Growing Up in New Zealand

Now We Are Twelve

Life in early adolescence

Supplementary materials for Now We Are 12: Indicators of food insecurity and access to food assistance in the *Growing Up in New Zealand* cohort

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Growing Up in New Zealand

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1. Summary

This document provides more detail about how food insecurity has been measured, calculated and categorised in the *Growing Up in New Zealand* data. Data users should also read the more detailed technical documentation available from the *Growing Up in New Zealand* Data Access Coordinator.

2. Food insecurity questions

Household food security status was measured using an 8-item questionnaire (1), calculated with the same method and categorised using the same cut-points as in the New Zealand Health Survey (2). This allows for comparisons between the *Growing Up in New Zealand* cohort and the age-specific nationally representative data in the New Zealand Health Survey. These same questions have been used in the 2002 Children's Nutrition Survey, 2008/09 Adults Nutrition Survey and 2012/13, 2014/15, 2015/16, and 2020/21 New Zealand Health Survey Child-proxy questionnaires.

Mothers at the 12-year *Growing Up in New Zealand* interviews were asked how often the following statements had been true for their household in the past year (with response categories of 0=Never, 1=Sometimes 2=Often, or 99=Don't know):

- We can afford to eat properly.
- Food runs out in our household due to lack of money.
- We eat less because of lack of money.
- The variety of foods we are able to eat is limited by lack of money.
- We rely on others to provide food and/or money for food, for my/our household when we don't have enough money.
- We make use of special food grants or food banks when I/we do not have enough money for food.
- I feel stressed not having enough money for food.
- I feel stressed because I can't provide the food I want for social occasions.

Unfortunately, the response category for the first item ("We can afford to eat properly") was different in the 12-year questionnaire than the 8-year and the national surveys. The correct responses should have been 1=Always, 2=Sometimes, 0=Never, or 99=Don't know. This change in wording needs to be taken into account for future analyses. It is also important to note that the question (DP14_Y12M) shows a different response category direction from the rest of the food insecurity variables (i.e., it is

positively worded, rather than negatively). Hence, the code frame for this variable has been recoded to ensure its direction is in alignment with all the other variables.

3. Cohort and sub-study participants

A total of 5073 participants from the 12-year mother dataset were assessed with eight food insecurity variables (DP14_Y12M – DP31_Y12M).

Table S1 gives an overview of the missingness in the dataset. 87.8% of the participants fully observed answering all eight items in the questionnaire. 9.4% of participants did not answer any of the questions, and they have therefore been excluded from the study. Lastly, 2.8% of the participants partially completed the questionnaire and they have been included in the final dataset with their missing values imputed. Hence a total of 4597 participants were included in the final dataset.

Since this is a child focused study, these results generated from mother responses were then attached to children dataset with overseas participants removed to give a total of n = 4500 in the analyses for the food insecurity sub-study.

4. Imputation for missing data

The imputation was done using the Multivariate Imputation by Chained Equations method (*mice* package in R). This iterative method imputed missing values using separate multivariate predictive models. For each incomplete variable, a model was adjusted on the observed data and used to predict and allocate plausible values to the missing observations.

Table S1: Missingness in the Food Insecurity Index questions

Missingness	***n***	**(%)**
Fully observed	4455	87.8
Partially missing	142	2.8
Fully missing	476	9.4

5. Creating the food insecurity categories

We then created a MIRT (Multivariate Item Response Theory) with a Generalised Partial Credit Model (GPCM) to analyse partial credit data, where responses are scored 0, 1, 2, …, k, where k is the highest score category for the variable. The output from MIRT was used to derive factor scores / aggregated food insecurity scores for each respondent based on responses to the eight food insecurity variables.

To make the output consistent and reasonable with the aggregated food insecurity score for the other New Zealand Health Survey (NZHS) years, the Biostatistics team used Weighted Likelihood Estimation (WLE). A review of the method was conducted by a biostatistician at the Ministry of Health.

Two cut-off points were used to categorise each participant (-1.91 and -1.01) obtained from the Ministry of Health based on a representative population sample. The participants with scores below -1.91 are Severely Food Insecure. Scores between -1.91 and -1.01 are Moderately Food Insecure, where the rest above -1.01 are Food Secure. Table S2 shows the proportion of the cohort in the three food insecurity scale categories.

Table S2: Proportion of young people living in food secure households at 8 and 12 years of age

Household food security status *n* (%)	**8-years of age (*N* = 4064)**	**12-years of age (*N* = 4334)**
Food secure	3434 (84.5)	3602 (83.1)
Moderately food insecure	560 (13.8)	646 (14.9)
Severely food insecure	70 (1.7)	86 (2.0)

Footnote: This table excludes missing data (i.e., mothers in the *Growing Up in New Zealand* cohort that did not complete the questionnaire) at each data collection wave, n = 436 at 8-years and n = 166 at 12-years.

There was a change in food security status for some young people, that is, household-level movement in or out of food security between these time points, and some missing data at each time point (Table S3). One-third of young people (*n* = 227) who were food insecure at 8-years of age were food secure at 12-years, and a similar number (*n* = 232) of young people who were food secure at 8 years of age had become food insecure by 12-years of age.

Table S3: Change in household food security status between 8 and 12 years of age

Data collection wave		**12 years**		
	Household food security status	**Food secure, *n* (row %)**	**Food insecure, *n* (row %)**	**Missing*, *n* (row %)**
8 years	Food secure	3107 (90.5)	232 (6.8)	95 (2.8)
	Food insecure	227 (36.0)	372 (59.1)	31 (4.9)
	Missing*	268 (61.5)	128 (29.4)	40 (9.2)

Footnote: * Missing means that the mother did not answer the questionnaire at that time point

Readers should note that the proportion of missing data at 12-years of age was higher for children who had been food insecure at the 8-year data collection wave (5.0%) compared to those who were food secure at 8 years (2.8%), meaning that the 12-year data was missing some disadvantaged children (Table S2). However, among children that re-joined the study at 12-years after missing the 8-year data

collection wave, 29.3% were food insecure at 12-years (higher than the proportion who were food insecure in the 12-year data collection generally).

6. Comparing food insecurity indicators in *Growing Up in NZ* with national data

Table S4 compares responses to three food insecurity indicators that were included in the *Growing Up in New Zealand* 12-year DCW and the New Zealand Health Survey during the same time period. We found that the prevalence of food insecurity indicators in the *Growing Up* cohort is the same (within the 95% confidence interval margin) as those for 10–14-year-olds in the New Zealand Health Survey.

Table S4: Food insecurity indicators in the New Zealand Health Survey (2021/22) and Growing Up in New Zealand 12-year DCW (2021/22)

Indicator of food insecurity ***How often has this been true for your household over the past year?***		***Growing Up in NZ* 2021/22, Cohort recruited in pregnancy now 12-year-olds *N* = 4304, %#**	**New Zealand Health Survey 2021/22, Representative sample of 10–14-year-olds *N* = 477, % (95% CI)**
Food runs out in our household due to a lack of money	Often	1.9	1.1 (0.4 - 2.5) *
	Sometimes	11.1	10.7 (7.4 - 14.9)
Use of special food grants or food banks	Often	1.4	1.6 (0.5 - 3.9) *
	Sometimes	8.6	6.7 (4.2 - 10.1)
We eat less because of a lack of money	Often	1.4	1.4 (0.4 - 3.5) *
	Sometimes	12.6	10.2 (7.2 - 13.9)

Footnotes: Response categories for the questions were Never, Sometimes, Often.

* This Health Survey data have an RSE (relative sampling error; the size of the sampling error relative to the result) of over 30%.

#Growing Up in NZ data do not have confidence intervals as these are exact proportions from a cohort, rather than estimates from a sample of a population like the NZ Health Survey data.

7. For more information

More detail about the methods used to create the food insecurity index and classify households as food secure, moderately food insecure or severely food insecure is in the Food Insecurity 8Y and 12Y Technical Report. Please contact the *Growing Up in New Zealand* Data Access Coordinator to be sent a copy of these reports.

References

1. Parnell WR, Gray AR. 2014. Development of a food security measurement tool for New Zealand households. *British Journal of Nutrition* 112(8): 1393–1401

2. Ministry of Health. 2019. Household Food Insecurity among Children: New Zealand Health Survey. Wellington: Ministry of Health

Suggested citation:

Gerritsen, S., Park, A., Wall, C., Napier, C., Exeter, D., Paine SJ. 2023. Now We Are 12: Indicators of food insecurity and access to food assistance in the *Growing Up in New Zealand* cohort. Snapshot 3. Auckland: *Growing Up in New Zealand*. Available from: www.growingup.co.nz

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