Scottish Maternal and Infant Nutrition Survey 2017:

Technical Report

Healthier Scotland
Scottish Government

Contents

1 Introduction

1.1 Overview

This report provides technical information for the 2017 Scottish Maternal and Infant Nutrition Survey (MINS).

This new survey was commissioned by the Children and Families Directorate of the Scottish Government to help support the implementation of the Maternal and Infant Nutrition Framework for Action (2011).[1] The Principal Investigator for the study was Linda Wolfson, Professional Advisor and National Maternal & Infant Nutrition Co-ordinator for the Scottish Government.

The overall aim of the survey was to gather data on maternal nutrition, breastfeeding, infant feeding and related health behaviours. This information will be used to inform future Scottish Government policy and to assist health services and other organisations to design and implement effective nutritional support for families.

The decision to carry out this survey was made in response to the cancellation of the previously well established UK-wide Infant Feeding Survey.[2] The cancellation of the UK survey provided the Scottish Government with an opportunity to design a bespoke survey more closely aligned with the MIN Framework[1] and related maternity and neonatal policies.

The results of the MINS were published by the Scottish Government in February 2018.[3]

1.2 Approval / permissions

The use of NHSScotland / National Records of Scotland (NRS) originated personal information for surveys such as this one is considered by the Public Benefit and Privacy Panel for Health and Social Care (PB&PP). This group approves the use of NHSScotland / NRS originated data when it deems that there is public benefit in doing so.* Permission to conduct the survey was granted by the PB&PP in February 2017.

The survey also received NHSScotland Ethical approval (December 2016) and NHSScotland Research & Development approval (March 2017).

* More information about PB&PP can be found at www.informationgovernance.scot.nhs.uk

1.3 Supporting organisations

The Scottish Government commissioned a number of organisations to support the survey:

- **ISD:** The Information Services Division (ISD) of NHS National Services Scotland was commissioned to oversee the day to day running of the project and to provide methodological advice and analytical expertise. ISD were responsible for obtaining the necessary permissions to carry out the survey. ISD also carried out all analyses, wrote the survey reports and produced the associated data tables.
- **NRS:** National Records of Scotland (NRS) drew the sample for the postnatal survey cohorts, undertook death checks, and mailed survey packs to selected participants. NRS also provided logistical / methodological advice in relation to this work.
- **ScotCen:** ScotCen Social Research (a division of the National Centre for Social Research (NatCen)) was appointed to prepare the survey materials and to support the survey data collection. ScotCen undertook testing of all three questionnaires, prepared the survey materials and carried out the fieldwork for the survey.

An Implementation Group was also established to provide subject matter expertise and advice (please see Appendix A for membership of this group).

Staff within NHSScotland Maternity Services / Health Visiting Teams assisted by encouraging women to take part in the survey and by distributing survey packs to the antenatal women who participated in the study (please see section 4.3. for further details).

2 Survey Design

2.1 Survey cohorts

Three separate cohorts of women were invited to self-complete a questionnaire between March and July 2017:

- **Antenatal:** Expectant mothers who were 20+ weeks pregnant.
- **8-12 week:** Mothers whose babies were 8-12 weeks old.
- **8-12 month:** Mothers whose babies were 8-12 months old.

A separate questionnaire was designed for each cohort, each focussing on maternal nutrition, breastfeeding, infant feeding and related health behaviours as appropriate to the relevant stage of pregnancy / motherhood.

Participation in the survey was entirely optional and respondents had the opportunity to complete the questionnaire either on paper or online. The timing of the fieldwork for each cohort was carefully planned to avoid the same women being asked to complete more than one questionnaire.

2.2 Development of survey materials

The survey materials used by the 2010 UK-wide Infant Feeding Survey[2] provided a starting point for the content of the MINS questionnaires. While many of the questions in the MINS are similar to those used in the earlier UK survey, the MINS questionnaires were specifically tailored and designed to align with the MIN Framework[1] and to ensure relevance to current maternal and infant nutrition policy in Scotland.

- One of the key developments in the MINS was the introduction of an antenatal questionnaire. The antenatal questionnaire was designed to capture information on the extent to which women make suitable nutritional and health adjustments before and during pregnancy. This questionnaire focussed on pregnancy planning actions, the intake of folic acid and other dietary supplements, alcohol consumption, weight, and diet. Questions about awareness of the Healthy Start Scheme and how Healthy Start vouchers were being used were also included.
- The 8-12 week questionnaire asked mothers about the birth of their baby, pre-birth feeding intentions, feeding and care practices adopted in the early weeks, breastfeeding challenges, support for these challenges, and reasons for stopping breastfeeding. This questionnaire also asked about the use of formula milk including infant formula preparation and methods used for cleaning and sterilising formula feeding equipment.
- The 8-12 month questionnaire focussed mainly on the introduction of complementary foods to infants. This questionnaire also asked about breastfeeding, breastfeeding in public, the use of formula milks and about the Healthy Start Scheme and the Sure Start Maternity Grant.

At the questionnaire drafting stage, the Scottish Government engaged with a wide range of interested parties to gather views on the content of the survey. In addition to the expert opinions provided by the members of the MINS Implementation Group, valuable contributions were received from the Heads of Midwifery, Health Visiting Leads, Government policy teams, the office of the Chief Medical Officer, the Scottish Infant Feeding Advisors Network, NHS Health Scotland, and the UNICEF UK Baby Friendly Initiative.

2.3 Testing of survey materials

As noted above, ScotCen was commissioned by the Scottish Government to test and prepare the survey materials.

Women from a number of antenatal / mother and baby groups in Scotland were asked to participate in this testing. Pregnant women and mothers with babies in the target age range were interviewed to test understanding of the questions. All testing was conducted in January 2017.

As many of the survey questions were very similar to those used in the previous UK-wide survey[2] or had been tested in other studies,[4] the interviews focussed on new or potentially ambiguous questions that may have been open to interpretation.

Mothers who participated in the interviews included both those who breastfed and those who formula fed their babies.

Table T1: Number of interviews completed and number of questions tested.

Questionnaire	Interviews completed	Questions tested
Antenatal	11	6
8-12 week	8	11
8-12 month	11	12

Findings from the interviews were reviewed by ScotCen and the Implementation Group and, where necessary, question wording was adjusted prior to final survey materials being printed.

2.4 Respondent burden

The estimated completion time for each questionnaire was as follows:

- Antenatal: 10-15 minutes (45 questions).
- 8-12 week: 15-20 minutes (62 questions).
- 8-12 month: 15-20 minutes (54 questions).

Full copies of the final questionnaires have been published alongside this report.

3 Sample Design

3.1 Sampling aim

For each survey cohort, the aim was to achieve a sufficiently robust sample to allow results to be presented at a national level and, where possible, to present results broken down by:

- Respondent age: 19 or under, 20-24, 25-29, 30-34 and 35 or over.
- Deprivation: The Scottish Index of Multiple Deprivation (SIMD) can be used to identify areas with higher or lower levels of deprivation. Respondents' postcodes were used to allocate responses to one of five deprivation groups (SIMD 1 = most deprived; SIMD 5 = least deprived). Note that the SIMD identifies deprived areas, not deprived individuals.
- NHS board of residence: There are 14 NHS board areas in Scotland. Due to the small number of respondents living in NHS Orkney, NHS Shetland and NHS Western Isles (< 30 respondents per board), results for these boards were combined.

3.2 Sampling approach

For each cohort, minimum target sample sizes were calculated based on the anticipated number of maternities / births likely to occur within a two month period within each NHSScotland board of residence. These calculations were based on a 95% confidence level, with a margin of error of 5% on either side. To allow for maximum variability in responses (i.e. the proportion of respondents answering a question in a particular way), the expected proportion was assumed to be 50%.

The formula for calculating the minimum target sample (M) is:

$M = B/(1+(B-1)/N)$.

Where:

- N = number of maternities / births within each NHS board of residence
- $B = z^2p(1-p)/c^2$
- p = expected proportion (assumes 50% to allow for maximum variability)
- z = 1.96 for a 95% confidence level
- c = margin of error (+/-5 percentage points)

The target sample size for each cohort was as follows:

- Antenatal: 3,800
- 8-12 week: 2,700
- 8-12 month 2,700

The reliability of a survey's results depends not only on the number of people invited to participate, but also on the number who actually respond. To assist in estimating the number of survey invitations required to obtain the above target sample sizes, response rates from the 2010 UK-wide Infant Feeding Survey and the 2015 Scottish Maternity Care Survey were used.[2, 5]

After taking likely response rates into account, it was agreed that a census approach should be taken rather than a sample approach. This means that all eligible women within each two month time period were invited to participate, rather than just a sample of those women.

While obtaining the target sample sizes would more than allow for analysis of results at a national level (95% confidence level, +/-5%), it was recognised from the outset that the margin of error may be wider for some age groups, SIMD quintiles and NHS boards of residence if response rates varied across these groups.

3.3 Sampling frame

Antenatal cohort

There was no available sampling frame for the antenatal survey as there is no central list of all women who are pregnant at any given time in Scotland. This being the case, it was agreed that all women who were 20+ weeks pregnant between 1st May and 30th June 2017 were eligible for inclusion in the antenatal survey.

8-12 week cohort

For the 8-12 week cohort, National Records of Scotland (NRS) Birth Registration Records were used as the sampling frame. All women who gave birth in Scotland between 1st March and 30th April 2017 were eligible, including those under the age of 16.

Women who were known to be deceased, or whose infant was known to be deceased were excluded. Women whose registered address was not in Scotland were also excluded.

8-12 month cohort

NRS Birth Registration Records were also used as the sampling frame for the 8-12 month cohort. All women who gave birth in Scotland between 1st July and 31st August 2016 were eligible, including those under the age of 16.

As with the 8-12 week survey, women who were known to be deceased, or whose infant was known to be deceased were excluded. Women whose registered address was not in Scotland were also excluded.

4 Fieldwork

4.1 Survey helpline

Throughout the fieldwork period ScotCen provided a free helpline service for women who had been invited to participate in the survey. The helpline gave women the opportunity to ask questions, raise concerns, opt out of the survey or complete the survey by telephone / in an alternative language if required (e.g. where a woman's first language was not English). The helpline could also signpost women to other sources of information / support where appropriate.

The helpline could be contacted by telephone or email.

4.2 Preparation of survey packs

ScotCen was also responsible for preparing and printing all survey materials. Each survey pack consisted of:

- A covering letter inviting the recipient to participate and explaining the purpose of the survey. This letter also provided a web address and access code for respondents who wished to complete the survey online.
- A list of anticipated frequently asked questions / answers (FAQ), including information about how to contact the survey helpline.
- A paper questionnaire, for women who wished to complete the survey on paper.
- A prepaid return envelope for the paper questionnaire.

For the antenatal survey, NRS Birth Registration Records for previous years were used to estimate the number of women who would be 20 or more weeks pregnant between May and June 2017. The appropriate number of survey packs were printed and distributed to all Maternity Services across NHSScotland at the end of April / beginning of May 2017.

For the two postnatal cohorts, NRS drew the sample and notified ScotCen of the number of survey packs required. ScotCen delivered the survey packs to NRS where packs were addressed and mailed out to mothers. This approach avoided the need to release names and addresses, collected by NRS as part of the birth registration process, to a third party.

A unique identifier was printed on each covering letter and questionnaire; NRS recorded the identifier associated with each survey pack against the mother that it was sent to. This allowed NRS to track all questionnaires returned to the ScotCen and target reminder mailings as appropriate (see sections 4.4 and 4.5 below).

4.3 Antenatal cohort

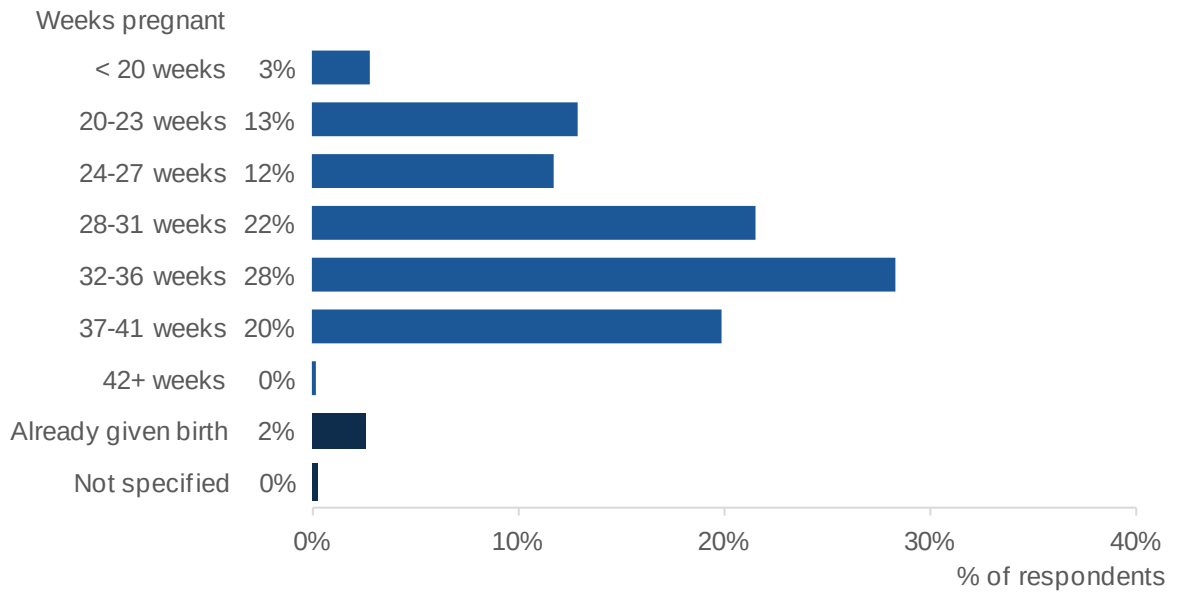
Maternity Service staff were asked to hand out survey packs to all expectant mothers who were 20+ weeks pregnant at routine antenatal appointments between 1st May and 30th June 2017. Arrangements for distributing the packs varied depending on the particular set-up within each maternity service.

Most expectant mothers in Scotland attend an antenatal appointment when they are around 20 weeks pregnant. At earlier antenatal appointments, such as the "booking" appointment at around 8-12 weeks, there tends to be a great deal of information to take in, therefore it was agreed that this would not be the best time to approach women to participate.

No reminders were issued for the antenatal cohort, but posters and postcards were on display at antenatal clinics to help promote the survey.

The vast majority (95%) of antenatal survey respondents were 20 or more weeks pregnant when they completed the survey, however a small number of questionnaires (3%) were returned by women at an earlier stage of pregnancy (range: 8 - 42 weeks). All of these responses were accepted as valid returns and were included in the final survey dataset.

Figure T1: How many weeks pregnant are you (to the nearest whole week)? (Percentage of antenatal respondents who indicated each number of weeks).



Source: Q1, Antenatal Survey

It should also be noted that 2% of antenatal respondents had already given birth and a very small number did not specify their stage in pregnancy (<0.5%); responses from these women were also accepted as valid returns.

4.4 8-12 week cohort

For the 8-12 week cohort, NRS mailed survey packs to all eligible mothers using the postal address that was provided when the birth was registered.

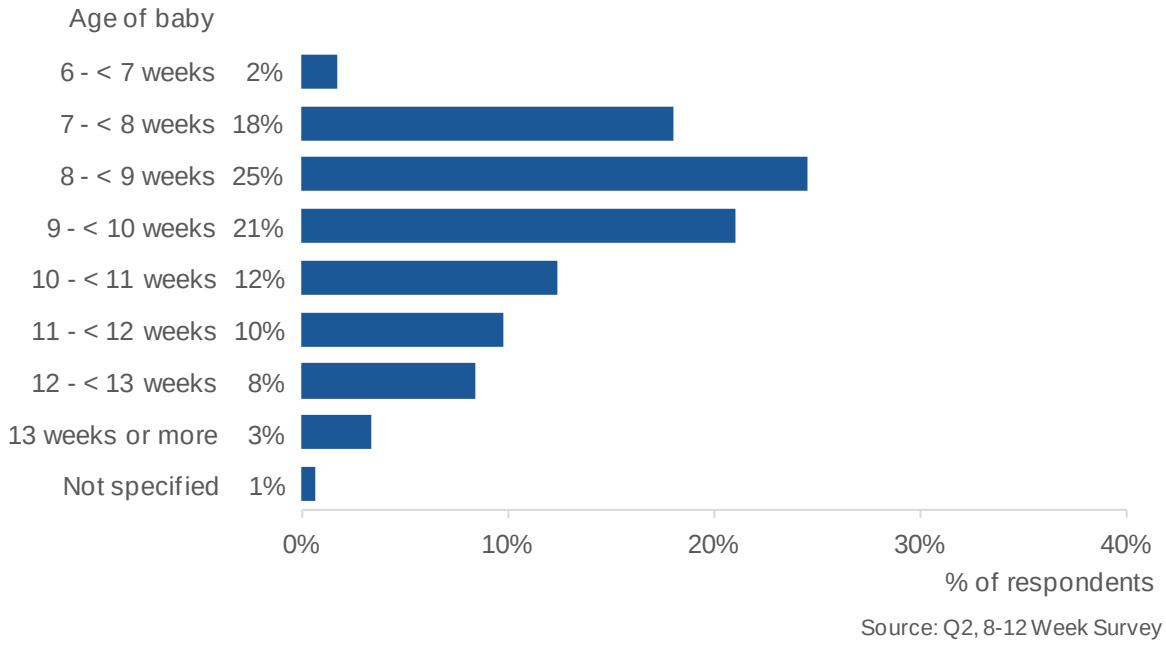
- The initial mail out of survey packs was done in three batches between the beginning of May and mid-June 2017. Mailings were staggered to ensure that infants were between six and nine weeks old when the packs were received.
- Three weeks after the initial pack was sent, a reminder pack was mailed to mothers who had yet to respond.

On the morning of each mail out (initial and reminder), NRS used Scottish Death Registration Records to ensure that any mothers who were known to have died, or whose new baby was known to have died, were removed from the mailing list. In cases where the baby was part of a multiple birth, these checks were carried out for all babies associated with that birth.

It was not possible to check whether infants were still with their mothers (for example, if the baby was in foster care). The covering letter apologised to mothers in this situation and advised them to return the blank questionnaire to avoid receiving a reminder letter.

The fieldwork procedures for the 8-12 week cohort were intended to ensure that infants were around eight weeks old at the time of survey completion. However, depending on when mothers chose to complete and return the questionnaire, some infants were slightly younger / older (range: 6 - 20 weeks). All of these responses were accepted as valid returns and were included in the final survey dataset.

Figure T2: How old is your baby? (Percentage of 8-12 week respondents who indicated each age).



Source: Q2, 8-12 Week Survey

The majority of respondents (68%) confirmed that their infant was at least eight, but less than 12, weeks old when they completed the survey. Twenty percent (20%) had infants aged less than eight weeks; 12% had infants aged 12 weeks or more (note that only 3% were 13 weeks or more).

A small number of respondents did not specify the age of their baby (0.7%); responses from these women were also accepted as valid returns.

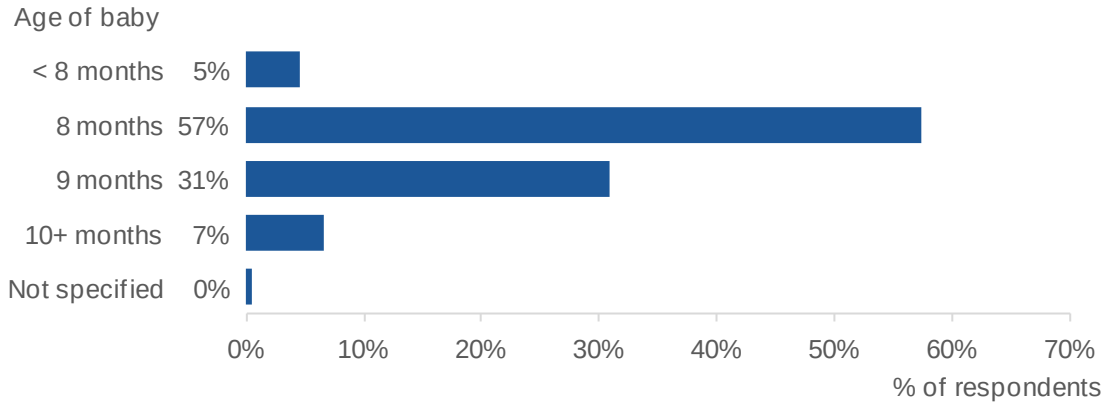
4.5 8-12 month cohort

For the 8-12 month cohort, NRS mailed survey packs to all eligible mothers using the postal address that was provided when the birth was registered.

- The initial mail out of survey packs was done in two batches between mid-March and mid-April 2017. Mailings were staggered to ensure that infants were between seven-and-a-half and eight-and-a-half months old when the packs were received.
- Three weeks after the initial pack was sent, a reminder pack was mailed to mothers who had yet to respond.
- Six weeks after the initial mailings, a second reminder was sent to those who had yet to respond.* This second reminder only contained a covering letter (with the web address and access code for online survey completion) and the list of FAQs.

As with the 8-12 week cohort, NRS removed mothers who were known to have died, or whose baby was known to have died, from the mailing list prior to each mail out.

Figure T3: How old is your baby (to the nearest whole month)? (Percentage of 8-12 month respondents who indicated each age).



Source: Q3, 8-12 Month Survey

The fieldwork procedures for the 8-12 month cohort were intended to ensure that infants were around eight months old at the time of survey completion. However, depending on when mothers chose to complete and return the questionnaire, some

* Due to the length of time since the birth, it was anticipated that a second reminder would be required to achieve the desired number of responses.

infants were slightly younger / older (range: 7 - 11 months*). All of these responses were accepted as valid returns and were included in the final survey dataset.

The majority of respondents (88%) confirmed that their infant was eight or nine months old when they completed the survey. Five percent (5%) had infants aged less than eight months; 7% had infants aged ten months or more.

A small number of respondents did not specify the age of their baby (<0.5%); responses from these women were also accepted as valid returns.

4.6 Undelivered survey packs

Antenatal

For the antenatal survey, a total of 30,590 survey packs were prepared and delivered to Maternity Services across NHSScotland. More than four in five of these packs (81%; 24,895) were given out to antenatal women. Packs that were not given out (19%, 5,695) were returned to the Scottish Government at the end of the study.

Postnatal

For both postnatal cohorts it was recognised that some mothers would have moved home since registering the birth of their baby eight weeks / eight months previously. It was also anticipated that more mothers in the 8-12 month cohort would have moved since giving birth. The numbers of survey packs that did not reach intended recipients, and that were returned to NRS, were closely monitored throughout the field work period.

- 8-12 week cohort: 52 survey packs were returned to NRS (0.6% of total packs mailed).
- 8-12 month cohort: 338 survey packs were returned to NRS (3.7% of total packs mailed).

4.7 Collation of data

All paper questionnaires were returned to ScotCen for data capture / coding via scanning. ScotCen also managed the online survey which allowed instant data capture.

For the two postnatal surveys, the unique identifier associated with each returned questionnaire was passed to NRS on a regular basis to allow them to target the reminder mailings.

At the end of the fieldwork period, the final survey datasets were securely transferred to ISD for analysis.

* Note that one respondent stated that their baby was six months old, but NRS records show that all infants were at least seven months old when survey packs were posted.

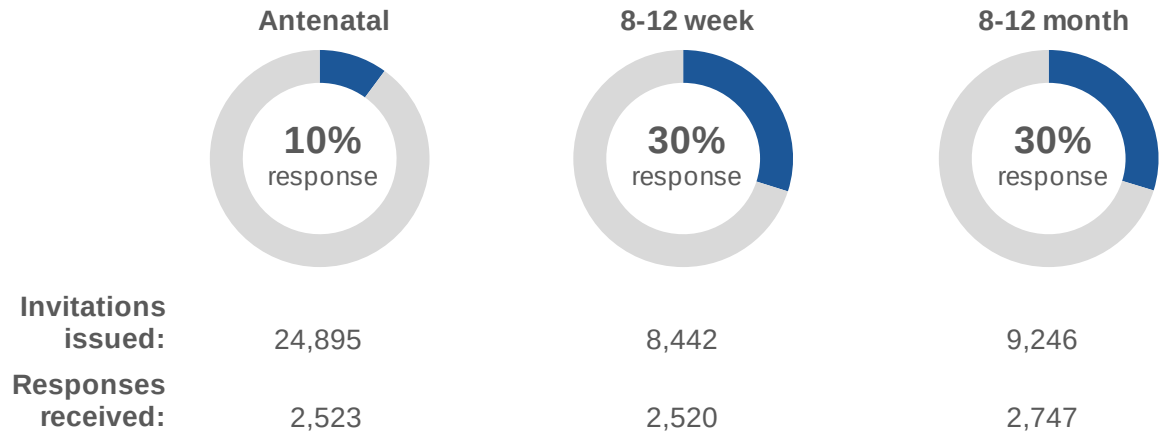
5 Survey Response

5.1 Overall survey response

More than 2,500 responses were received for each survey cohort, providing sufficient data to present results at a national level.

Although response was lower than anticipated (particularly for the antenatal cohort), in most cases there were enough responses to present results by respondent age, deprivation and NHS board of residence.* However, it should be noted that the margin of error was wider than +/- 5% for some respondent groups.

Figure T4: Response to each part of the 2017 Scottish Maternal and Infant Nutrition Survey (number and percentage of responses).



5.2 Mode of response

For each cohort, the vast majority of respondents chose to complete the survey on paper. A slightly higher proportion (13%) chose to complete the 8-12 month questionnaire online; this may have been related to the second reminder that was issued for this cohort. No respondents completed the survey by telephone.

Table T2: Mode of response for each part of the 2017 Scottish Maternal and Infant Nutrition Survey (number and percentage of responses).

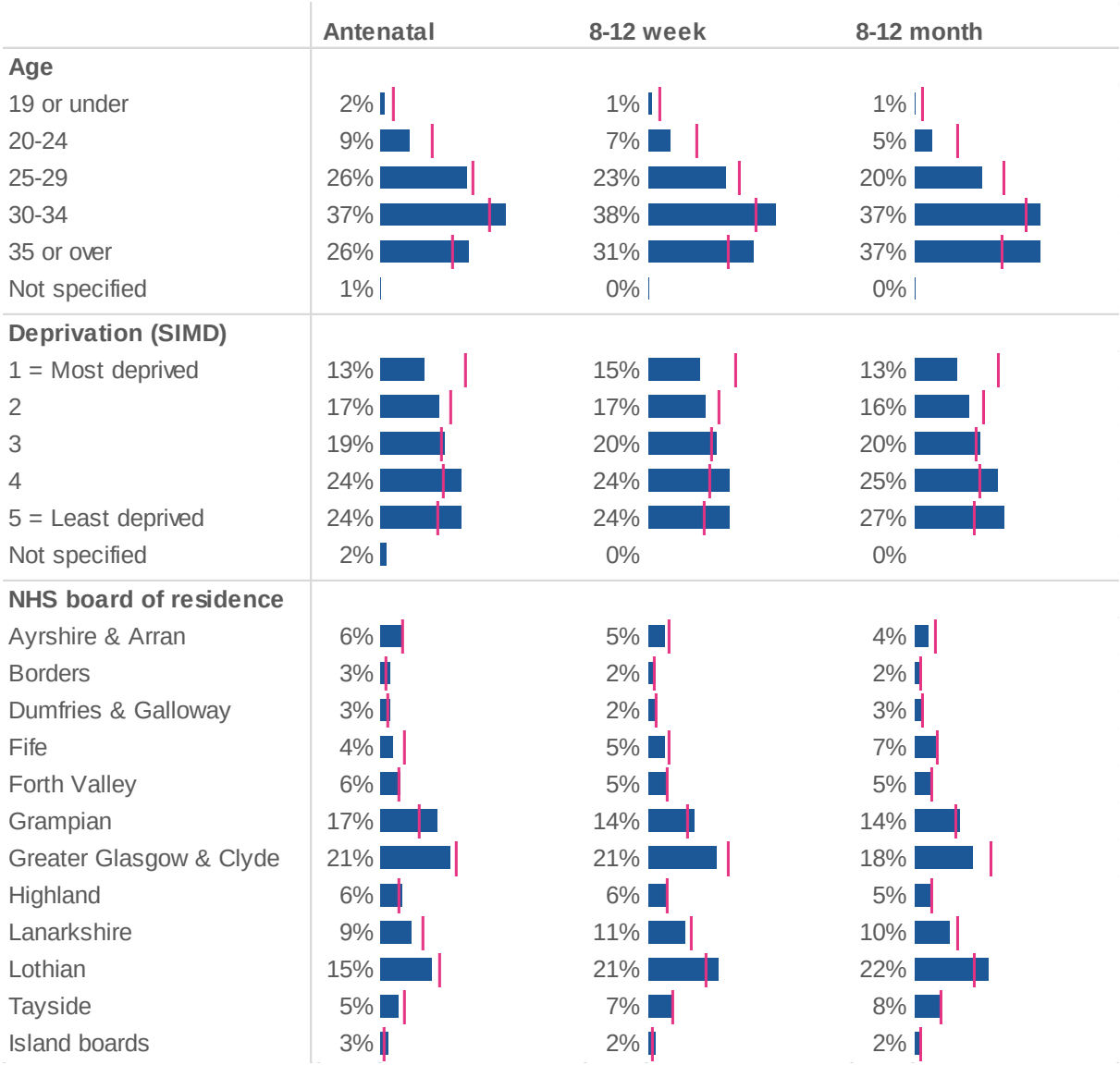
	Online		Paper	
Survey cohort	Count	%	Count	%
Antenatal	216	9%	2,307	91%
8-12 week	221	9%	2,299	91%
8-12 month	348	13%	2,399	87%

* With the exception of the two postnatal cohorts where there were too few respondents aged 19 and under to present results for this age group.

5.3 Respondent profile

Younger women and those who lived in the most deprived areas responded to the survey proportionately less frequently than older women and those who lived in the least deprived areas.

Figure T5: Profile of survey respondents versus survey population (percentage of respondents (%, ■) / percentage of women in survey population (|), by respondent age, deprivation and NHS board).



For example, for the 8-12 week cohort:

- Mothers aged 19 and under constituted 3% of the survey population, however they only accounted for 1% of survey responses.
- On the other hand, mothers aged 35 and over constituted 23% of the survey population, but accounted for 31% of survey responses.

- Mothers who lived in the most deprived areas (SIMD 1) accounted for 26% of the survey population, but only 15% of respondents lived in these areas.
- Mothers who lived in the least deprived areas (SIMD 5) accounted for 17% of the survey population, but 24% of survey respondents lived in these areas.

This means that younger women living in the most deprived areas are under-represented, whereas older women living in the least deprived areas are over-represented. Women who lived in some NHS boards of residence also responded more frequently than those who lived in others.

To help correct for these differential response rates, all survey results were weighted by respondent age, SIMD quintile and NHS board of residence. This is discussed in more detail below.

5.4 Weighting for non-response

As highlighted above, there were differential response rates amongst different groups of women. To help account for these differences, survey results were weighted to be representative of the survey population by respondent age, SIMD quintile and NHS board of residence.

There was no sampling frame for the antenatal cohort, therefore the survey population for this cohort was based on NRS Birth Registration Records for 2016 (all maternities).[6] For the two postnatal cohorts, the sampling frames described in section 3.3 above were used as the survey population.

With the exception of information presented in section 1 of the main report (Introduction), all percentage estimates were weighted in order to increase the representativeness of the results.

- Where results are reported at NHS board of residence level, results have been weighted to be representative of the survey population within that board, in terms of respondent age and SIMD quintile.
- Where results are reported at Scotland level, results have been weighted to be representative of the survey population, in terms of respondent age, SIMD quintile and NHS board of residence across Scotland.
- Any extreme weights were trimmed to two standard deviations of the mean weight for each NHS board / Scotland (weight trimming was applied in less than 5% of cases).
- Weights were scaled to the unweighted sample sizes for each NHS board / Scotland.

6 Analysis and Reporting

All analyses were carried out by ISD using IBM SPSS (version 21).

6.1 Interpretation of survey results

Main results and tables

- For each survey cohort, weighted percentage estimates are presented in the main survey report, showing how respondents answered each question.
- Tables showing these weighted percentages, plus weighted and unweighted counts, accompany the main report (see Report Tables – All Sections).
- Unless otherwise stated, specific differences mentioned in the report text are statistically significant at the 95% confidence level.
- Tables showing all results for each cohort by respondent age, SIMD quintile and NHS board of residence also accompany the main report (see Tables A1-A3, B1-B3 and C1-C3); these tables present the 95% confidence interval associated with each result.
- All 95% confidence intervals were calculated using the Wilson method,[7] using unweighted sample sizes. As a census approach was taken, no design factor was applied.
- Although not referred to within the report, tables showing results for each cohort by respondent ethnicity are also available (see Tables A4, B4 and C4). However, it should be noted that the vast majority of respondents (92 - 94%) indicated that "white" best described their ethnic group.

Rounding of results

- Where percentages do not add up to 100%, this may be due to rounding or because some respondents did not provide an answer to a question (labelled as "Not specified" in the tables that accompany the report).
- Similarly, where two or more results have been aggregated, the resulting percentage may appear 1% higher / lower than expected due to rounding.
- Any results smaller than 0.5% are reported as 0%.
- For "tick all that apply" questions, where respondents could indicate more than one answer, percentages may sum to more than 100%.

Results based on small numbers of respondents

- Results based on small numbers of respondents should be treated with caution.
- Results based on responses from fewer than 50 respondents have been highlighted.
- Results based on responses from fewer than 30 respondents are not shown (except for a small number of key analyses which have been highlighted).

6.2 Other points to note

Consistency of response

Respondents were not always consistent when responding to similar types of questions. For example, in the antenatal survey, there was more than one question about stopping / reducing alcohol intake before pregnancy; responses to these questions did not always correlate.

Comparison to the 2010 UK-wide Infant Feeding Survey

Throughout the main report, several results from the MINS are compared to equivalent results from the 2010 UK-wide Infant Feeding Survey.[2] While many results are broadly comparable, it should be noted that the question wording and methodology used in both surveys differed. It should also be noted that the demographic profile of women giving birth in Scotland has changed since 2010 (e.g. mothers are now generally older).[6, 8]

Any comparisons between the two surveys have not been statistically tested.

Comparison to official Scottish National Statistics

To help provide context to this survey, several results are compared to figures sourced from official Scottish National Statistics publications (for example, Births in Scottish Hospitals and Scottish Infant Feeding Statistics).[8, 9]

It should be noted that survey results are only based on a sample of the population, whereas the official national statistics referenced in this report are based on all women who gave birth in Scotland. While the survey is helpful in establishing variations between different groups of women, data presented in the official national statistics for Scotland should be regarded as the definitive source.

6.3 Final survey datasets

The final dataset for each survey cohort will be made available via the UK Data Archive. Further information about the UK Data Archive can be found on the organisation's website (https://www.ukdataservice.ac.uk/).

Note that in order to ensure the anonymity of MINS respondents, some variables used when producing the MINS report (such as NHS board of residence) will not be made available in the datasets placed on the UK Data Archive.

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Appendix A

Maternal and Infant Nutrition Survey Implementation Group

Name	Designation	Organisation
Professor Annie Anderson	Professor of Public Health Nutrition	Centre for Public Health Nutrition Research, Ninewells Medical School, University of Dundee
Dr Ruth Campbell	Consultant Dietician in Public Health Nutrition	NHS Ayrshire & Arran
Ms Janet Dalzell	Breastfeeding Co-ordinator	Directorate of Public Health, Dundee
Dr Stephan Dombrowski	Senior Lecturer in Psychology	University of Stirling
Ms Anne Tainsh	Professional Lead for Scotland, Baby Friendly Initiative	UNICEF
Dr Heather Whitford	Lecturer in Midwifery	Mother and Infant Research Unit, School of Nursing and Health Sciences, University of Dundee
Dr Kate Woodman	Public Health Adviser – Early Years	NHS Health Scotland
Professor Charlotte Wright	Professor of Community Child Health (Medicine)	University of Glasgow