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National Diet and Nutrition Survey 2017 to 2023 report for Northern Ireland

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Abstract

This report presents results from 2017-2023 of the National Diet and Nutrition Survey (NDNS) for Northern Ireland. NDNS is a continuous cross-sectional survey, designed to assess the diet, nutrient intake and nutritional status of the general population aged 18 months and over living in private households in the UK. A representative sample of around 1000 people (500 adults and 500 children) take part in NDNS each year. The Northern Ireland NDNS steering group comprised of the Food Standards Agency in Northern Ireland, Department of Health and Safefood, fund additional recruitment to boost the achieved Northern Ireland sample to 100 adults (aged 19 years and older) and 100 children (aged 18 months to 18 years) each fieldwork year to provide a representative sample of the Northern Ireland population. NDNS in 2017-2023 (fieldwork years 10 to 15) comprised an interview to collect background information, a 4-day estimated diet diary (fieldwork years 10 and 11), 4 online 24-hour dietary recalls (fieldwork years 12 to 15), physical activity questionnaire, physical measurements and a blood and urine sample. Results are used by government to monitor progress toward diet and nutrition objectives of UK Health Departments and to develop policy interventions.

Key findings from the more recent 2019 to 2023 data:

- Consumption of fruit and vegetable portions was below the recommendation in all age and sex groups, with only 4% of children aged 11 to 18 years meeting the 5 a day recommendation.
- Children aged 11 to 18 years were the highest mean consumers of sugary, fizzy drinks and squashes at 167mls/day. Similarly, mean consumption of confectionary was also highest in those aged 11 to 18 years, at 14g/day for boys, and 20g/day for girls.
- The highest mean consumption of chips and other fried foods was also among those aged 11 to 18 years (37g/day for boys and 50g/day for girls). Consumption was lowest for adults aged 65 years and over (16g/day for men and 8g/day for women).

- Boys aged 11 to 18 years were the highest mean consumers of meat products (67g/day), with women aged 65 years and over being the lowest mean consumers (17g/day). With the exception of children aged 4 to 10 years, mean daily consumption was higher for males than females.
- Mean daily intakes of total energy in children aged 18 months to 3 years exceeded the Estimated Average Requirement (EAR) and were close to the EAR for children aged 4 to 10 years. Underreporting may partly explain findings relating to energy intake being below recommendations.
- In all age groups, the recommendations for intake of mean saturated fatty acids and free sugars were exceeded. Similarly, the mean intake of fibre was below government recommendations for all age groups.
- When considering equivalised income, the number of 5 a Day portions of fruits and vegetables increased with increasing income.
- There was an increase in fibre intake seen in men aged 65 years and over with increasing income.
- 88% of children aged 11 to 18 years reported buying food or drink from the out of home sector (for example cafes, pubs, takeaways) in the last 7 days followed by 84% of adults aged 19 to 64 years and 80% of children aged 4 to 10 years.

Lead

The report details the diet, nutrient intake, and nutritional status of the general population in Northern Ireland (2017-2023) via the National Diet and Nutrition Survey (NDNS).

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Contents

1 Background and content

1.1 Background

The National Diet and Nutrition Survey (NDNS) was set up in 2008 as a cross-sectional survey with a continuous programme of fieldwork, designed to assess the diet, nutrient intake and nutritional status of the population aged 18 months and over living in private households in the UK. Fieldwork ran from 2008 to 2023 aside from a suspension during the COVID-19 global pandemic (12 months in Northern Ireland, 7 months in the rest of the UK). The core NDNS is jointly funded by the Department of Health and Social Care (DHSC) and the UK Food Standards Agency (FSA).

FSA in Northern Ireland (FSA in NI) has responsibility for monitoring the diet of the population in Northern Ireland and has co-funded additional recruitment (i.e. boosted sample) in all survey years except in fieldwork year 5 (2012 to 2013) in order to achieve representative data for Northern Ireland. The Northern Ireland boost is co-funded by the Northern Ireland Steering Group which comprises three funding partners: the Department of Health (DoH); Safefood and FSA in NI.

The phase for this report (fieldwork years 10 to 15, 2017 to 2023) was carried out by a consortium comprising the National Centre for Social Research (NatCen) and the MRC Epidemiology Unit at the University of Cambridge (Epidemiology Unit).[1] Fieldwork in Northern Ireland was carried out by the Northern Ireland Statistics and Research Agency (NISRA) and NatCen.

NDNS provides the only source of nationally representative UK data on the types and quantities of foods consumed by individuals, from which estimates of nutrient intake for the population are derived. Analysis of blood and urinary biomarkers provides data on the population's nutritional status. Results are used by government to monitor progress toward diet and nutrition objectives of UK Health Departments and develop

[1] NatCen has led the consortium since the beginning of the cross-sectional survey. The MRC Epidemiology Unit at the University of Cambridge joined the consortium in November 2017 when responsibilities transferred from the former MRC Elsie Widdowson Laboratory.

policy interventions, for example to monitor progress towards achieving a healthy, balanced diet as visually depicted in the Eatwell Guide (The Eatwell Guide - FSA) and in Northern Ireland in relation to strategy marker foods published in the obesity prevention strategy (A Fitter Future for All). NDNS is an important source of evidence underpinning work of the Scientific Advisory Committee on Nutrition (SACN) and its advice to UK governments on nutrition related matters.

The food consumption data is also used by the FSA to assess exposure to chemicals in food, as part of the risk assessment and communication process in response to a food emergency or to inform negotiations on setting regulatory limits for contaminants.

1.2 Content of this report

This report presents an overview of food consumption, nutrient intake and nutritional status for the Northern Ireland population, 2017 to 2023 (fieldwork years 10 to 15). As the survey is organised by fieldwork year, fieldwork years are referred to when describing some aspects of the methodology. Delays in fieldwork due to COVID-19 meant that there was some overlap between fieldwork years 13, 14 and 15.

Chapter 2 provides detail of the methodology and survey design, including the sample design and size. It also describes changes in dietary assessment methodology since the fieldwork years 5 to 9 (2012 to 2017) report (National Diet and Nutrition Survey (NDNS) Report for Northern Ireland - Food Standards Agency).

Chapter 3 provides response rates over the fieldwork period and presents characteristics of participants including body mass index (BMI), ethnicity and food security (Excel tables 3.1 to 3.3).

Chapter 4 presents data on foods consumed, including strategy marker foods, and the percentage of the population meeting the main food-based dietary recommendations (Excel tables 4.1 to 4.4). Commentary in this chapter covers fruit and vegetables, sugary, fizzy drinks and squashes, confectionery, chips and other fried foods, and meat products.

Chapter 5 presents data on nutrient intakes including the percentage of the population meeting dietary recommendations and the contribution of food groups to nutrient intakes (Excel tables 5.1 to 5.38). Commentary in this chapter focuses on energy, saturated fatty acids, free sugars and fibre.

Chapter 6 presents data on urinary iodine (Excel tables 6.1 and 6.2).

Chapter 7 presents food consumption and nutrient intakes by equivalised household income (Excel tables 7.1 to 7.22). Commentary in this chapter focuses on: consumption of fruit and vegetables, sugary, fizzy drinks and squashes, confectionery, chips and other fried foods, and meat products; intakes of energy, free sugars, fibre and sodium.

Chapter 8 focuses on food and drink from the out of home sector (Excel tables 8.1 to 8.7).

Data in this report is based on participants in Northern Ireland from the UK core sample together with the boosted Northern Ireland sample. Results are presented for age groups 18 months to 3 years (sex combined), 4 to 10 years, 11 to 18 years, 19 to 64 years and 65 years and over.

Background information on the survey, including the sample, methodology and statistical analysis methods, can be found in the appendices. Questionnaire data on physical activity for Northern Ireland is provided in appendix V. Additional variables not included in this report are listed in appendix T and will be available via the UK Data Service.

2 Methodology for 2017 to 2023

2.1 Introduction

This chapter provides an overview of the methodology for NDNS 2017 to 2023 (fieldwork years 10 to 15). Data collection was carried out between April 2017 and May 2023. Full details of the methods and fieldwork documents for fieldwork years 12 to 15 are provided in the appendices to the UK report (National Diet and Nutrition Survey 2019 to 2023: report - GOV.UK); full details for fieldwork years 10 to 11 are provided in the appendices to the UK years 9 to 11 report (NDNS: results from years 9 to 11 (2016 to 2017 and 2018 to 2019) - GOV.UK).

NDNS is a cross-sectional survey (that is data collected from participants at a single point in time), designed to be representative of the UK population. NDNS was impacted by the COVID-19 global pandemic, and from March 2020 the survey methodology and protocols had to be adapted in line with government advice and regulations. This included the suspension of fieldwork in Northern Ireland between March 2020 and March 2021. Further detail is provided in section B.1.2 of appendix B.

2.2 Sample design

The Northern Ireland sample was boosted to a target of 100 adults (aged 19 years and older) and 100 young people (aged 18 months to 18 years) per fieldwork year to achieve representative data for Northern Ireland.

For each fieldwork year, the sample was drawn from the ‘small users’ list in the Postcode Address File (PAF). These are the addresses (or delivery points) which receive fewer than 25 articles of mail a day. To be cost effective, the addresses were clustered into Primary Sampling Units (PSUs), small geographical areas based on postcode sectors, randomly selected from across the UK. A list of addresses was randomly selected from each PSU. A reserve sample was drawn at the same time as the main sample, to be issued (in full or in part) if achieved numbers fell short of the target.

Selected addresses were randomly allocated to 1 of 2 address types: 'basic addresses' and 'young person addresses'. Basic addresses made up around one-third of the

issued sample and in these, up to 2 adults and 1 child were selected. 'Young person addresses' made up around two-thirds of the issued sample and in these, up to 2 children (each from a different NDNS age group 18 months to 3 years, 4 to 10 years, 11 to 18 years) and no adults were selected. This design was used to achieve (as far as possible) equal numbers of adults and children in the sample. Further details are provided in appendix B.

2.3 Fieldwork

Information describing the purpose of the survey was posted to all selected addresses. This was followed by an interviewer visiting each address to recruit participants in the eligible age range(s).

At each address, the interviewer recorded the number of households[2]. In cases where there were 2 or more households, the interviewer randomly selected 1 to be invited to take part. From each selected household the interviewer randomly selected individuals ('participants') to take part in the survey. In fieldwork years 10 and 11, this was either 1 adult and 1 child or 1 child only, depending on the address type. From year 12, this was 2 adults and 1 child or up to 2 children from different age groups, again depending on the address type.

The interviewer carried out a Computer Assisted Personal Interview (CAPI) with each participant. In the case of a child aged 10 years and under, the CAPI was carried out with their parent or guardian (defined as a person with legal responsibility for the child). See appendix D.

Participants in fieldwork years 10 and 11 were then asked to complete a 4-day estimated food diary which was placed and then collected and checked by an interviewer (for full details of the food diary data collection and processing protocols

[2] An address can contain more than one household if it is split into 2 or more separate units or if within one address or unit the occupants do not share cooking facilities nor a living room, sitting room or dining area.

see appendix A in NDNS: results from years 9 to 11 (2016 to 2017 and 2018 to 2019) - GOV.UK.

From fieldwork year 12, the food diary was replaced with an online dietary data assessment method and participants were asked to self-complete four 24-hour dietary recalls using Intake24.[3] The first recall was completed on the day of the interview. Participants received the invitation to complete their next dietary recall by text or email 2 to 6 days (randomly allocated) after completion of their previous dietary recall. If a participant did not complete their dietary recall on the requested day they received up to 4 reminders sent over the next 9 days to prompt completion, always requesting completion of the recall for the preceding day. See appendix B for full details of the protocols.

Participants in all fieldwork years were asked to complete a physical activity questionnaire (PAQ) and provide height and weight measurements (measured by a fieldworker if visited in person or self-reported if interviewed remotely). Those aged 4 years and over and visited in person were asked to provide a spot urine sample.

Participants in the core UK sample who completed at least 3 diary days or one of 4 requested dietary recalls were invited to take part in the second stage of the survey. This involved a visit from a biomedical fieldworker to take a blood sample and further physical measurements. Those in the Northern Ireland boost sample were not eligible for a biomedical visit.

In 2019 to 2022 (fieldwork years 12 to 14), a sub-sample of participants aged 4 years and over were additionally invited to take part in a doubly labelled water (DLW) study

[3] Intake24 (UK Locale, System Version 3, 2019, Cambridge University). Intake24 was developed by Newcastle University, originally with funding from Food Standards Scotland and is licenced under the Open Government Licence. The tool is now maintained and developed in collaboration by Cambridge University, Monash University (Australia) and Newcastle University (UK). The version of Intake24 used for NDNS is provided and adapted by the University of Cambridge, based on the original, with technical advisory input from Newcastle University.

for assessment of misreporting by total energy expenditure. See appendix X for full details of the protocols.

2.4 Methodological changes and considerations for interpreting the data

Change in the dietary assessment method and analytical approach

For the first 11 years of NDNS fieldwork (2008 to 2019), dietary assessment was based on a paper diary completed by participants over 4 consecutive days. The design aimed to achieve an appropriate balance of weekdays and weekend days across the sample. Diaries were reviewed by interviewers and foods and portions were retrospectively coded by trained coders. In 2018, the survey moved to an online dietary data collection method with automated coding to enable increased cost efficiency and to provide opportunities for improving data quality and the potential to scale the survey in the future. Following a review and evaluation of online tools, Intake24, a web-based, multiple pass 24-hour recall tool, was selected to replace the paper food diary in NDNS from 2019 (fieldwork year 12). Further details about Intake24 are available in appendix A.

The change from paper diary to online 24-hour recall was accompanied by a move to collecting dietary data on non-consecutive rather than consecutive days. The aim remained to achieve an appropriate balance of weekdays and weekend days across the sample. Collecting dietary data on non-consecutive days provided the opportunity to calculate ‘usual intakes’ which is the accepted method to estimate population habitual nutrient and food intakes. This is a statistical procedure which utilises the whole dataset to eliminate day-to-day variation in individual intakes (within-person random error) (see appendix U). For previous NDNS years (2008 to 2019) which used the paper diary, nutrient and food intakes were calculated using the 'day average’ method (where intakes from each recording day are simply averaged to get a daily intake for each individual). When calculating ‘day average’ nutrient and food intakes, the variance of the usual group intake is inflated by day-to-day variation in individual intake, resulting in inflated estimates of the prevalence of low or high intakes. With the collection of repeated 24-hour recalls on non-consecutive days, it is possible to

eliminate the within-person variability of the data and thereby obtain an estimate of the population usual intake distribution (Souverein and others, 2011). The main effect of shifting to the calculation of 'usual intakes' is to reduce the extremes of the distribution, drawing them closer to the mean. This enables a more appropriate estimation of ‘percentiles’ or ‘proportions above/below a threshold’. The ‘day average’ method is now known to overestimate proportions above or below a threshold.

The ‘usual intake’ method was applied to all nutrients and most foods in the 2019 to 2023 (fieldwork years 12 to 15) data. For less frequently consumed foods, for example oily fish, the 'usual intake' method could not be applied because there was insufficient data to estimate within-person variance. In these cases the ‘day average’ method was used.

The introduction of Intake24 and the move to calculating ‘usual intakes’ has made it possible to include all participants with at least 1 recall in the dietary dataset. Participants who completed only 1 or 2 recalls can be included because day-to-day variation estimates from participants of similar ages with 3 or 4 recalls can be applied. See appendix U. This differs from the protocol in 2008 to 2019 using the paper diary where only participants who completed 3 or 4 diary days were included (a diary with fewer than 3 days was considered incomplete).

A formal evaluation of the dietary method change was carried out using data collected from 2019 to 2023. The evaluation was carried out in 3 stages: the stage 1 report was published in September 2021, the stage 2 report was published in November 2023, and the stage 3 report was published in May 2025. The evaluation found that step changes (that is changes that are different from what the year 1 to 11 trend data would suggest) in intakes of some foods and nutrients were observed at the point when Intake24 replaced the food diary in 2019. Where step changes occurred it was not possible to be confident in the continuation of the time series. Therefore, the time trend for dietary data has not been published in this nor the UK report (National Diet and Nutrition Survey 2019 to 2023: report - GOV.UK).

The evaluation notes that much of the data collection period for 2019 to 2023 coincided with the COVID-19 pandemic and rising inflation. These events have resulted

in changes to the availability and price of food with likely consequences for lifestyle and eating behaviours for many people (Hoenink and others, 2024) (https://foodfoundation.org.uk/publication/broken-plate-2022). The evaluation concluded that while some of the observed differences in intakes of foods and nutrients seen in the evaluation were likely to be attributable to the diet method changes (as they were observed before the pandemic), it cannot be ruled out that some of the changes are real rather than methodological. More years of data are needed and it is too early to say whether or not the step changes seen will come to represent a sustained change in long-term trends.

Change in participant selection within a household

At the time the dietary assessment method was changed to Intake24, the number of adult and child participants per household was increased to improve cost efficiency. In 2008 to 2019 (fieldwork years 1 to 11) 1 adult and 1 child were selected in around one-third of sampled addresses (referred to as 'basic addresses') and 1 child (no adult) in around two-thirds of sampled addresses (referred to as 'young person addresses'). For 2019 to 2023 (fieldwork years 12 to 15) up to 2 adults and 1 child were selected from around one-third of addresses and up to 2 children (each from a different NDNS age group 18 months to 3 years, 4 to 10 years, 11 to 18 years) and no adults were selected from the remaining two-thirds of addresses. Analysis carried out as part of the stage 3 report suggests that the new participant selection model resulted in some clustering of dietary data within a household although the degree of clustering is unlikely to be great enough to reduce confidence in the survey estimates.

Underreporting of energy intake

The misreporting of energy intake (generally underreporting) is a known issue for all dietary surveys and studies (Poslusna and others, 2009). In NDNS the DLW biomarker has been used to measure total energy expenditure in a sub-sample of participants to assess the extent of misreporting. The results of the most recent DLW sub-study, carried out in 2019 to 2022, showed that energy intake was underreported by around 30% on average. There is evidence that there is less underreporting in young children than in older children and adults but other differences between population subgroups are less clear. Previous studies carried out when diet was assessed using the food

diary found very similar levels of underreporting overall. There is no evidence that the move to Intake24 has resulted in a higher level of underreporting although the level remains substantial.

It is not known whether the components of energy intake (that is protein, fat, carbohydrate, alcohol) are misreported equally or differentially, for example whether fat intake may be over or underreported to a higher degree than protein. Energy and nutrient intakes presented in this report have not been adjusted to take account of misreporting. Further details are provided in appendix X.

2.5 Weighting the NDNS data

It is necessary to apply weighting factors to the data collected in NDNS for 2 reasons: to remove any bias in the observed results which may be due to differences in the probability of households and individuals being selected to take part; and to attempt to reduce non-response bias. The survey design meant that adults living in households with more than one other adult, and children in households with one or more other children were less likely to be selected than adults or children in single adult or child households.

In addition, there were a number of stages in the survey where it was possible for participants to drop out. If the people who refuse to participate at a particular stage are systematically different from those who take part, then the sample would be biased.

Weighting factors were used to correct for both these cases. There were 2 stages to the weighting scheme: the first was to generate a set of design weights to correct for the unequal selection probabilities; and the second was to create a set of weights to adjust for non-response.

The sample design includes an adjustment for selecting more addresses in Northern Ireland. All of the addresses in Northern Ireland, and therefore participants, are weighted down as a result. This means that weights were applied to put the 4 countries into their correct population proportions in the UK so that, for example, the

percentage of the NDNS sample in Northern Ireland is the same as the percentage of the UK population that is in Northern Ireland.

Since the UK weights for 2019 to 2023 (fieldwork years 12 to 15) contain all cases who responded to each respective section of NDNS, the Northern Ireland weights are simply the UK weights but for Northern Ireland cases only. Outliers were trimmed, and the weights were rescaled to a mean of 1. These weights were checked against the Northern Ireland mid-year population estimates of age and sex and are indeed still representative of the general population. Weights for Northern Ireland have also been created for years 10 to 11 in a very similar way, rescaled from the previously created weights for years 9 to 11.

Further details about the weighting strategy are provided in appendix BB.

3. Response and socio-demographic characteristics of the NDNS 2017 to 2023 Northern Ireland sample

3.1 Response

Tables 3.1 to 3.3 show household and individual-level response rates for 2017 to 2023 (fieldwork years 10 to 15; combined) and for the individual fieldwork years.

NDNS was impacted by the COVID-19 global pandemic. From March 2020 the survey methodology and protocols had to be adapted in line with government COVID-19 advice and regulations for fieldwork. This included the suspension of data collection in Northern Ireland between March 2020 and March 2021.[4] As a result, cases are unevenly distributed across fieldwork years 12 to 15 and are skewed towards the later years when restrictions were lifted and in-home interviewing could resume. (See appendix B for further detail).

Figures shown in this chapter are based on unweighted data and so represent the actual number of individuals who took part in NDNS.

Household-level response

For 2017 to 2023 (fieldwork years 10 to 15), 4,233 addresses were issued of which 44% were eligible for household selection. Ineligible addresses included vacant or derelict properties and institutions. 'Young person' addresses that were screened out because they did not contain any children in the eligible age range (18 months to 18 years) accounted for 73% of the total ineligible addresses.

Household selection was carried out at 99% of eligible addresses. The individuals in the remaining 1% of addresses refused to participate before the household selection could be carried out (Excel table 3.1).

In total, 46% (845) of selected households were productive, that is at least 1 selected participant completed the stage 1 CAPI questionnaire and at least 3 days of the food

[4] Data collection in England, Scotland and Wales resumed in October 2020.

diary (fieldwork years 10 to 11) or the first dietary recall (fieldwork years 12 to 15). Response declined over the fieldwork years from 52% in 2017 to 2018, 49% in 2018 to 2019, 45% in 2019 to 2020, 46% in 2021 to 2022 to 43% in 2022 to 2023.[5] NDNS, in common with all UK surveys, has experienced a decline in response rates over time and a sharper decline during the COVID-19 pandemic.

Individual-level response

In total, 1,168 individuals (577 adults and 591 children) from 845 households completed the stage 1 CAPI questionnaire. Analyses in this report (including response rates for subsequent stages/components of the survey) are based on these 1,168 individuals. Response results are shown in Excel tables 3.2 and 3.3.

All 358 individuals in fieldwork years 10 to 11 completing the stage 1 CAPI questionnaire, went on to complete at least 3 food diary days.

Of the 810 individuals in fieldwork years 12 to 15 completing the stage 1 CAPI questionnaire, 94% (758) went on to complete at least 1 dietary recall, 77% (620) completed at least 2 dietary recalls, 70% (566) completed at least 3 dietary recalls and 65% (529) completed all 4 dietary recalls. There was some variation between fieldwork years in the percentage of individuals completing the stage 1 CAPI questionnaire who went on to complete at least 1 recall: 91% in 2019 to 2020, 89% in 2021 to 2022 and 95% in 2022 to 2023. The percentage of individuals completing 4 recalls was 75%, 70% and 63%. There was no difference between males and females nor between adults and children in terms of stage 1 questionnaire and dietary recall completion rates.

Overall, 61% of invited participants completed the PAQ with completion rates higher amongst adults than children (86% of invited adults completed the PAQ compared with 38% of invited children).

[5] No data collection was carried out in Northern Ireland in the 2020 to 2021 fieldwork year.

Participants aged 4 years and over who were interviewed in-person were asked to provide a spot urine sample and 79% did so (81% of adults, 76% of children).[6]

3.2 Socio-demographic characteristics of participants

This section describes the socio-demographic and health-related lifestyle characteristics of the NDNS sample for 2017 to 2023 (fieldwork years 10 to 15), using data collected during the CAPI interviews. Data is shown in Excel tables 3.4 to 3.11.

Body Mass Index (BMI) of participants

Interviewer-measured height and weight was sought from participants aged 2 years and over who were interviewed in person. Self-reported height and weight measurements were collected from those who were interviewed by phone. Height and weight measurements were used to calculate body mass index (BMI). BMI is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m^2).

The self-reported height and weight measurements for adults (aged 19 years and over) were adjusted using prediction equations based on Health Survey For England (HSE) data (Health Survey for England predicting height, weight and body mass index from self-reported data - NHS Digital). The adjustment takes into account the tendency of people to underestimate their weight and overestimate their height. In the HSE report, mean BMI from self-reported height and weight was $1.0kg/m^2$ and $1.1kg/m^2$ lower than interviewer-measured mean BMI among men and women, respectively. As the self-reported values have been adjusted, they have been combined with measured values for reporting.

[6] Spot urine collection was suspended for a time due to COVID-19, when face-to-face visits were not possible. No spot urine samples were collected from March 2020 until November 2021.

The child (aged 18 years and under) self-reported height and weight measurements were not adjusted as the HSE adjustment method was developed only for adult data. Interviewer-measured heights and weights for children are reported below.

Adults

Excel table 3.4 shows mean and corresponding BMI status, in adults, by age group and sex, defined according to the World Health Organization (WHO) BMI classification (A healthy lifestyle - WHO recommendations) as shown in table A.

Table A: BMI classification

BMI (kg/m^2)	Description
18.5 to 24.9	Healthy weight
25 to 29.9	Overweight
30 to 34.9	Obesity Class I
35 to 39.9	Obesity Class II
40 or more	Obesity Class III

There was little difference in mean adjusted BMI by sex overall, with men aged 19 years and over having a mean adjusted BMI of 28.6 kg/m^2 and women 28.0 kg/m^2. There were no differences in mean adjusted BMI by sex amongst those aged 19 to 64 years (means of 28.3 kg/m^2 for men, 28.2 kg/m^2 for women) but men in the older age group had a slightly higher mean adjusted BMI: 29.2 for men aged 65 years and older and 27.3 for women in the same age group. A higher percentage of men than women were living with overweight or obesity (76% in men and 64% in women) but the same proportion of men and women were living with obesity (28%). (See Excel table 3.4).

After adjusting for self-reported height and weight measurements, mean BMI figures for adults were higher than HSE 2021 figures based on adjusted self-reported heights

and weights. Among NDNS men, 76% were living with overweight or obesity compared with 69% in HSE 2021. For women, the figures were 64% and 59% respectively.

Children

The data for children aged 18 months to 18 years are reported in Excel table 3.5 for interviewer-measured height and weight. For population monitoring purposes, a child's BMI is classed as overweight or obese where it is on or above the 85th centile or 95th centile respectively, based on the UK90 growth reference data. The population monitoring cut offs for overweight or obesity are lower than the clinical cut offs (91st and 98th centiles for overweight and obesity) used to assess individual children; this is to capture children in the population in the clinical overweight or obesity BMI categories and those who are at high risk of moving into the clinical overweight or clinical obesity categories.

There was little difference in BMI for girls and boys when based on interviewer-measured height and weight. Similar proportions of boys and girls were living with overweight (16% and 18% respectively), living with overweight and obesity combined (40% and 41% respectively); and living with obesity (23% for boys and for girls).

Ethnicity

As presented in Excel table 3.6, 95% of participants in the study were White, 1% Black, 2% Asian, 1% Mixed/Multiple ethnic background and 1% other ethnic background. These figures are similar to the latest Northern Ireland 2021 Census figures (97% White, 1% Black, 1% Asian, 1% Mixed/Multiple ethnic groups and less than 1% Other ethnic groups).

Vegetarian and vegan diets

Participants interviewed in fieldwork years 12 to 14 were asked whether they would describe themselves (or their child) as vegetarian, vegan or neither. One per cent of participants reported that they were vegetarian while less than 0.5% reported following a vegan diet. (See Excel table 3.7).

In 2022 to 2023 (fieldwork year 15), the answer categories were expanded. One per cent of year 15 participants reported that they (or their child) were vegetarian, less than

0.5% vegan, 1% pescatarian, 1% described themselves as mainly vegetarian or vegan (occasionally eating meat) and 1% reported following a religious practice for eating (see Excel table 3.8).

Socio-economic classification

Participants were assigned a National Statistics Socio-economic Classification (NS-SEC) based on the employment of the Household Reference Person (HRP) for their household. NS-SEC is an Office for National Statistics standard classification. Categories are assigned based on a person's occupation, whether employed, self-employed, or supervising other employees. Responses were applied to all individual participants in a household, including children, and are shown in Excel table 3.9.

Equivalised income

The adult completing the household questionnaire was asked to estimate the total household income. This was then used to derive equivalised household income, utilising the McClemens scoring system (McClemens, 1977) which takes into account the number and ages of household members. Responses were applied to all individual participants in a household, including children.

To enable comparisons, incomes are classified into tertiles (thirds). As can be seen in Excel table 3.10, the proportion of participants in each equivalised household income tertile was 42% in the lowest tertile, 36% in the middle tertile and 22% in the highest tertile. A higher proportion of children than adults were in the lowest tertile (48% and 36% respectively) and conversely, a higher proportion of adults than children were in the highest tertile (28% of adults and 16% of children).

Households' food security status

In 2022 to 2023 (fieldwork year 15), the adult who completed the household questionnaire was asked a series of questions about their household's experiences with accessing and consuming adequate food over the last 12 months. These questions were based on a set of questions developed in the US (U.S. Adult Food Security Survey Module - USDA). Those whose response to these questions suggested they may be food insecure were asked further questions relating to the last 30 days. Responses

were used to derive a food security score which was applied to all individual participants in a household, including children. Results are shown in Excel table 3.11.

Most participants lived in households, with high food security (78%). However, 12% lived in marginally secure households, 5% in households with low food security and 5% in households with very low food security. None of the older participants (aged 65 years and over) lived in a very low food secure household. The findings are broadly in line with those reported in the 2021 to 2022 Family Resources Survey (FRS) report (88%, 6%, 3% and 3% respectively) (Family Resources Survey: financial year 2021 to 2022 - GOV.UK). The Food and You survey for Northern Ireland (based on data collected between April 2022 and January 2023) found a lower proportion of individuals living in food secure households than those found in NDNS and FRS (59% of Food and You participants were classified as high food secure and 15% as marginally secure and 26% were classified as food insecure (13% low, 13% very low) (Food and You 2: Northern Ireland Wave 5-6 Key Findings). While these other surveys used the same questions, caution should be taken when comparing results with NDNS due to differences in time periods and how the data was analysed.

4. Foods consumed 2017 to 2023

4.1 Introduction

The results presented in this chapter derive from the Northern Ireland sample for 2017 to 2023 (fieldwork years 10 to 15). Northern Ireland core cases from the UK sample and Northern Ireland boost cases provide an overall Northern Ireland sample of 1,168 individuals aged 18 months and over (see chapter 3).

Due to the change from paper diary to online 24-hour recalls in 2019 (fieldwork year 12) and differences in the analytical approach, it is not appropriate to combine consumption data (see section 2.4, chapter 2). Therefore 2017 to 2019 (fieldwork years 10 to 11) data using the food diary has been presented separately from 2019 to 2023 (fieldwork years 12 to 15) data using Intake24. As the sample size is much smaller in the 2017 to 2019 dataset, results are presented for both sexes combined for all age groups.

Reported consumption data by NDNS food groups is presented in Excel tables 4.1 and 4.2 for 2019 to 2023 (fieldwork years 12 to 15) combined only. For this report, the NDNS food grouping structure has been reviewed and updated to better reflect current public health priorities and monitoring requirements. Further details can be found in appendix R. In these tables, all composite dishes, including homemade dishes and manufactured products, are assigned to a food group based on the main components of the dish. For example, beef lasagne has been assigned to 'Beef products and dishes' and vegetable lasagne has been assigned to 'Vegetable products and dishes'.

Excel tables 4.1a to 4.1c show mean consumption of NDNS food groups for the total survey population (that is including non-consumers, those who did not report consumption from a particular food group in any of their recalls). Excel tables 4.2a to 4.2c show mean consumption of NDNS food groups for consumers only and the percentage of consumers. Consumption figures for these tables have not been calculated using the 'usual intakes' method because it was not possible to apply this method to all food groups. Instead, consumption have been calculated using the 'day average' method (see chapter 2 and appendix U). No commentary is provided on these tables.

Excel tables 4.3a and 4.3b present consumption of the Northern Ireland strategy marker foods for the total survey population (including non-consumers) for 2017 to 2019 combined and for 2019 to 2023 combined. Consumption of sugary, fizzy drinks and squashes, confectionery, chips and other fried foods, and meat products (including sausages, burgers, meat and chicken pies) is based on NDNS food groups[7] [8] [9] [10]. Consumption figures for total fruit and vegetables (not including fruit juice) are based on disaggregated data, that is including only the contribution of relevant ingredients from composite dishes (both homemade dishes and manufactured products), but excluding the other components of those dishes. Commentary below focuses on fruit and vegetable 5 A Day portions, sugary, fizzy drinks and squashes, confectionery, chips and other fried foods, and meat products from the more recent 2019 to 2023 data. The absence of commentary for the other foods does not indicate that there is no public health interest.

For 2017 to 2019, intakes have been calculated using the 'day average' method for all strategy marker foods. For 2019 to 2023, intakes of total fruit and vegetables, and sugary, fizzy drinks and squashes have been calculated using the 'usual intakes' method. It was not possible to use the ‘usual intakes’ method for confectionery, chips and other fried foods, and meat products and so these have been calculated using the 'day average' method. Further details on these methods can be found in chapter 2 and appendix U.

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[7] Sugary, fizzy drinks and squashes – NDNS food group 35 (Soft drinks, not low calorie) All types including squashes and cordials, carbonates. Not 100% fruit juice. Not mineral water. See appendix R.

[8] Confectionery – NDNS food groups 33.1 (sugar confectionery) and 33.3 (chocolate confectionery). See appendix R.

[9] Chips and other fried foods – NDNS food group 27.2 (chips and fried potatoes). See appendix R.

[10] Meat products – NDNS food groups 20 (burgers), 21 (sausages), 22 (meat pies) and 18.2 (coated poultry - not burgers). See appendix R.

Excel tables 4.4a and 4.4b present consumption of fruit and vegetable 5 A Day portions, fruit, fruit juice, vegetables, meat and fish for the total survey population for 2017 to 2019 combined and for 2019 to 2023 combined. Consumption figures in these tables are based on disaggregated data and have been calculated using the 'day average' method for 2017 to 2019 and the 'usual intakes' method for 2019 to 2023 (except for oily fish where this was not possible and so intakes have been calculated using the 'day average' method). Table B summarises the different types of tables in this chapter.

Table B: Summary of the food consumption tables

Consumption for	Population	Survey years	Analytical method	Excel tables
NDNS food groups	Total	2019 to 2023	Day average	4.1a to 4.1c
NDNS food groups	Consumers only	2019 to 2023	Day average	4.2a to 4.2c
Northern Ireland strategy marker foods	Total	2017 to 2019	Day average	4.3a
Northern Ireland strategy marker foods	Total	2019 to 2023	Usual intakes (exceptions apply, see text)	4.3b
Selected foods using disaggregated data	Total	2017 to 2019	Day average	4.4a
Fruit and vegetable portions, total fruit, total vegetables, fruit juice, red and processed meat, white meat, total meat, oily fish, total fish calculated from disaggregated data	Total	2019 to 2023	Usual intakes (except oily fish)	4.4b

Evidence from the DLW sub study (see chapter 2 and appendix X) shows that there continues to be substantial underreporting of energy intake in NDNS. This is common to all dietary surveys. It is likely that there are differences in the extent to which

different foods are underreported but not possible to say which foods are underreported to a greater or lesser extent.

4.2 Fruit and vegetables (5 A Day portions)

The current recommendation is to consume at least 5 portions of a variety of fruit and vegetables per day (5 A Day: what counts? - NHS). For those aged 11 years and over, a portion is 80g to give a minimum target of 400g per day. While children under 11 years are also recommended to eat at least 5 portions of a variety of fruit and vegetables a day, no portion size has been set. The number of portions of fruit and vegetables consumed per day has been calculated from disaggregated data for adults and children aged 11 to 18 years based on the 5 A Day criteria. See appendix A for details.

Excel table 4.4b shows that mean consumption of fruit and vegetable portions for 2019 to 2023 was below the recommendation in all age and sex groups for which this was calculated. Children aged 11 to 18 years consumed on average 2.4 portions per day and 4% met the 5 A Day recommendation. On average, adults aged 19 to 64 years and adults aged 65 years and over consumed 2.7 portions and 2.5 portions per day respectively. Eight per cent of adults in both age groups met the 5 A Day recommendation. Consumption for adults and older adults was lower in 2019 to 2023 than in 2017 to 2019. This is likely to be partly due to the dietary method change but may also reflect a real reduction in fruit and vegetable consumption due to a combination of lack of availability during the COVID-19 pandemic and cost of living pressures during this data collection period. Other data sources suggest that there has been a reduction in fruit and vegetable purchases during this period (Defra Family Food 2023). See chapter 2 and the stage 3 evaluation report.

4.3 Sugary, fizzy drinks and squashes

In 2015 SACN recommended that the consumption of sugar-sweetened beverages should be minimised by both children and adults (SACN 2015). Excel table 4.3b shows that for 2019 to 2023 the highest mean consumption of sugary, fizzy drinks and squashes was in children aged 11 to 18 years (167g per day, equivalent to 167mls per day). The highest consumers in this age group (97.5th percentile) drank 672mls per day.

Children aged 18 months to 3 years and 4 to 10 years consumed on average 26mls per day and 60mls per day respectively. The highest consumers drank 152mls and 318mls per day respectively. In adults mean consumption was 101mls per day for those aged 19 to 64 years (highest consumers 600mls per day) and 23mls per day for those aged 65 years and over (highest consumers 191mls per day).

4.4 Confectionery

Among children, mean consumption of confectionery in 2019 to 2023 was highest in children aged 11 to 18 years (14g per day for boys and 20g per day for girls) (Excel table 4.3b). Adults aged 19 to 64 years consumed on average 12g per day. Consumption for the other age groups ranged from 4g to 8g per day.

4.5 Chips and other fried foods

Excel table 4.3b shows that for 2019 to 2023 the highest mean consumption of chips and other fried foods was in children aged 11 to 18 years (37g per day for boys and 50g per day for girls). Mean consumption was lowest for adults aged 65 years and over (16g per day for men and 8g per day for women).

4.5 Meat products

Mean consumption of meat products (including sausages, burgers, meat and chicken pies) was highest in boys aged 11 to 18 years (67g per day) and lowest in women aged 65 years and over (17g per day) (Excel table 4.3b). With the exception of children aged 4 to 10 years, mean daily consumption was higher for males than females.

5. Nutrient intakes 2017 to 2023

5.1 Introduction

The results presented in this chapter derive from the Northern Ireland sample for 2017 to 2023 (fieldwork years 10 to 15). Northern Ireland core cases from the UK sample and Northern Ireland boost cases provide an overall Northern Ireland sample of 1,168 individuals aged 18 months and over (see chapter 3).

Due to the change from paper diary to online 24-hour recalls in 2019 (fieldwork year 12) and differences in the analytical approach, it is not appropriate to combine intake data (see section 2.4, chapter 2). Therefore 2017 to 2019 (fieldwork years 10 to 11) data using the food diary has been presented separately from 2019 to 2023 (fieldwork years 12 to 15) data using Intake24 where appropriate. As the sample size is much smaller in the 2017 to 2019 dataset, results are presented sex-combined for all age groups.

Intakes of energy and macronutrients are presented in Excel table 5.2 and 5.14 and intakes of micronutrients are presented in table 5.17. Figures in these tables have been calculated using the 'day average' method for 2017 to 2019 and the 'usual intakes' method for 2019 to 2023. The percentage contribution of NDNS food groups to energy and macronutrient intakes are presented in Excel tables 5.3 to 5.13 and micronutrients in Excel tables 5.18 to 5.38 for 2019 to 2023 only. See appendix R for more information about NDNS food groups.

Evidence from the DLW sub study shows that there was substantial underreporting of energy intake in adults and older children. This is common to all dietary surveys and was seen in previous NDNS. It is not possible to say whether the macronutrient components of energy intake are underreported equally or differentially nor the impact on micronutrient intakes. See chapter 2 and appendix X for more detail.

The commentary in this chapter focuses on a selection of nutrients of public health interest (energy, free sugars, saturated fatty acids and fibre) from the more recent 2019 to 2023 data drawing together data from the tables noted above. This includes describing current intakes, comparisons with recommendations and the contribution

of food groups to intake. The absence of commentary for a nutrient does not indicate that there is no public health interest or concern about intakes.

SACN statement on expressing fat and carbohydrate recommendations recommends that the Dietary Reference Value (DRV) for fats and carbohydrates should be expressed as a percentage of energy intake excluding energy from alcohol (ethanol). Macronutrient intakes in this chapter are expressed as a percentage of energy excluding ethanol for comparison with the DRVs. The Excel tables also present intakes as a percentage of total energy.

5.2 Energy

Mean daily intakes of total energy and energy excluding ethanol for 2019 to 2023 are shown in Excel table 5.2b. Mean total energy intakes for children in kilocalories per day (kcals per day) were 1191 for those aged 18 months to 3 years, 1489 for those aged 4 to 10 years and 1884 for boys and 1582 for girls aged 11 to 18 years. Mean energy intakes for adults in kcals per day were 1846 for men and 1460 for women aged 19 to 64 years and 1607 for men and 1405 for women aged 65 years and over.

Mean daily intakes of total energy exceeded the Estimated Average Requirement (EAR) in children aged 18 months to 3 years and were close to the EAR for children aged 4 to 10 years (Government recommendations for energy and nutrients for males and females aged 1 – 18 years and 19+ years – GOV.UK). Mean daily intakes of total energy were below the EAR in the other age. However, it is unlikely that average energy intakes are actually below recommendations and underreporting is likely to contribute to these findings. The DLW sub-study showed evidence of underreporting particularly in adults and children aged 11 years and over. It is likely that there are underreporters and overreporters in all age groups including younger children, with younger children more likely to overreport and older children and adults more likely to underreport. See appendix X).

The per cent contribution of food groups to total energy intake for 2019 to 2023 are shown in Excel table 5.3. The ‘cereals and cereal products’ food group was the largest source of energy for all age groups, contributing on average 41% to energy intake for children aged 18 months to 3 years, 43% to 45% for children aged 4 to 18 years and

39% for adults aged 19 to 65 years and 45% for adults aged 65 years and over. 'Milk and milk products and alternatives' was the second largest contributor to energy intake for children aged 18 months to 3 years (17%) followed by 'meat and meat products' (13%). The 'meat and meat products' food group was the second largest contributor to energy intake for children aged 11 to 18 years and adults aged 19 to 64 years (18%). Children aged 4 to 10 years and adults aged 65 years and over derived a similar proportion of energy from 'milk and milk products and alternatives' and 'meat and meat products' (11% to 15%).

5.3 Saturated fat

Intakes of saturated fat are expressed as a percentage of energy intake excluding alcohol (ethanol) throughout this section. This has been shortened to percentage of energy intake for simplicity.

The government recommendation is that the population average contribution of saturated fat to energy intake should be no more than 10% (Saturated fats and health – GOV.UK). This recommendation applies to all adults. It also applies in full for children from age 5 years; it does not apply before age 2 years.

Mean daily intakes for saturated fatty acids for 2019 to 2023 are shown in Excel table 5.2b. Mean saturated fatty acids intake exceeded the government recommendation in all age groups to which the recommendation applies. In children, mean intake ranged from 12.5% to 13.7% of energy intake. In adults aged 19 to 64 years mean intake of saturated fatty acids as a percentage of energy intake was 12.4%. Adults aged 65 years and over had the highest mean intake of saturated fatty acids (14.4% of energy intake).

Eight per cent of children aged 4 to 10 years (5% of boys and 12% of girls) met the recommendation of saturated fatty acids intake contributing no more than 10% of energy. For children aged 11 to 18 years, 14% met the recommendation. For adults, 18% of those aged 19 to 64 years met the recommendation, while 11% of those aged 65 years and over (6% of men and 14% of women) met the recommendation.

The per cent contribution of food groups to saturated fat intake in 2019 to 2023 are shown in Excel table 5.6. The 'cereals and cereal products' group was the largest

contributor for adults (31% to 32%) and for children aged 4 to 18 years (35% to 36%). Most contributions from the 'cereals and cereal products' were from sandwiches (which also includes spread and fillings), pizza, sweet biscuits and cakes.. 'Milk and milk products and alternatives' made the largest contribution to saturated fat intake for children aged 18 months to 3 years (33%) followed by 'cereals and cereal products' (30%). The 'milk and milk products and alternatives' food group was the second largest contributor to saturated fat intake for children aged 11 to 18 years (28%) and adults aged 65 years and over (20%). Adults aged 19 to 64 years derived a similar proportion of energy from 'milk and milk products and alternatives' and 'meat and meat products' (20% to 21%). Adults aged 65 years and over derived 17% of their saturated fat intake from the 'fats and oils' groups, mainly from butter (15%) compared with 8% to 9% in the other age groups.

5.4 Free sugars

Intakes of free sugars are expressed as a percentage of energy intake excluding alcohol (ethanol) throughout this section. This has been shortened to percentage of energy intake for simplicity.

The government recommendation is that for those aged 1 year and over free sugars should provide a population average of no more than 5% of energy (Carbohydrates and Health – GOV.UK; Feeding young children aged 1 to 5 years – GOV.UK).

Mean daily intakes for free sugars for 2019 to 2023 are shown in Excel table 5.2b. In all age groups, mean intake of free sugars exceeded the government recommendation. Mean intakes were around double the recommendation in children aged 11 to 18 years (10.7% energy intake for boys and 13.0% for girls) and adults aged 19 to 64 years (10.1%). In the 18 months to 3 years, 4 to 10 years and 19 to 64 years age groups mean intakes were 8.0%, 9.2% and 8.1% of energy respectively.

Amongst children, 27% of those aged 18 months to 3 years, 8% of those aged 4 to 10 years and 3% of those aged 11 to 18 years met the recommendation of free sugars intake contributing no more than 5% of energy intake. Twenty-two per cent of adults aged 19 to 64 years and 25%, 30% of adults aged 65 years and over met the recommendation.

The per cent contribution of food groups to free sugars for 2019 to 2023 are shown in Excel table 5.12. For most age groups, the largest contributor was 'cereals and cereal products' providing 29% to 42% of free sugars intake, mainly from cakes, sweet biscuits and breakfast cereals. Children aged 11 to 18 years derived a similar proportion of their free sugar intake from 'cereals and cereal products' (30%) and 'non-alcoholic beverages' (32%) of which fruit juice provide 12% and soft drinks with added sugar provided 19%.

The 'non-alcoholic beverages' food group (i.e. fruit juices, soft drinks, tea, coffee and water) provided 19% of free sugars intake for the 18 months to 3 years age group and 21% for the 4 to 10 years and 19 to 64 years age groups.

The 'sugar, preserves and confectionery' food group contributed 16% to 18% of free sugars intake for the 2 youngest age groups and 24% to 30% for the older children and adult age groups.

5.5 Fibre

The government recommendation (Carbohydrates and Health – GOV.UK) is that the population average intake of fibre[11] for adults should be 30g per day, with proportionally lower recommendations for children from the age of 2 years.[12]

Mean daily intakes for fibre for 2019 to 2023 are shown in Excel tables 5.2b. In all age groups, mean intake of fibre was below the government recommendations. For children aged 18 months to 3 years, 4 to 10 years and 11 to 18 years, mean daily intakes were 11.7g, 13.8g and 14.8g respectively. For adults aged 19 to 64 years and 65 years and over, mean daily intakes were 15.2g and 15.1g respectively.

[11] Fibre is measured by the American Association of Analytical Chemists (AOAC) methods. AOAC fibre includes resistant starch and lignin in the estimation of total fibre in addition to non-starch polysaccharides.
[12] Fibre recommendations: 30g/day for adults; 25g/day for older children aged 11 to 16 years, 20g/day for children aged 5 to 11 years and 15g/day for children aged 2 to 5 years.

Amongst children, 19% aged 18 months to 3 years, 11% aged 4 to 10 years and 2% aged 11 to 18 years met the recommendation for their age group.[13] For adults, 4% met the fibre recommendation (30g).

The per cent contribution of food groups for fibre intake for 2019 to 2023 are shown in Excel table 5.13. 'Cereals and cereal products' were the main source of fibre for all age groups, contributing between 47% and 57% to average daily intakes. 'Vegetables and vegetable products and dishes' was the second major contributor to fibre intakes (17% to 22%). 'Fruit' provided 15% of fibre intakes for children aged 18 months to 3 years, 12% for children aged 4 to 10 years and 5% to 7% for the other age groups.

6. Urinary iodine concentration 2013 to 2023

6.1 Introduction

Insufficient iodine intake is a risk factor for reduced growth and cognitive function in children and may affect thyroid hormone metabolism in adults. Population iodine status is assessed by the measurement of urinary iodine concentration (UIC). The majority of iodine consumed in the diet is excreted in urine and UIC reflects and fluctuates with recent dietary intake. When measured in populations, these fluctuations even out and median UIC can be used to assess population iodine dietary supply and hence provide a population-level indication of iodine status. In NDNS, iodine concentration is measured by inductively-coupled plasma mass spectrometry (ICP-MS) and was introduced into NDNS in 2013 (fieldwork year 6) for those aged 4 years and over. See appendix Q.

[13] The recommendation applies to children from the age of 2 years. For the purposes of reporting the 18 months to 3 years age group, the recommendation has been applied to the whole group, including those under 2 years.

The World Health Organization (WHO) criteria for adequate population iodine status is a median UIC between 100 and 199µg/L and fewer than 20% of the population below 50µg/L. Median UIC less than 100µg/L indicates insufficient population iodine intake.

Descriptive statistics for urinary iodine concentrations for the Northern Ireland sample for 2017 to 2023 (fieldwork years 10 to 15) are presented in Excel table 6.1. Time trend analysis for urinary iodine is presented in Excel table 6.2 for 2013 (the start of urinary iodine assessment) to 2023.

6.2 Urinary iodine concentrations

In 2019 to 2023, median UIC was 161, 108, 105 and 134µg/L in children aged 4 to 10 years, children aged 11 to 18 years, adults aged 19 to 64 years and adults aged 65 years and over, respectively. Median UIC was lower in females than males in all age groups. In particular, girls aged 11 to 18 years had median UIC of 82µg/L compared to 164µg/L in boys. Correspondingly, 63% of girls aged 11 to 18 years had UIC less than 100µg/L, 27% less than 50µg/L and 8% less than 20µg/L. In children aged 4 to 10 years, 27% had UIC less than 100µg/L. In adults aged 19 to 64 years and adults aged 65 years and over, the figures were 48% and 27% less than 100µg/L, respectively. In women of childbearing aged (16 to 49 years) median UIC was 99µg/L, and 52% had a median UIC less than 100µg/L.

Time trend analysis (Excel table 6.2) indicated no significant year-on-year changes in UIC between 2013 and 2023. However, in girls aged 11 to 18 years, median UIC decreased by 5.6% (0.3, 10.7) per year.

7. Equivalised income and foods and nutrients in 2019 to 2023

7.1 Introduction

Equivalised household income[14] analysis has been carried out on some key foods and nutrients and results are presented in Excel worksheets 7.1 to 7.22 for 2019 to 2023 (fieldwork years 12 to 15) combined. Northern Ireland core cases from the UK sample and Northern Ireland boost cases provide an overall Northern Ireland sample of 758 individuals aged 18 months and over in 2019 to 2023 (see chapter 3). The 708 individuals who provided income data are included in this analysis.

For the equivalised income analysis the average change in each variable per £10,000 increase in equivalised household income was estimated (via the slope) from a linear regression model along with the 95% confidence interval. It should be noted that £10,000 was selected as a convenient increment to assess the size of the change in each variable. It should not be interpreted as having any meaning with respect to diet. The slope of the regression line for UK has also been provided along with the 95% confidence interval but no statistical comparison is made with the Northern Ireland slope.

Appendix U provides a full explanation of the analytical approach. Due to differences in the variation of the datapoints or sample size within each of the age and sex groups (see Excel table 7.0), there are instances for some foods and nutrients where larger slopes were not statistically significant whereas smaller slopes were statistically significant. Where there are limited datapoints within an age and sex group (for

[14] Equivalisation is a standard methodology that adjusts household income to account for different demands on resources, by considering the household size and composition. The adult completing the household questionnaire was asked to estimate the total household income, before any deductions for tax etc. This included income from earnings, self-employment, benefits, pensions, and interest from savings.

example oily fish) caution should be taken when interpreting the magnitude of change per £10,000 increase.

The commentary in this chapter describes the findings for some foods and nutrients of public health interest, focusing on the magnitude of change, upward or downward trends where these are considered nutritionally meaningful rather than statistically significant. Statistical significance is indicated by the confidence intervals set out in brackets in the text.

The text in this report does not describe the actual group mean for each income decile. Trends in arithmetic mean are reported as 'change per £10,000' where the dietary data were normally distributed and could be analysed without transformation. Where the dietary data were skewed and needed to be log-transformed before analysis, the trends in geometric mean are reported as 'percentage change per £10,000'. No commentary is provided in those cases where a regression line cannot be fitted (where most of the data is zero, where there is a clear non-linear relationship, where the number of datapoints within an age and sex group was less than 30).

7.2 Distribution of equivalised income data

On inspection, NDNS equivalised income data appears positively skewed, but a log transformation resulted in a negative skew. Therefore, no transformation was applied to the income data prior to the regression analysis. Investigation of high income responses indicated that they did not unduly affect the regression slope. For more information see appendix U.

7.3 Foods

For sugary, fizzy drinks and squashes, confectionery, meat products (including sausages, burgers, meat and chicken pies)[15] [16] [17] [18] there was a high proportion of non-consumers in some or all age and sex groups, and so the percentage of consumers and intakes for consumers only are presented instead of population intakes (Excel table 7.0). This is because the regression analysis of population intakes is highly influenced by zero values which can be misleading.

Fruit and vegetables (5 A Day portions)

5 A Day portions (5 A Day: what counts? - NHS) have been calculated for the following age groups: 11 to 18 years, 19 to 64 years, 65 to 74 years and 75 years and over. Refer to chapter 5 for more details. Excel worksheet 7.10 shows that, for every £10,000 increase in equivalised income, the number of 5 A Day portions consumed increased for all age and sex groups by 0.1 to 0.2 portions per day.

The figures in Excel worksheet 7.11 show that the proportion achieving the 5 A Day recommendation was low regardless of income. For most age and sex groups (where it was possible to estimate income trends), there was little change in the proportion achieving the 5 A Day recommendation with respect to income.

Sugary, fizzy drinks and squashes

Excel worksheet 7.2 shows that, where it was possible to estimate income trends, changes in the percentage consuming sugary, fizzy drinks and squashes were small

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[15] Sugary, fizzy drinks and squashes – NDNS food group 35 (Soft drinks, not low calorie) All types including squashes and cordials, carbonates. Not 100% fruit juice. Not mineral water. See appendix R.
[16] Confectionery – NDNS food groups 33.1 (sugar confectionery) and 33.3 (chocolate confectionery). See appendix R.
[17] Chips and other fried foods – NDNS food group 27.2 (chips and fried potatoes). See appendix R.
[18] Meat products – NDNS food groups 20 (burgers), 21 (sausages), 22 (meat pies) and 18.2 (coated poultry - not burgers). See appendix R.

and in an upward and downward direction across the age and sex groups. The largest change was seen in women aged 19 to 64 years where the percentage consuming sugary, fizzy drinks and squashes decreased by 4 percentage points (CI 1, 7) for every £10,000 increase in equivalised income. There was a downward trend in terms of quantities of sugar-sweetened soft drinks being consumed with increasing income in girls aged 11 to 18 years and women aged 19 to 64 years (Excel worksheet 7.3).

Confectionery

Excel worksheet 7.4 shows there was no consistent pattern across the age and sex groups with respect to income in the percentage consuming confectionery and most changes were small. For every £10,000 increase in equivalised income there was a 6 percentage point (CI 6, 7) increase in the percentage of consumers of confectionery for adults aged 65 years and over. For most age and sex groups, there was a decrease in the intake for consumers of confectionery with increasing income (Excel worksheet 7.5). For girls aged 11 to 18 years, average consumption decreased by 21% (10, 31) for every £10,000 increase in equivalised income.

Chips and other fried foods

There was no consistent pattern across the age and sex groups with respect to income in the percentage consuming chips and other fried foods and most changes were small (Excel worksheet 7.6). For every £10,000 increase in equivalised income there was an 8 percentage point (CI -1, 17) increase in the percentage of consumers of chips and other fried foods for men aged 65 years and over. For children aged 18 months to 3 years and girls aged 11 to 18 years there was a 5 percentage point decrease (CI -3, 12 and -2, 13 respectively) in the percentage of consumers of chips and other fried foods for every £10,000 increase in equivalised income.

For children aged 18 months to 3 years, 4 to 10 years and girls aged 11 to 18 years who consumed chips and other fried food, intake decreased by 8% to 10% for every £10,000 increase in equivalised income (Excel worksheet 7.7).

Meat products

Excel worksheet 7.8 shows there were small changes across the age and sex groups in in the percentage consuming meat products (including sausages, burgers, meat and chicken pies) with respect to income and no consistent pattern.

For boys aged 4 to 10 years and women aged 19 to 64 years who consumed meat products, there was a decrease in intake of 12% (CI 2, 21) and 10% (CI 2, 17) respectively for every £10,000 increase in equivalised income. For boys aged 11 to 18 years who consumed meat products, there was an increase in intake of 10% (CI -6, 28) for every £10,000 increase in equivalised income.

7.4 Nutrients

Energy

Excel worksheet 7.15 shows that for children, total energy intake decreased with increasing household income while, for adults, total energy intake increased with increasing household income. Changes in both directions were small with the largest seen in men aged 65 years and over where total energy intake increased by 88kcal per day (CI -32, 208) for every £10,000 increase in equivalised income.

Free sugars

The figures in Excel worksheet 7.20 show mean free sugars intake exceeded the recommendation of no more than 5% of energy excluding alcohol across the range of equivalised income for the youngest and oldest age groups, as indicated by the regression line. For adults aged 65 years and over, free sugars intake as a percentage of energy increased, on average, with increasing income, particularly for women whose intake went up by 0.5 percentage points (CI 0.1, 1.0) for every £10,000 increase in equivalised income. For those aged 4 to 10 years, 11 to 18 years and 19 to 64 years, free sugars intake decreased by 0.4 percentage points (CI 0.1, 0.7), 0.6 percentage points (CI 0.2, 1.0) and 0.6 percentage points (CI 0.3, 0.9) respectively for every £10,000 increase in equivalised income. For these age groups, the regression line indicated that those in households with the highest equivalised incomes would be more likely to meet the recommended intakes.

Fibre

The figures in Excel worksheet 7.18 show that for boys and girls aged 11 to 18 years and all adult age and sex groups, the majority of fibre intakes were below recommendations.[19] For children aged 18 months to 3 years, girls aged 11 to 18 years, adults aged 19 to 64 years and adults aged 65 years and over, fibre intake increased, on average, with increasing income. The largest increase in fibre intake was 1.0g per day (CI -0.7, 2.7) for every £10,000 increase in equivalised income seen in men aged 65 years and over. The regression line indicated that men in this age group in higher equivalised income households would be more likely to meet the recommended intake.

Sodium

Excel worksheet 7.19 shows that for both children and adults, changes in sodium intake with increasing household income were small and not in a consistent direction. For men aged 65 years and over, sodium intake increased, on average, by 78mg per day (CI -68, 224) for every £10,000 increase in equivalised income. Intakes are based on estimated sodium content of foods consumed. They do not include sodium from salt added by participants during cooking or at the table.

[19] Fibre recommendations: 30g/day for adults; 25g/day for older children aged 11 to 16 years, 20g/day for children aged 5 to 11 years and 15g/day for children aged 2 to 5 years.

8. Food and drink from the out of home sector

8.1 Introduction

Data on purchases and consumption of food and drinks from the out of home sector was collected in the stage 1 CAPI questionnaire and in Intake24 in 2019 to 2023 and is presented in Excel tables 8.1 to 8.7. Out of home sector refers to any outlet where food or drink is prepared in a way that means it is ready for immediate consumption, on or off the premises (for example café, pub, takeaway).

8.2 Data collected from CAPI

As part of the stage 1 CAPI questionnaire, participants were asked how often they purchased food and drink from the out of home sector. Participants were shown a list of places where they might buy food or drink to eat on the premises, elsewhere, or on the go, and asked if they had purchased food or drinks from such places in the last 7 days. As shown in Excel table 8.1, 78% of participants reported buying food or drink from the out of home sector in the last 7 days. Participants were more likely to purchase lunch or an evening meal (both 41%) than breakfast (18%) from out of home sources. Forty-six per cent reported buying a drink, and 43% reported buying snacks. Purchases were most often made 1 to 2 times a week with 6% or less reporting buying food or drink every day in the last 7 days. Eighty-eight per cent of children aged 11 to 18 years reported buying food or drink from the out of home sector in the last 7 days followed by 84% of adults aged 19 to 64 years and 80% of children aged 4 to 10 years.

Participants aged 16 years and over and in full or part-time employment were asked what they usually did about meals when they were at work. Of those aged 19 to 64 years, 54% said they brought food from home and 27% reported eating food from a work canteen or café or shop (Excel table 8.2). Numbers of participants aged 16 to 18 years and 65 years and over in full or part-time employment were too small to comment.

Participants aged 18 years and under and in full-time education were asked what they usually did for lunch on a school or college day. For those aged 4 to 10 years, 56% reported having a cooked school lunch while 41% reported bringing a packed lunch

from home (Excel table 8.3a). For children aged 11 to 18 years, 44% reported having a cooked school lunch while 42% reported bringing a packed lunch from home, 7% reported having a cold school lunch and 4% bought lunch from a shop or cafe.

Ninety-two per cent of children aged 4 to 10 years reported having no provision at school to buy drinks or snacks (separately from meals) (Excel table 8.3b). For children aged 11 to 18 years where some provision at school is more common, 49% reported buying drinks or snacks.

Twenty-two per cent of children aged 4 to 10 years and 26% of children aged 11 to 18 years reported having some sort of free or subsidised food or drink at school (Excel table 8.3c). Four per cent of children aged 4 to 10 years and 10% of children aged 11 to 18 years reported having a free school lunch.

8.3 Data collected from Intake24

For each eating occasion (meal, snack or drink) recorded in Intake24, participants were asked to record where they had bought or obtained most of the food and/or drink for that occasion (Excel table 8.4). Almost all participants (99%) recorded at least 1 eating occasion where most of the food had been purchased as part of the household shopping. Around half of participants (55%) recorded at least 1 eating occasion where the food had come from the out of home sector, including 26% reporting an eating occasion with food from a fast food or take-away outlet and 19% from a café, coffee shop, sandwich bar. Eighteen per cent reported buying food from a supermarket, local shop or petrol station that they consumed “on the go”.

Those aged 4 to 10 years, 11 to 18 years and 19 to 64 years were most likely to report at least 1 occasion where the food had come from the out of home sector (53%, 72% and 60% respectively). Those in the youngest and oldest age groups were least likely to report at least 1 occasion where the food had come from the out of home sector (40% of those aged 18 months to 3 years and 35% of those aged 65 years and over).

Excel table 8.5 presents the same data as a percentage of eating occasions for each age group. Food that had been mostly purchased from the out of home sector (including food delivery services and takeaways) accounted for 12% of all eating

occasions overall, 14% for the 19 to 64 years age group and 15% for the 11 to 18 years age group.

Overall, food and drink consumed at out of home eating occasions contributed 15% of total energy intake (Excel table 8.6). This increased to 27% when only those participants who reported consumption from the out of home sector were included (Excel table 8.7). Similar proportions were seen for other nutrients including saturated fat, free sugars and sodium. Food and drink from the out of home sector contributed most to the energy and nutrient intakes of those aged 19 to 64 years. When looking at out of home consumers only 29% of average energy intake came from food and drink from the out of home sector for this age group.

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Appendices

The report's appendices can be found at NDNS 2017 to 2023 report for Northern Ireland appendices. All the appendices are listed below.

- Appendix A: dietary data collection and processing
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