 presents how many times per week children consumed foods such as crisps and pizza.

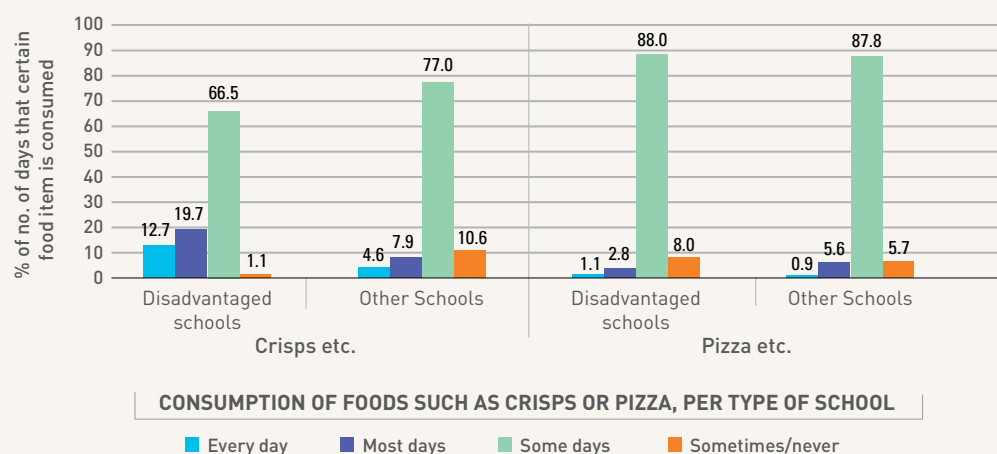
Figure 44

Number of days per week that children consumed foods such as crisps, popcorn or peanuts and foods such as pizza, French fries, fried potatoes, hamburger, sausage or meat pies. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



Crisps, popcorn or peanuts were consumed significantly more frequently by children in DEIS schools than children in other schools for both first (panel A; $\chi^2=11.3$, $p=0.0473$) and third (panel B; $\chi^2=17.7$, $p<0.0001$) class. There was no difference in number of times that children consumed products such as pizza, French fries, fried potatoes, hamburger, sausage or meat pies between the ones who attended DEIS schools and other schools.

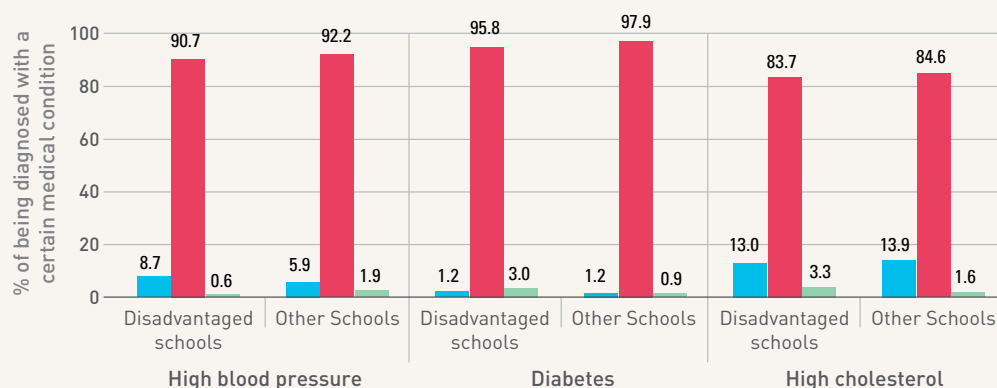
MEDICAL CONDITIONS

Figure 45 represent households with a diagnosis of a medical condition in the previous 12 months.

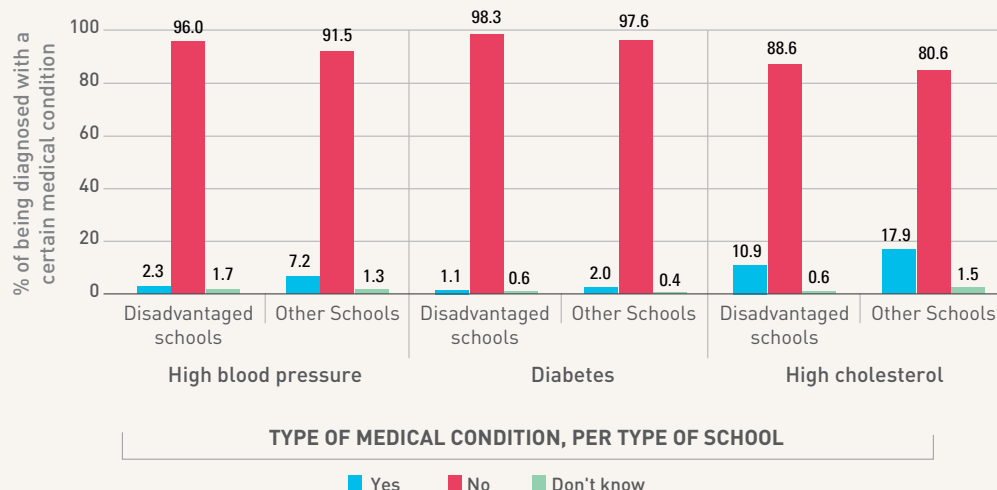
Figure 45

Distribution of diagnosis of a medical condition in the previous 12 months in households. See Appendix 1 for number of missing values for each category.

A: Children from first class DEIS or other schools in 2010 and 2012.



B: Children from third class DEIS or other schools in 2010.



In both groups, few households were diagnosed with a medical condition. No significant differences were observed between certain medical conditions and type of school attendance for both first class (panel A) and third class (panel B) children.

SOCIAL, ECONOMIC AND HOUSING

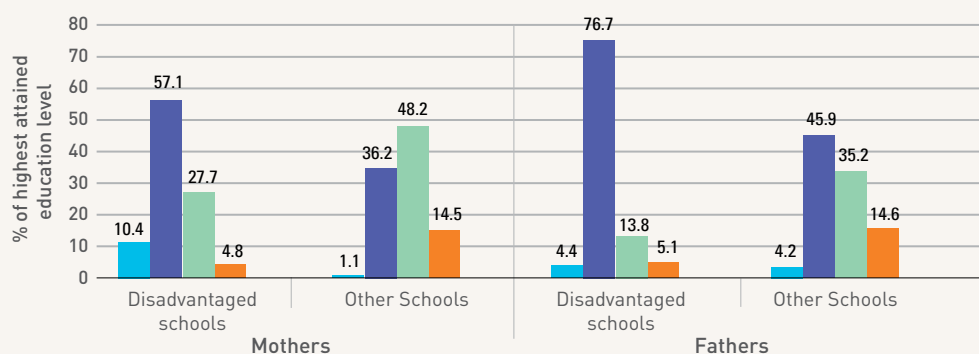
For first class children, the number of adults and children living in a household did not differ between children who attended DEIS schools and other schools. For both type of households, the median number of adults (aged 18 years or older) was two persons (range is 1-7 for children in DEIS schools and 1-10 for children in other schools). The median number of persons aged less than 18 in the households was three persons (range is 1-6 for children in DEIS schools and 1-8 for children in other schools). For third class children on the other hand, a significant difference was observed for both the number of adults ($F=7.53$, $p=0.0070$) and the number of children ($F=11.95$, $p=0.0008$) between households, although the actual differences were very small. For third class children in DEIS schools, the median number of adults was two persons (range: 1-5) and the median number of persons aged less than 18 years was three (range: 1-9). For third class children in other schools, the median number of adults was also two persons (range: 1-8) and the median number of persons aged less than 18 years was three (range: 1-7).

Figure 46 presents the highest education level attained by parents.

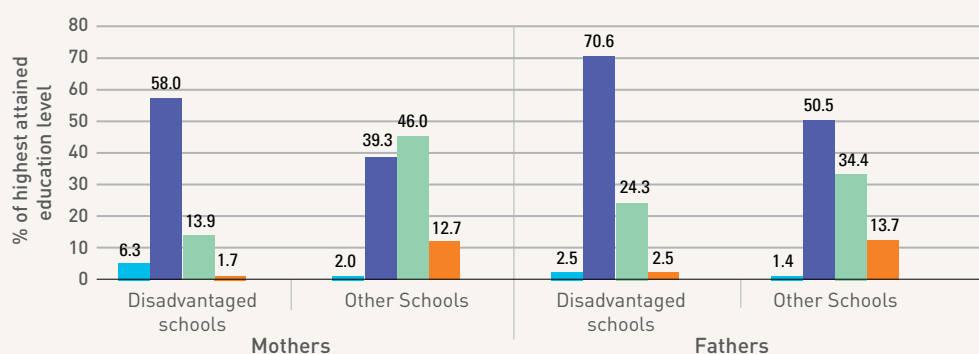
Figure 46

Distribution of highest attained education level by parents.

A: Parents of children from first class DEIS (119 fathers and 135 mothers) or other (1756 fathers and 1834 mothers) schools in 2010 and 2012.



B: Parents of children from third class DEIS (52 fathers and 62 mothers) or other (858 fathers and 893 mothers) schools in 2010.



HIGHEST ATTAINED EDUCATION LEVEL BY PARENTS, PER TYPE OF SCHOOL

■ Primary school ■ Secondary school ■ Postgraduate/BSc ■ MSc or higher

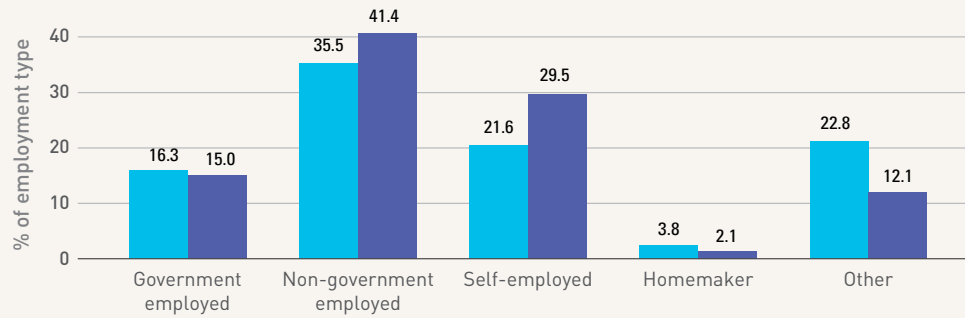
Significantly less parents of children in DEIS schools had attained a bachelor's degree or higher than parents of children in other schools for both children in first ($\chi^2=80.5$, $p<0.0001$ for mothers and $\chi^2=34.2$, $p=0.0012$ for fathers) and third ($\chi^2=13.3$, $p=0.0350$ for mother and $\chi^2=8.3$, $p=0.0319$ for fathers) class.

Figures 47 and 48 present the main type of employment done by the father or the mother, respectively over the previous 12 months.

Figure 47

Distribution of main type of employment done by fathers in previous 12 months.

A: Fathers of children from first class DEIS (n=119) or other (n=1771) schools in 2010 and 2012.



B: Fathers of children from third class DEIS (n=50) or other (n=858) schools in 2010.

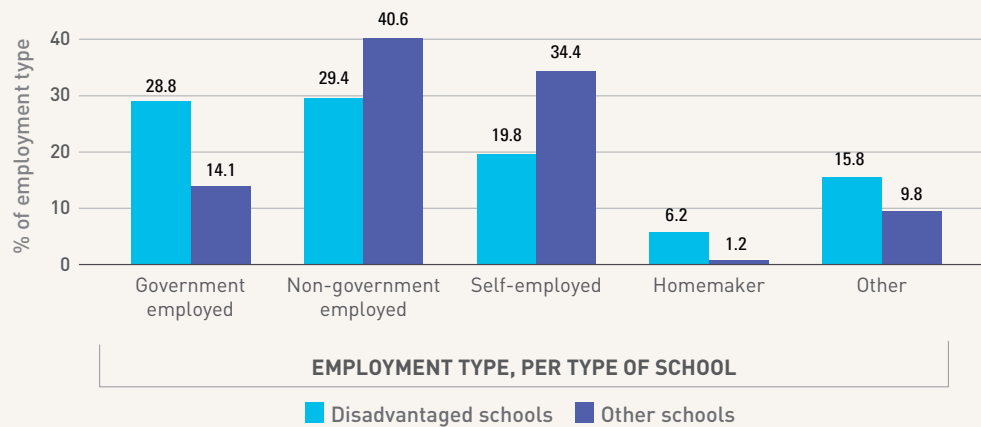
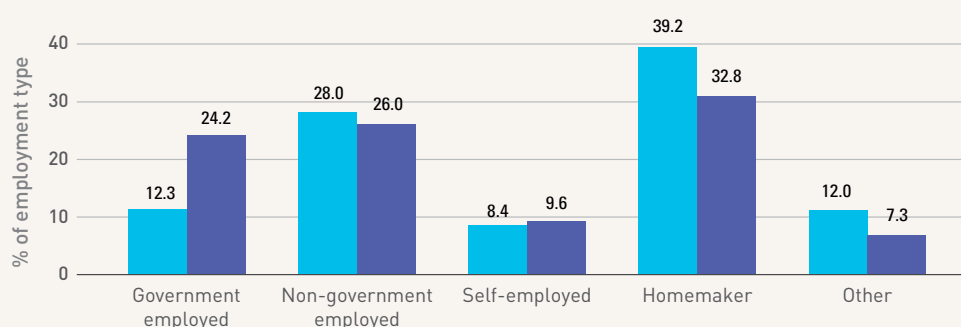


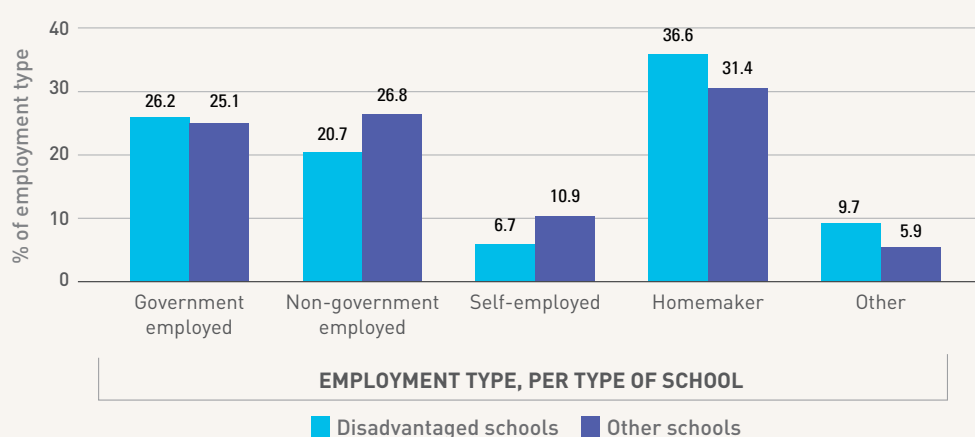
Figure 48

Distribution of main type of employment done by mothers in previous 12 months.

A: Mothers of children from first class DEIS (n=135) or other (n=1854) schools in 2010 and 2012.



B: Mothers of children from third class DEIS (n=60) or other (n=897) schools in 2010.



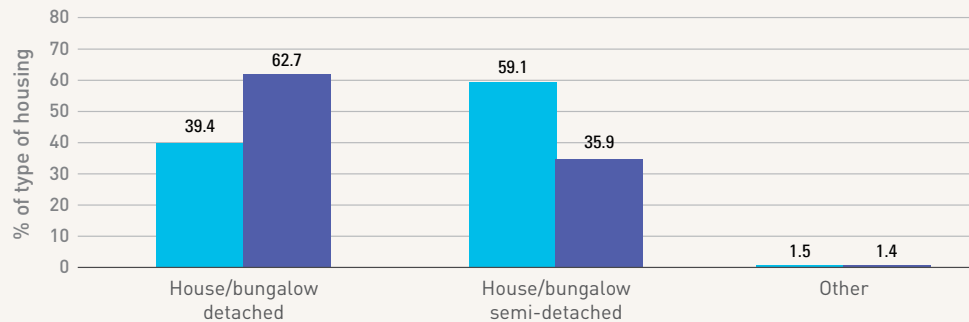
There were no differences between children's type of school attendance and the type of work done by the fathers for both first class (figure 47, panel A) and third class (figure 47, panel B) children. For the type of work done by mothers, a significant difference was observed, with mothers of first class children in DEIS schools working less in government-type jobs than children in other schools (figure 48, panel A; $\chi^2=10.0$, $p=0.0467$). No differences were observed for type of work done by mothers of third class children (figure 48, panel B).

Figure 49 presents the type of housing that the family lived in.

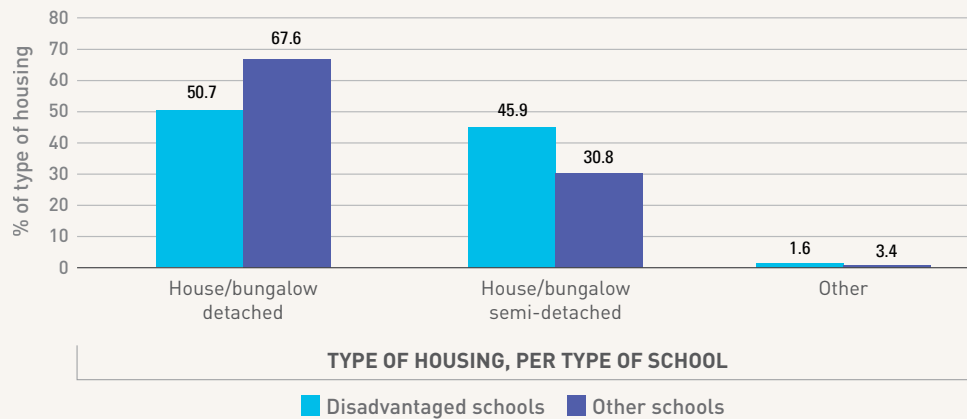
Figure 49

Distribution of type of housing that families lived in.

A: Families of children from first class DEIS (n=135) or other (n=1877) schools in 2010 and 2012



B: Families of children from third class DEIS (n=62) or other (n=906) schools in 2010



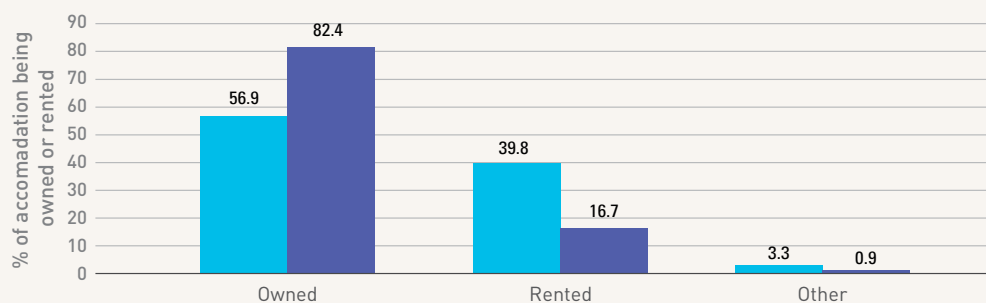
Families of children in DEIS schools were more likely to live in semi-detached houses or bungalows than families of children who attended other schools for both first (panel A; $\chi^2=22.8$, $p=0.0020$) and third (panel B; $\chi^2=6.0$, $p=0.0532$) class.

Figure 50 presents whether the accommodation that the family lived in was either owned or rented by them.

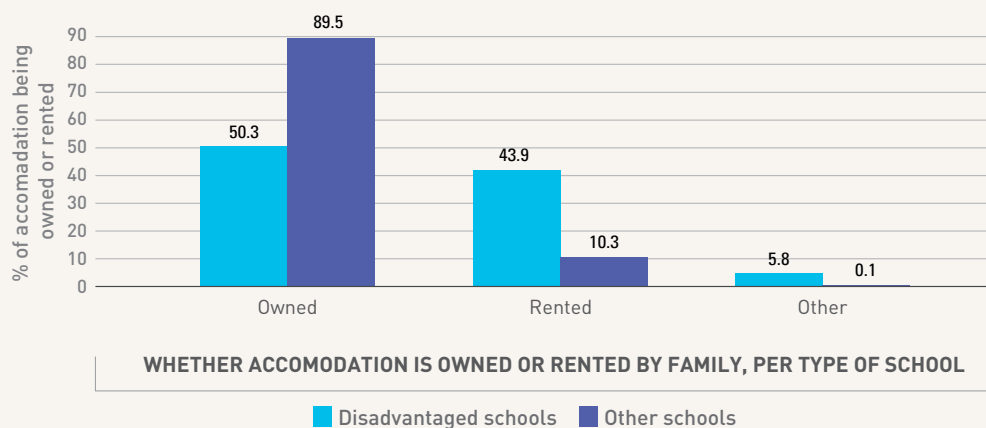
Figure 50

Percentages of accommodation owned or rented by families

A: Families of children from first class DEIS (n=136) or other (n=1877) schools in 2010 and 2012.



B: Families of children from third class DEIS (n=61) or other (n=905) schools in 2010.



Families with children in DEIS schools were more likely to rent their accommodation than families with children in other schools for both first ($\chi^2=42.8$, $p=0.0001$) and third ($\chi^2=83.4$, $p<0.0001$) class.

Conclusion

The possible risk factors contributing to childhood obesity were very similar in both birth cohorts. Some significant differences were observed between children who attended first class in 2010 and 2012. Fewer children spent 2 hours or more per day playing outdoors in 2012 than in 2010 and more children spent time on a computer and for a longer duration in 2012 than in 2010. Moreover, children consumed less sugar-sweetened soft drinks and diet soft drinks in 2012 than in 2010.

Not surprisingly, more significant differences were observed between children who attended DEIS schools and children who attended other schools. Children from first class DEIS schools had a lower birth weight, walked or cycled to school more often, went less often by motorised vehicles and spent less time on homework than children in other schools. Children who attended either first or third class in DEIS schools lived closer to school, were less likely to be a member of a sports club, visited sports clubs less often and spent more time watching television than children in other schools. Children from first class DEIS schools in 2012 played more outdoors, which was not observed for children attending DEIS schools in 2010. These children (2010) spent more time playing games during the week than children in other schools. No such difference was observed for children attending DEIS schools in 2012. First class children in DEIS schools were less likely to have a computer at home and their parents were more likely to consider routes to school to be safe.

Regarding diet, DEIS schoolchildren ate vegetables less frequently and consumed products such as chocolate and crisps more often than children in other schools. Furthermore, first class children in DEIS schools ate breakfast and fish less often than children in other schools. Third class children in DEIS schools consumed fruit less often and full-fat milk and products such as biscuits more often.

The mothers whose first class children attended DEIS schools were less likely to have a government-type of employment than mothers of children in other schools. Moreover, less parents of DEIS schoolchildren attained a bachelor degree or higher than parents of children in other schools. Finally, families with children who attended DEIS schools were less likely to live in detached houses or bungalows and were more likely to rent their accommodation than families with children in other schools.

The following must be borne in mind when interpreting the results on the comparisons carried out between children in DEIS schools and children in other schools. Although there were considerable numbers of DEIS schools included in the study, the numbers for comparison were rather small, especially when looking at third class children. Therefore, caution should be taken in interpreting these results.

To conclude, children became a little less physically active in 2012 than in 2010, while their diet improved slightly over time. A different pattern, however, was observed among children in DEIS schools, with several possible risk factors more pronounced in this group than children who attended other schools.

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Below, a table presents all those who have worked on the several rounds of the WHO COSI study and their specific role(s).

| Role | Name | Institution | Place |
|-------------------------------|---------------------------------------|---|---------------------|
| Principal Investigator | Nazih Eldin (Rounds 2, 3) | Health Promotion Department, Health Service Executive | Navan, County Meath |
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| | Orla McMahon (Round 2) | | |
| | Lisa-Marie Mulhern (Round 3) | | |
| | Michelle O'Brien (Rounds 2, 3) | | |
| | Helena Scully (Round 3) | | |



| Role | Name | Institution | Place |
|-----------------|---|---|--------|
| Data collectors | Rounds 1 and 2: Cathy Cronin | National Nutritional Surveillance Centre, University College Dublin | Dublin |
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| | Round 2: Siobhan Boyle, Lorraine Carrabine, Gillian Dawson, Sinead Duffy, Sinead Duignan, Clare Kelly, Laura Kennedy, Louise Mahony, Elaine McCarthy, Orla McMahon, Amy Mullee, Sinead O'Brien, Tonya O'Neill, Eilis Sutton | | |
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| Role | Name | Institution | Place |
|---|---|--|--------|
| Chairperson steering group committee | Catherine Hayes (Round 1) | Specialist in Public Health Medicine, Health Service Executive | Dublin |
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Appendices

APPENDIX 1: MISSING VALUES FOR EACH OF THE QUESTIONS IN THE FAMILY QUESTIONNAIRE

Table I. Missing values for each question in the Family Questionnaire, stratified by rounds

| | Data collection round | | |
|--|-----------------------|-------------|----------------|
| | Round 2 (2010) | | Round 3 (2012) |
| | 9-year-olds | 7-year-olds | 7-year-olds |
| n | 969 | 1008 | 1012 |
| Missing Values | | | |
| Birth weight | 40 | 34 | 44 |
| Full term* | N/A | N/A | 11 |
| Breastfeeding | 4 | 5 | 16 |
| Yes/no | | | |
| Duration (only for those children who were breastfed) | 4 | 1 | 4 |
| Transportation to school | 0 | 0 | 1 |
| Safe routes | 7 | 8 | 7 |
| Distance home-school | 31 | 28 | 31 |
| Sport club | 6 | 4 | 6 |
| Being a member | | | |
| No of visits/week (only for those children who were a sports member) | 4 | 3 | 6 |
| Sleep | 7 | 11 | 10 |
| Computer at home | 10 | 4 | 6 |
| Playing outdoors | 11 | 6 | 8 |
| Week | | | |
| Weekend | 45 | 32 | 31 |
| Homework | 11 | 3 | 3 |
| Week | | | |
| Weekend | 48 | 41 | 23 |
| Playing computer games | 24 | 16 | 14 |
| Week | | | |
| Weekend | 28 | 33 | 24 |
| Watching TV | 3 | 6 | 8 |
| Week | | | |
| Weekend | 17 | 18 | 17 |
| Breakfast | 1 | 4 | 6 |
| Fresh fruit | 12 | 18 | 25 |
| Vegetables | 14 | 13 | 7 |
| 100% Fruit juice | 15 | 22 | 18 |
| Sugar-sweetened soft drinks | 31 | 23 | 21 |
| Diet soft drinks | 25 | 24 | 20 |
| Low-fat milk | 31 | 28 | 27 |
| Full-fat milk | 13 | 19 | 15 |
| Flavoured milk | 24 | 27 | 21 |
| Cheese | 10 | 13 | 9 |

| | Data collection round | | |
|-------------------------|-----------------------|-------------|----------------|
| | Round 2 (2010) | | Round 3 (2012) |
| | 9-year-olds | 7-year-olds | 7-year-olds |
| n | 969 | 1008 | 1012 |
| Missing Values | | | |
| Other dairy | | 9 | 10 |
| Meat | 4 | 7 | 5 |
| Fish | 5 | 13 | 9 |
| Crisps etc | 5 | 10 | 7 |
| Chocolate etc | 3 | 7 | 6 |
| Biscuits etc | 7 | 12 | 12 |
| Pizza etc | 3 | 6 | 4 |
| Hypertension | 4 | 20 | 17 |
| Diabetes | 4 | 20 | 15 |
| High cholesterol | 4 | 19 | 14 |
| People aged ≥ 18 y | 9 | 22 | 24 |
| People aged < 18 y | 7 | 22 | 23 |
| Education | 14 | 30 | 21 |
| Mother | | | |
| Father | 59 | 72 | 73 |
| Work | 12 | 10 | 21 |
| Mother | | | |
| Father | 61 | 62 | 68 |
| Housing | 1 | 4 | 4 |
| Owned/rented | 3 | 3 | 4 |

*Full term data only available for the 3rd round of data collection in 2012.

Table II. Missing values for each question in the Family Questionnaire for 7-year-olds, stratified by type of school

| | DEIS schools ^a | Other schools |
|--|---------------------------|---------------|
| n | 136 | 1884 |
| Missing values: | | |
| Birth weight | 4 | 74 |
| Full term** | 0 | 11 |
| Breastfeeding | 0 | 21 |
| Yes/no | | |
| Duration (only for those children who were breastfed) | 0 | 5 |
| Transportation to school | 0 | 1 |
| Safe routes | 0 | 15 |
| Distance home-school | 6 | 53 |
| Sport club | 0 | 10 |
| Being a member | | |
| No of visits/week (only for those children who were a sports member) | 2 | 7 |
| Sleep | 2 | 19 |
| Computer at home | 2 | 8 |
| Playing outdoors | 1 | 13 |
| Week | | |
| Weekend | 6 | 57 |
| Homework | 1 | 5 |
| Week | | |
| Weekend | 5 | 59 |
| Playing computer games | 2 | 28 |
| Week | | |
| Weekend | 3 | 54 |
| Watching TV | 3 | 11 |
| Week | | |
| Weekend | 3 | 32 |
| Breakfast | 3 | 7 |
| Fresh fruit | 6 | 37 |
| Vegetables | 1 | 19 |
| 100% Fruit juice | 6 | 34 |
| Sugar-sweetened soft drinks | 5 | 39 |
| Diet soft drinks | 3 | 41 |
| Low-fat milk | 6 | 49 |
| Full-fat milk | 1 | 33 |
| Flavoured milk | 5 | 43 |
| Cheese | 1 | 21 |
| Other dairy | 3 | 16 |
| Meat | 1 | 11 |
| Fish | 1 | 21 |
| Crisps etc | 1 | 16 |
| Chocolate etc | 1 | 12 |
| Biscuits etc | 3 | 21 |
| Pizza etc | 1 | 9 |
| Hypertension | 0 | 37 |
| Diabetes | 0 | 35 |
| High cholesterol | 0 | 33 |
| People aged ≥18 y | 0 | 46 |
| People aged <18 y | 3 | 42 |

| | DEIS schools* | Other schools |
|------------------------|---------------|---------------|
| n | 136 | 1884 |
| Missing values: | | |
| Education | 1 | 50 |
| Mother | | |
| Father | 17 | 128 |
| Work | 1 | 30 |
| Mother | | |
| Father | 17 | 113 |
| Housing | 1 | 7 |
| Owned/rented | 0 | 7 |

*DEIS: Delivering Equality of Opportunity in Schools

**Full term data only available for the 3rd round of data collection in 2012.

Table III. Missing values for each question in the Family Questionnaire for 9-year-olds, stratified by type of school

| | DEIS schools ^a | Other schools |
|--|---------------------------|---------------|
| n | 62 | 907 |
| Missing values: | | |
| Sex | 0 | 0 |
| Birth weight | 6 | 34 |
| Breastfeeding | | |
| Yes/no | 1 | 3 |
| Duration (only for those children who were breastfed) | 1 | 3 |
| Transportation to school | 0 | 0 |
| Safe routes | 0 | 7 |
| Distance home-school | 5 | 26 |
| Sport club | | |
| Being a member | 0 | 6 |
| No of visits/week (only for those children who were a sports member) | 0 | 4 |
| Sleep | 1 | 6 |
| Computer at home | 0 | 10 |
| Playing outdoors | | |
| Week | 0 | 11 |
| Weekend | 4 | 41 |
| Homework | 1 | 10 |
| Week | | |
| Weekend | 4 | 44 |
| Playing computer games | | |
| Week | 1 | 23 |
| Weekend | 1 | 27 |
| Watching TV | 0 | 3 |
| Week | | |
| Weekend | 1 | 16 |
| Breakfast | 0 | 1 |
| Fresh fruit | 0 | 12 |
| Vegetables | 1 | 13 |
| 100% Fruit juice | 1 | 14 |
| Sugar-sweetened soft drinks | 2 | 29 |
| Diet soft drinks | 1 | 24 |
| Low-fat milk | 2 | 29 |
| Full-fat milk | 0 | 13 |
| Flavoured milk | 4 | 20 |
| Cheese | 2 | 8 |
| Other dairy | 0 | 4 |
| Meat | 1 | 4 |
| Fish | 1 | 4 |
| Crisps etc | 1 | 4 |
| Chocolate etc | 0 | 3 |
| Biscuits etc | 3 | 4 |
| Pizza etc | 0 | 3 |
| Hypertension | 0 | 4 |
| Diabetes | 0 | 4 |
| High cholesterol | 0 | 4 |
| People aged ≥18 y | 1 | 8 |
| People aged <18 y | 0 | 7 |

| | DEIS schools* | Other schools |
|------------------------|---------------|---------------|
| n | 62 | 907 |
| Missing values: | | |
| Education | | |
| Mother | 0 | 14 |
| Father | 10 | 49 |
| Work | | |
| Mother | 2 | 10 |
| Father | 12 | 49 |
| Housing | 0 | 1 |
| Owned/rented | 1 | 2 |

*DEIS: Delivering Equality of Opportunity in Schools

APPENDIX 2:

CHARACTERISTICS OF CHILDREN WHO ATTENDED THIRD CLASS DURING THE THIRD ROUND OF DATA COLLECTION IN 2010

Table I. Descriptives of third class children in 2010 (n=969)

| | % | Mean (95% CI) |
|--|------|------------------|
| Descriptives | | |
| Boys | 44.2 | |
| Age (years) | | 9.0 (8.9-9.0) |
| Sleep (minutes) | | 611 (607-615) |
| Birth weight and breastfeeding | | |
| Birth weight (grams) | | 3481 (3415-3546) |
| Ever breastfed | 57.7 | |
| Duration (months) of those children who were breastfed (n=572) | | |
| <1-2 | 38.4 | |
| 3-5 | 25.6 | |
| ≥6 | 36.0 | |
| Medical conditions | | |
| Hypertension | 6.9 | |
| Yes | | |
| No | 91.7 | |
| Don't know | 1.4 | |
| Diabetes | 1.9 | |
| Yes | | |
| No | 97.7 | |
| Don't know | 0.4 | |
| High cholesterol | 17.6 | |
| Yes | | |
| No | 81.0 | |
| Don't know | 1.4 | |

Table II. Physical activity/inactivity patterns of third class children in 2010 (n=969)

| | % | |
|--|-------------|----------------|
| Transportation to school | | |
| Motorised vehicle | 76.7 | |
| Bicycle/walking | 14.8 | |
| Combination bicycle, walking and motorised vehicle | 8.3 | |
| Other | 0.3 | |
| Parents that considered routes to school to be safe | 29.9 | |
| Distance home-school (km) | 25.3 | |
| <1 | | |
| 1-4 | 51.1 | |
| >4 | 23.6 | |
| Being a member of a sport club | 88.4 | |
| No of visits/week of those children who were members of at least one sports club (n=867) | | |
| 1 | 19.4 | |
| 2 | 32.1 | |
| 3 | 25.6 | |
| >3 | 22.9 | |
| Having a computer at home | 95.6 | |
| | Week | Weekend |
| Playing outdoors (hours/day) | | |
| None | 2.1 | 0.5 |
| <1 | 16.9 | 3.2 |
| 1 | 43.5 | 11.1 |
| 2 | 28.9 | 28.6 |
| ≥3 | 8.7 | 56.6 |
| Homework | | |
| None | 0.6 | 18.7 |
| <1 | 20.8 | 36.8 |
| 1 | 49.3 | 30.0 |
| 2 | 27.5 | 8.9 |
| ≥3 | 1.9 | 5.7 |
| Playing computer games | | |
| None | 38.9 | 20.7 |
| <1 | 47.6 | 41.3 |
| 1 | 11.3 | 21.7 |
| 2 | 2.2 | 13.2 |
| ≥3 | 0 | 3.1 |
| Watching TV | | |
| None | 4.4 | 0.3 |
| <1 | 26.9 | 5.3 |
| 1 | 34.4 | 13.3 |
| 2 | 28.0 | 48.6 |
| ≥3 | 6.2 | 32.5 |

Table III Diet of third class children in 2010 (n=969)

| | | % |
|-----------------------------|-----------------|------|
| Breakfast | Every day | 93.1 |
| | Most days | 3.9 |
| | Some days | 2.8 |
| | Never/sometimes | 0.3 |
| Fresh fruit | Every day | 60.3 |
| | Most days | 22.8 |
| | Some days | 14.1 |
| | Never/sometimes | 2.8 |
| Vegetables | Every day | 55.5 |
| | Most days | 27.1 |
| | Some days | 13.6 |
| | Never/sometimes | 3.9 |
| 100% Fruit juice | Every day | 20.1 |
| | Most days | 16.5 |
| | Some days | 42.5 |
| | Never/sometimes | 21.0 |
| Sugar-sweetened soft drinks | Every day | 2.9 |
| | Most days | 7.5 |
| | Some days | 55.2 |
| | Never/sometimes | 34.5 |
| Diet soft drinks | Every day | 0.9 |
| | Most days | 3.1 |
| | Some days | 36.0 |
| | Never/sometimes | 60.0 |
| Low-fat milk | Every day | 24.7 |
| | Most days | 3.7 |
| | Some days | 9.0 |
| | Never/sometimes | 62.6 |
| Full-fat milk | Every day | 57.1 |
| | Most days | 10.6 |
| | Some days | 10.1 |
| | Never/sometimes | 22.2 |
| Flavoured milk | Every day | 1.4 |
| | Most days | 1.3 |
| | Some days | 14.1 |
| | Never/sometimes | 83.2 |
| Cheese | Every day | 15.2 |
| | Most days | 22.1 |
| | Some days | 41.7 |
| | Never/sometimes | 21.0 |
| Other dairy | Every day | 30.4 |
| | Most days | 29.5 |
| | Some days | 33.7 |
| | Never/sometimes | 6.4 |
| Meat | Every day | 39.2 |
| | Most days | 48.6 |
| | Some days | 10.4 |
| | Never/sometimes | 1.8 |

| | | % |
|---------------|-----------------|------|
| Fish | Every day | 0.4 |
| | Most days | 7.4 |
| | Some days | 75.1 |
| | Never/sometimes | 17.1 |
| Crisps etc | Every day | 5.0 |
| | Most days | 8.5 |
| | Some days | 76.4 |
| | Never/sometimes | 10.1 |
| Chocolate etc | Every day | 4.8 |
| | Most days | 16.8 |
| | Some days | 75.1 |
| | Never/sometimes | 3.4 |
| Biscuits etc | Every day | 5.6 |
| | Most days | 22.3 |
| | Some days | 64.4 |
| | Never/sometimes | 7.7 |
| Pizza etc | Every day | 0.9 |
| | Most days | 5.4 |
| | Some days | 87.8 |
| | Never/sometimes | 5.8 |

Table IV. Social and economic factors and housing of third class children in 2010 (n=969)

| | % | | Median (range) |
|--------------------------------|---------|---------|----------------|
| People aged ≥ 18 y | | | 2 (1-8) |
| People aged < 18 y | | | 3 (1-9) |
| Housing | | | |
| House/bungalow - detached | 66.8 | | |
| House/bungalow – semi-detached | 31.5 | | |
| Other | 1.7 | | |
| Owned/rented | | | |
| Owned | 87.7 | | |
| Rented | 11.9 | | |
| Other | 0.4 | | |
| | Mother: | Father: | |
| Education | | | |
| Primary school | 2.2 | 1.4 | |
| Secondary school | 40.2 | 51.4 | |
| Postgraduate/BSc | 45.4 | 34.0 | |
| MSc or higher | 12.2 | 13.2 | |
| Work | | | |
| Government employed | 25.2 | 14.7 | |
| Non-government employed | 26.5 | 40.1 | |
| Self-employed | 10.7 | 33.8 | |
| Homemaker | 31.6 | 1.4 | |
| Other | 6.0 | 10.0 | |

APPENDIX 3:
EXAMPLE OF THE FAMILY QUESTIONNAIRE USED IN THE THIRD ROUND OF
DATA COLLECTION IN 2012

ID nr

THE CHILDHOOD GROWTH STUDY
Family Survey

Please note: In this survey, 'your child' refers to the child who is currently in first class and was asked to take part in the WHO childhood Growth Study. Please give information only for this child when filling in the survey.

1. What is your child's date of birth?

Day/Month /Year

 / /

2. What is the sex of your child?

Boy

☐

Girl

☐

3. How much did your child weigh when they were born?

 g OR lbs

4. Was your child born at full term (in general after 37 weeks of pregnancy)?

☐

Yes

☐

No

☐

Don't know

5. Where do you live?

6. What is the name of your child's school?

7. What is the address of your child's school:

8. In which class is your child now?

9. How does your child usually get to and from school? Please tick one box for "Going to school" and one box for "Coming from school".

Going to school

☐

They usually take the school bus

☐

They usually go by public transport

☐

They are usually brought by car

☐

They usually ride a bicycle

☐

They usually walk

☐

Other (please state):

Coming from school

☐

They usually take the school bus

☐

They usually go by public transport

☐

They are usually brought by car

☐

They usually ride a bicycle

☐

They usually walk

☐

Other (please state):

10. In your opinion, are the routes to and from school safe for your child to walk or ride a bicycle?

☐

Yes

☐

No

11. How far is your child's school from your home?

- ☐ Less than 1 kilometre
 ☐ 1-2 kilometres
 ☐ 3-4 kilometres
 ☐ 5-6 kilometres
☐ More than 6 kilometres

12. Is your child a member of one or more sport or dancing clubs? Examples include. football, soccer, running, hockey, swimming, tennis, basketball, gymnastics, ballet, fitness, ballroom dancing.

- ☐ Yes – if so, please move to the next question
☐ No – if so, please move to question 14

13. How many times in a typical week does your child go to a sport or dancing club?

- ☐ 0 days a week
 ☐ 1 day a week
 ☐ 2 days a week
 ☐ 3 days a week
☐ 4 days a week
 ☐ 5 days a week
 ☐ 6 days a week
 ☐ 7 days a week

14. How much sleep does your child usually get each day?

- hours and minutes

15. In their free time, how much time does your child usually spend playing outside, either at home or somewhere else? Please tick one box for weekdays and one box for the weekend.**Weekdays**

- ☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

Weekend

- ☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

16. How much time, outside school, does your child usually spend doing homework or reading a book, either at home or somewhere else? Please tick one box for weekdays and one box for the weekend.**Weekdays**

- ☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

Weekend

- ☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

17. Do you have a computer at home?

☐ Yes ☐ No

18. How much time does your child usually spend using a computer for playing games (apart from any homework), either at home or somewhere else? Please tick one box for weekdays and one box for the weekend.

☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

19. How much time does your child usually spend watching television (including videos), either at home or somewhere else? Please tick one box for weekdays and one box for the weekend.

Weekdays

☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

Weekend

☐ None at all
☐ Less than 1 hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 or more hours a day

20. Over a usual week, how often does your child have breakfast?

☐ Every day ☐ Most days (4-6 days) ☐ Some days (1-3 days) ☐ Never

21. Over a usual week, how often does your child have the following kinds of foods or drinks? Please tick one box for each line.

| | Every day | Most days (4-6 days) | Some days (1-3 days) | Never |
|------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Fresh fruit | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vegetables (excluding potatoes) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 100% Fruit juice (not concentrate) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Soft drinks containing sugar | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Diet or "light" soft drinks | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | Every day | Most days (4-6 days) | Some days (1-3 days) | Never |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Low fat or semi-skimmed milk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Full-fat milk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Flavoured milk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cheese | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Yoghurt, milk pudding, cream cheese, quark or other dairy products | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Meat | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fish | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Foods such as crisps, popcorn or peanuts | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Foods such as chocolate | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Foods such as biscuits, cake, doughnuts or pie | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Foods like pizza, French fries, fried potatoes hamburger, sausage or meat pies | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

22. Was your child ever breastfed?

- ☐ Yes – if so, please move to the next question
- ☐ No – if so, please move to question 23

23. For how long was your child breastfed in their first year of life?

- | | |
|--|---|
| <input type="checkbox"/> Less than 1 month | <input type="checkbox"/> About 4 months |
| <input type="checkbox"/> About 1 month | <input type="checkbox"/> About 5 months |
| <input type="checkbox"/> About 2 months | <input type="checkbox"/> About 6 months |
| <input type="checkbox"/> About 3 months | <input type="checkbox"/> More than 6 months |

24. During the past 12 months, has a doctor or other health worker told you or anyone else in your household that one of you has high blood pressure (hypertension)?

- ☐ Yes ☐ No ☐ Don't know

25. During the past 12 months, has a doctor or other health worker told you or anyone else in your household that one of you has diabetes?

- ☐ Yes ☐ No ☐ Don't know

26. During the past 12 months, has a doctor or other health worker told you or anyone else in your household that one of you has a high cholesterol level?

☐

Yes

☐

No

☐

Don't know

27. How many people aged 18 years or older live in your household?

28. How many people younger than 18 live in your household?

29. What is the highest level of education that you or your partner or spouse have completed? Please select one answer only for each of you.

Mother☐

Primary school

☐

Secondary school

☐

Undergraduate or Bachelor degree

☐

Masters degree or higher

Father☐

Primary school

☐

Secondary school

☐

Undergraduate or Bachelor degree

☐

Masters degree or higher

30. Which of the following best describes your (or your partner's or spouse's) main work over the last 12 months? Please select one answer only for each of you.

Mother☐

Government employed

☐

Non-government employed

☐

Self-employed

☐

Student

☐

Homemaker

☐

Unemployed, able to work

☐

Unemployed, not able to work

☐

Retired

Father☐

Government employed

☐

Non-government employed

☐

Self-employed

☐

Student

☐

Homemaker

☐

Unemployed, able to work

☐

Unemployed, not able to work

☐

Retired

31. In what type of housing are you currently living?

- ☐ House or bungalow - detached
- ☐ House - semi-detached or terraced
- ☐ Apartment
- ☐ Shared house
- ☐ Shared apartment
- ☐ Other (please state)
-

32. Is this accommodation.....

- ☐ Owned by you
- ☐ Rented by you
- ☐ Other (please state)

Date of completing this form

Day Month Year

/ /

Signed:.....

*****END OF SURVEY*****

THANK YOU VERY MUCH FOR FILLING IN THIS SURVEY.

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