

Introduction to the *Growing Up in New* **Zealand** 12-Year Data Collection Wave

Authors: Carin Napier, Esther Yao, Rina Prasad, Anushree Kedia, Debra Fenton, Saraid Black, Avinesh Pillai, Susan Morton, Sarah-Jane Paine







1. Introduction

The aim of this document is to provide a summary of the 12-year Data Collection Wave (DCW) that occurred between September 2021 and July 2022, during which the *Growing Up in New Zealand (GUiNZ)* cohort of young people (mean age = 12.30 years, standard deviation = 0.27 years) completed their own questionnaires. This allowed for their voices to be heard directly, and for information to be gathered on their identity, health and wellbeing, relationships, perspectives, and priorities.

GUINZ is a longitudinal study that collects contemporary, population-relevant information to understand the development and wellbeing of children growing up in New Zealand in the 21st century. The study began by recruiting pregnant mothers who had expected delivery dates between 25 April 2009 and 25 March 2010 and were residing in the geographical areas defined by the three contiguous District Health Board regions (DHBs) of Auckland, Counties Manukau and Waikato. The cohort of 6,853 children recruited at baseline was diverse, broadly generalisable to the New Zealand birth population at the time, and of sufficient size to provide adequate statistical power for complex analyses of developmental trajectories within subgroups (including by ethnicity and area-level deprivation) (1). The study has since carried out multiple significant DCWs. Findings from previous DCWs can be accessed through www.growingup.co.nz.

The study's model of child development is child-centred and recognises the dynamic interaction between children and their families, communities, environments, and societal contexts. The study acknowledges the importance of the antenatal period and early childhood for laying the foundations for future development and wellbeing. The lattice design of the study represents the multi-disciplinary influences that are considered at any cross-sectional point in time for each child, and is based on the weaving of a kete, or basket, that Māori understand to hold all the necessary elements for life (Figure 1).

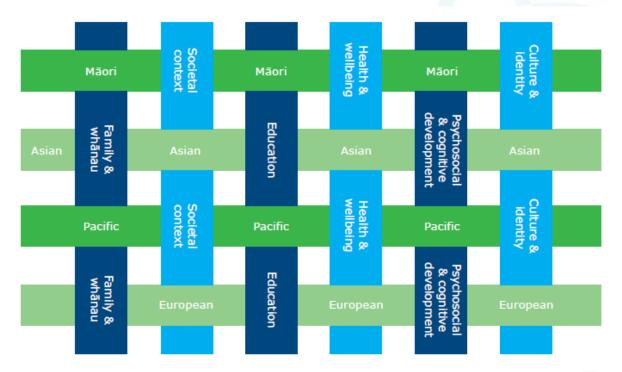


Figure 1. Growing Up in New Zealand Research Domains and Themes.

From its inception, the *GUINZ* study has been explicitly designed to follow children from before birth until they become young adults, to understand what 'works' for children and families and what creates challenges for wellbeing. The timing of DCWs, and what is measured (from whom and how) in *GUINZ* are all planned according to the study's conceptual framework, overarching objectives and multidisciplinary research questions (1).

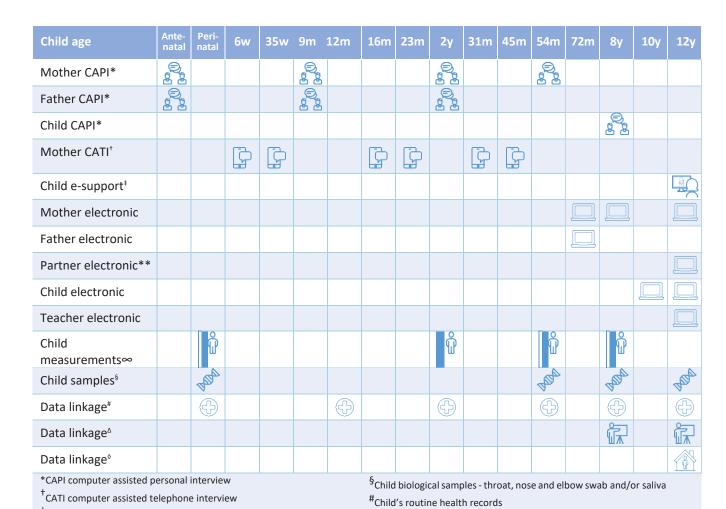
Two key objectives motivated the overall design (including the timing, respondents, mode, and tools) for the 12-year DCW:

- To collect age and stage appropriate key developmental and contextual information from contemporary New Zealand children in the Growing Up cohort during their Intermediate school years (as close in time as possible to when they are 12 years of age and before they transition to secondary school and Year 9).
- To maintain contact and engagement with the current cohort themselves to ensure the sustainability of the study and the provision of quality evidence over time.

The 12-year DCW represents the sixth major DCW undertaken with the *GUINZ* cohort, initially planned to be completed face-to-face.

Each DCW is viewed as part of a longitudinal set of data collection waves rather than as an entity on its own. Although age specific data collection waves can provide valuable cross-sectional information about New Zealand children and families, the value of the data collected at any one time point is that it can be put into the context of prior developmental trajectories and detailed environmental characteristics from before birth, as well as providing information about intermediate points between prior data and later life outcomes.

Longitudinal information has previously been collected from the *GUiNZ* cohort via face-to-face interviews conducted with the cohort children's parents in the perinatal period (starting before birth), when the cohort children were nine months old (pre-interview call at 35 weeks); when the children were two years old (pre-interview call at 23 months); when the children were 4.5 years old (pre-interview call at 53 months), and when the children were approximately 8 years old. The different modes of data collection in the *GUINZ* study are presented in Figure 2.



[‡]E-support via Zoom ΔChild's education records

**Mother's partner – not necessarily the child's father ∞Child's height, weight and waist circumference ^oLinkage of child's home address to environmental records

Note: The 72M electronic data collection with partners was funded by the Ministry of Business, Innovation and Employment.

Figure 2. Overview of the longitudinal collection in GUINZ

2. COVID-19 and the 12-year DCW

On 11 March 2020, a global pandemic was declared by the World Health Organization (WHO). The New Zealand Government introduced a four-level COVID-19 alert system, with the restrictions on population movement, travel and gatherings increasing with each Alert Level. Between March 2020 to September 2022, New Zealand had six periods in Levels 3 or 4 or under the RED traffic light system (i.e. under the most restrictive public health protections).

On 17 August 2021, New Zealand was moved into Alert Level 4 due to an outbreak of the COVID-19 Delta variant, initially detected in the Auckland region. This nationwide lockdown occurred just before the beginning of the 12-year DCW on 29 September 2021 with Auckland and Waikato regions (areas with the largest number of cohort members) remaining in Alert Levels 4 and 3 until the Alert Level system was replaced by the COVID-19 Protection Framework on 2 December 2021.

During the 12-year DCW, several contingencies were applied to manage the various levels of COVID-19 Alert Levels. The plan included three modes of data collection: remote data collection with concurrent video conferencing and/or phone assistance, remote data collection with text, email, and LiveChat assistance, and home visits.

- Remote data collection with concurrent video conferencing and/or phone assistance involved virtual
 collection of information with comprehensive support from trained interviewers via concurrent
 telephone or web-based conferencing (Zoom) to assist with questionnaires. The electronic survey
 measures with telephone and video support enabled face-to-face interactions while minimising the
 risk of virus transmission.
- Remote data collection with text, email, and LiveChat assistance involved virtual collection of
 information with extra support via dedicated text, email, LiveChat, and helpline, with or without
 specific interview times.
- Home visits involved collecting information with interviewers in the children's homes using either
 GUINZ devices or participants' devices.

These modes of data collection allowed the study to connect with families while adhering to public health advice during COVID-19 alert levels.

2.1 Planning for the 12-year DCW

The DCW was initially designed to be in the field with the *Leading Light/Te Rōpū Pīata* group in late 2020 and with the 'Main Cohort' (MC) when the children were at least 11 years of age. Although delays to the DCW to mid-2021 meant that the cohort children were 12 years of age when they completed their questionnaires, the DCW has still enabled data collection at an important milestone in the life course and educational transition. Whilst other international longitudinal studies opted to shorten their questionnaires to manage the challenges of undertaking a DCW during the COVID-19 pandemic, maintaining the full questionnaire in the *GUINZ* 12-year DCW has ensured that we have been able to provide a high quality and comprehensive dataset that meets the scientific and policy advice that was received during the consultation.

Online questionnaires were developed for the child, mother, mother's partner, and teacher of the child.

The key design components focused on the children's health and wellbeing, cognitive and psycho-social development, and education information. Other design features included:

- Peer relationships and socialisation behaviours, including technology use and communication
- Identity, including ethnicity as well as body image and gender identity
- General developmental update
- General health, follow-up biological sample collection
- Characteristics of family, school and community environments

 Further consents for bilateral linkage to administrative data sources (including education, health and linking the child's home address to environmental data).

The assessment of which constructs should be included in the 12-year DCW was guided using established *GUiNZ* procedures and included determining, for each construct, whether it:

- related to the developmental stage of the child, is age-appropriate, and is child focused
- could be measured longitudinally
- would provide sufficient data variability for discrimination
- added new dimensions to ongoing longitudinal analyses.

Ethical approval was received in May 2021 and the Leading Light (LL) data collection commenced in May 2021. The 'Leading Light/ Te Rōpū Pīata' cohort leads the way for all phases of the longitudinal study and provides the opportunity for dress rehearsal for final testing and fine tuning of study instrumentation and data collection procedures. The MC data collection commenced in September 2021.

An ethics amendment to enable a fully online DCW due to COVID-19 public health restrictions was approved in November 2021. The ethics amendment included a zoom-enabled interview modality and mailing of biological sample kits to the cohort children.

2.2 Survey methods and questionnaire content

The 12-year DCW was originally planned as a hybrid data collection model that included in-home child observation questions and activities. However, due to COVID-19 restrictions, the child activities were adapted to be completed online. The parental and teacher questionnaires were always planned to be virtual/remote. Child anthropometry and the parent-child interactive task were not possible using a remote model, as an interviewer needed to be physically present in the home to complete the measurements and tasks. Therefore, they were not included in the 12-year DCW.

The 12-year DCW consisted of several components to continue the collection of age and context-specific information to address the overarching longitudinal study objectives. These components were grouped into different questionnaire types and settings, including:

- Household Grid Questionnaire (Mother field interviewer administered)
- Mother¹ Questionnaire including Child Proxy questions (mother completed electronically)
- Child Questionnaire (child completed electronically with virtual/telephonic support)
- Child Activities (child completed including assessment of the Te Reo Māori receptive vocabulary and a web-based cognitive tool)
- Mother's Partner Questionnaire including Child Proxy questions (partner completed electronically)

¹ Mothers are defined via an algorithm that considers caregiver and legal guardian status. This person may change between DCWs.

- Collection of three non-invasive biological samples (self-completed, with written instructions and returned to GUINZ)
- Teacher Survey (completed electronically by the child's 2021 teacher)
- New Consents for extending linkage to routine health, education and environment datasets (mother completed)
- Consent to contact the mother using social media and other messaging platforms (mother completed)

The **mother questionnaire** gathered information about the child's immediate household and living environment. It included updated measures of household socioeconomic status, maternal employment and household income, material wellbeing, food security, sources of informal and formal support, maternal health and wellbeing (including depression), measures of the inter-parental relationship, and information regarding the family, household, and wider environment.

The **mother's partner questionnaire** collected information about the partner, including updated household socio-economic status, parental employment and household income, material wellbeing, food security, sources of informal and formal support, parental health and wellbeing (including depression), interparental relationship, and information regarding the family and household environment.

The **child proxy questionnaire**, completed by the mother and mother's partner, gathered information about the child's ethnicity and culture, gender, puberty, eating patterns and food behaviours, health and wellbeing including their sleeping habits and activity, parent-child interactions, experiences at school, media use, and behaviour and social skills. Some of the questions asked of the parents were also asked of the children.

The **child questionnaire** was completed by the children themselves with virtual/telephonic support, and consisted of age-appropriate questions to establish their views of themselves, their home and school environment, and their identities.

The **child activities questionnaire** was sent to the child via the mother for completion, and included specific activities to test language, psycho-social, and cognitive development.

Finally, the **teacher questionnaire** was sent electronically to the child's 2021 teacher to collect information about the child at school, including educational outcomes (e.g., academic performance, school engagement), factors that influence school success (e.g., bullying, teacher expectations, school relationships), learning needs, school environment, and learning supports.

In addition to the questionnaires, three non-invasive **biological samples** were collected from the children as part of the 12-year DCW. These included a swab of the skin inside the elbow, a swab of the skin inside the nose, and a swab of the throat. These samples were self-collected by the child with support from the parent,

and a biological sample collection kit, with instructions, was delivered to consenting/assenting families. Two thousand children were randomly selected and stratified using prioritised child ethnicity at 12-year (Māori, Pacific, Asian, and European), socioeconomic status information, and child gender.

More detail about the questionnaire content will be available by July 2023 and can be found at growingup.co.nz

2.3 Collection of 12-year data

The 12-year MC data collection took place between September 2021 and July 2022. The teacher questionnaire continued until 18 October 2022, and the last biological sample kits were sent out on 3 August 2022, with a return cut-off date at the end of October 2022. The field operations workflow consisted of contacting families to confirm contact details and allocating them to a field interviewer for follow-up and support. The team was also responsible for managing the biological sampling process, overseeing teacher surveys, and conducting various end-of-DCW activities. These activities included contacting participants who had partially completed questionnaires, retrieving devices loaned to participants, and documenting feedback from participants and staff.

3. Response and retention rates

3.1 12-year DCW participation numbers

Prior to the 12-year DCW, 403 children had formally opted out of the study. The remaining 6,450 young people (94.1% of the baseline child cohort of 6,853) were invited to participate in the 12-year DCW. Of these young people, 4,624 (71.7%) participated in at least one component of the 12-year child questionnaire.

The following data were also collected2:

- Household grid data from 4,988 mothers,
- Mother questionnaire data from 4,659 mothers, and
- Mother's partner questionnaire data from 2,507 partners.

3.2 12-year DCW response rates

A **response rate** provides a measure of how many of the eligible cohort participated in any given DCW. A number of potential methods for calculating response rates exist in *GUINZ* because: (1) each DCW included questionnaires completed by the mother, partner and/or child (therefore response rates can be calculated for each type of respondent); (2) the primary participants for the *NWA12* series are provided by self-completion of the questionnaire by the cohort children, but this has only been available since the 8-year DCW; (3) respondents can end an interview with only partial responses provided to any questionnaire; and (4)

² Participants who answered at least one component of the questionnaire were counted as having valid data. This means participants who did not consent to taking part in the questionnaire were excluded from these counts.

the eligible cohort can be defined in various ways (e.g., those who were alive at the time of data collection, or those who were alive at the time of data collection and had not formally opted out of the study).

In the current report, response rates for a DCW was defined as the number of household units where the mother and/or child responded to at least one survey question in the DCW, divided by the total number of households at baseline in the GUiNZ study minus the number of households where the child has died over the duration of the study (final N = 6,743).

Households were used as the unit of analysis for *NWA12* response and retention analysis because data collection focused on each household (which included children, mothers, and/or mothers' partners). While this results in the exclusion of twins and triplets who were not first-born, it does not devalue the important data provided by these young people. Data provided by these young people were included in other *NWA12* papers.

Using the definition of response rate described, the household response rate for the 12-year DCW was 71.0% (4,787 out of 6,743 households). In other words, mothers and/or children in 4,787 of 6,743 *GUINZ* households either partially or fully completed the 12-year DCW. Multivariable binary logistic regression showed that households where mothers identified with a non-European ethnic group, who were younger, or had lower educational qualifications, were less likely to participate in the 12-year DCW (see Table 1). Households in more socioeconomically deprived areas were also less likely to participate. Child's sex assigned at birth, and urban/rural geography of the household, were not significantly associated with 12-year response rates. Note that except for child sex (taken from perinatal data), all characteristics examined were taken from the antenatal DCW to minimise missing data.

Table 1. Descriptive statistics and multivariable binary logistic regression of antenatal characteristics associated with 12-year response rates

Characteristic		Participated (n = 4,787)		Did not participate (n = 1,956)		Multivariable logistic model	
	n	%	n	%	Adjusted odds ratio ^a	<i>p</i> -value	
Child sex assigned at birth							
Воу	2,459	51.4	1,024	52.4	1.00	Ref	
Girl	2,328	48.6	932	47.6	0.96	0.439	
Mother ethnicity ^b							
Māori	767	16.0	475	24.3	1.95	<0.001	
Pacific	485	10.1	515	26.3	3.24	<0.001	
Asian	640	13.4	390	19.9	3.25	<0.001	

Characteristic	Participated (n = 4,787)		Did not participate (n = 1,956)		Multivariable logistic model	
	n	0/0	n	%	Adjusted odds ratio ^a	<i>p</i> -value
Other	167	3.5	79	4.0	2.42	<0.001
European	2,722	56.9	494	25.3	1.00	Ref
Missing	<10	<0.2	<10	< 0. 5	-	-
Mother age at pregnancy						
<20 years	147	3.1	175	8.9	1.00	Ref
20-24 years	540	11.3	442	22.6	0.76	0.045
25-29 years	1,127	23.5	518	26.5	0.53	<0.001
30-34 years	1,656	34.6	443	22.6	0.41	<0.001
35-39 years	1,102	23.0	306	15.6	0.46	<0.001
40+ years	214	4.5	72	3.7	0.49	<0.001
Missing	<10	<0.2	<10	< 0. 5	-	-
Mother education						
No secondary school qualification	235	4.9	241	12.3	1.00	Ref
Secondary school/NCEA 1-4	977	20.4	625	32.0	0.75	0.011
Diploma/trade cert/NCEA 5-6	1,410	29.5	653	33.4	0.64	<0.001
Bachelor's degree	1,250	26.1	274	14.0	0.39	<0.001
Higher degree	901	18.8	157	8.0	0.37	<0.001
Missing	14	0.3	<10	<0.5	-	-
Socioeconomic deprivation (NZDepa	2006 quintile:	s)				
Quintile 1 (least deprived)	903	18.9	188	9.6	1.00	Ref
Quintile 2	990	20.7	237	12.1	1.00	0.987
Quintile 3	899	18.8	258	13.2	1.02	0.875
Quintile 4	959	20.0	454	23.2	1.24	0.047
Quintile 5 (most deprived)	1,034	21.6	818	41.8	1.52	<0.001
Missing	<10	<0.2	<10	<o.5< td=""><td>-</td><td>-</td></o.5<>	-	-

Characteristic	Participated (n = 4,787)		Did not participate (n = 1,956)		Multivariable logistic model	
	n	%	n	%	Adjusted odds ratio ^a	p-value
Urban/rural geography						
Urban	4,405	92.0	1,874	95.8	1.00	Ref
Rural	381	8.0	82	4.2	0.84	0.187
Missing	<10	<0.2	<10	<0.5	-	-

Note. Except for child sex, all characteristics were measured in the antenatal DCW. Child sex was taken from perinatal data.

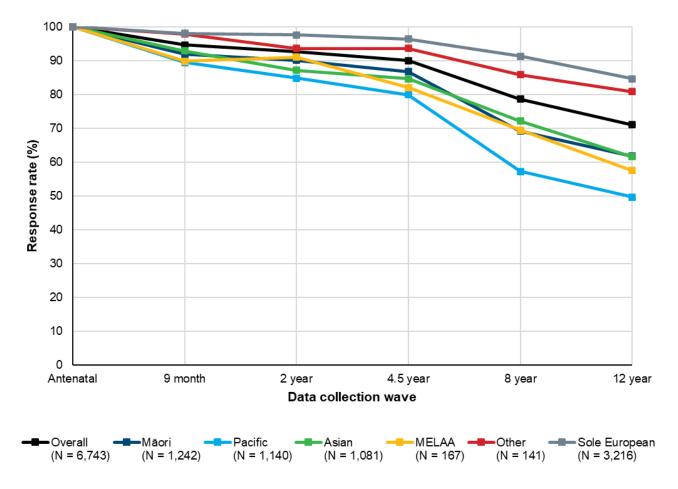
3.3 Longitudinal response patterns

Understanding patterns of participant engagement and response over time is an important quality measure for longitudinal studies. Monitoring ethnic-specific response rates is also important for understanding the quality of information provided for priority communities represented in this study, and adhere to the *GUINZ* Kaitiaki Principles (2). Note participants in *GUINZ* are able to 'skip' DCWs and re-engage in subsequent DCWs. This section uses the same definition of 'response rate' as the previous section (i.e., number of households where the mother and/or child completed at least one survey question in the DCW, divided by the number of households at baseline minus households where the child has died over the duration of the study).

Figure 3 shows the response rates at each DCW both for the overall cohort, and by maternal ethnicity as reported during pregnancy (total response ethnicity and the derived Sole European category was used; see *NWA12* Methods). Overall, there was a small decrease in response rates from the antenatal DCW (N = 6,743) through to 4.5 years (n = 6,071; 90.0%). These rates were followed by a larger decrease at 8 years (n = 5,300; 78.6%) and 12 years (n = 4,787; 71.0%). Response rates by ethnicity show a 'fanning effect' – that is, the difference in response rates by ethnicity increases as a function of time.

^a An odds ratio greater than 1 indicates greater odds of non-response compared to the reference group; an odds ratio lower than 1 indicates lower odds of non-response compared to the reference group (i.e., greater odds of response).

^b Externally prioritised ethnicity was used to create mutually exclusive groups for statistical modelling (see *NWA12* Methods). This means those who reported more than one ethnic grouping were assigned to a single category based on the following order of priority: Māori, Pacific Peoples, Asian, Other, and European.



Note: Ethnicity refers to mother's total response ethnicity reported at the antenatal DCW (except for European, where the derived Sole European category was used). MELAA = Middle Eastern/Latin American/African.

Figure 3. Response rate by data collection wave and maternal ethnicity

Social sequence analysis was used to examine longitudinal response patterns from the antenatal DCW to 12 years. Figure 4 shows that the majority of *GUINZ* households participated in all six main DCWs (n = 4,329; 64.2%). The next most common response patterns were non-participation in 12-year DCW only (n = 699; 10.4%), non-participation in both the 8-year and 12-year DCWs (n = 500; 7.4%), and non-participation in the 8-year DCW only (n = 234; 3.5%).

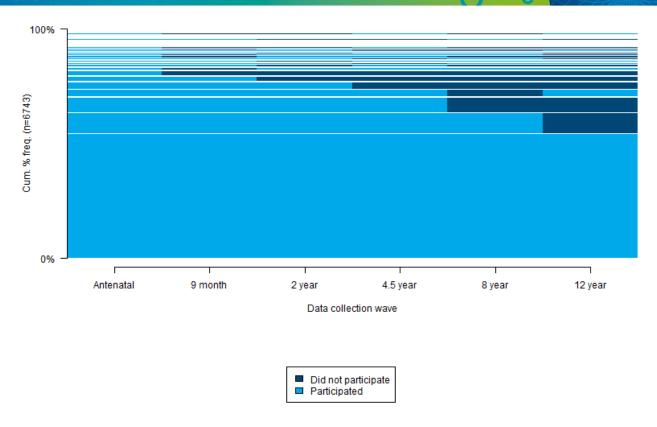


Figure 4. Sequence frequency plot showing longitudinal response patterns

Cluster analysis of the sequences (using optimal matching distances) showed that there were four distinct clusters of longitudinal response patterns (see Figure 5):

- Cluster 1: most households completed all the main DCWs. A small proportion skipped the 9-month DCW but participated in other DCWs. Cluster 1 represented close to two-thirds of the cohort (n = 4,397; 65.2%).
- Cluster 2: the majority skipped one DCW, most commonly at 12 years. A smaller proportion skipped an earlier DCW but participated in subsequent ones, or skipped both an earlier DCW and the 12-year DCW but participated in the DCWs in between. Cluster 2 represented 12.3% of the cohort (n = 829).
- Cluster 3: the majority skipped two or three DCWs, usually at the latter stages of the study (e.g., 4.5-year DCW or later). Although many of these households did not re-engage in subsequent DCWs, a noteworthy proportion that skipped the 8-year DCW participated in the 12-year DCW. A smaller proportion of households came in and out of DCWs. Cluster 3 represented 17.3% of the cohort (n = 1,168).
- Cluster 4: the majority only participated in one or two DCWs (usually at antenatal and 9 months). A
 smaller proportion participated in one or two subsequent DCWs. Cluster 4 represented 5.2% of the
 cohort (n = 349).

The clusters therefore ranged from high levels of longitudinal response (Cluster 1; most common) through to low levels of longitudinal response (Cluster 4; least common).

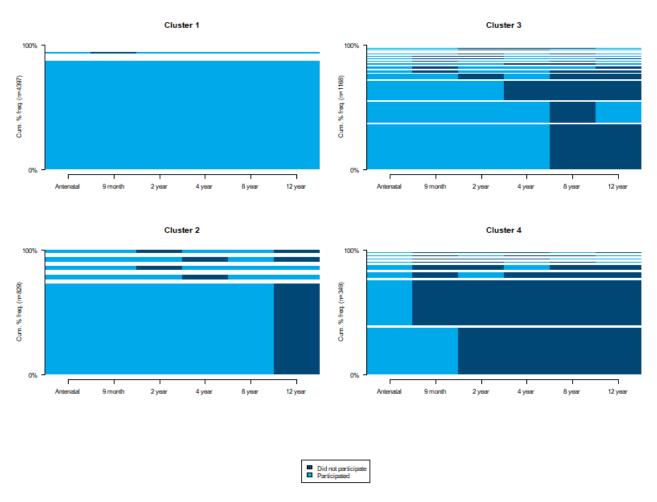
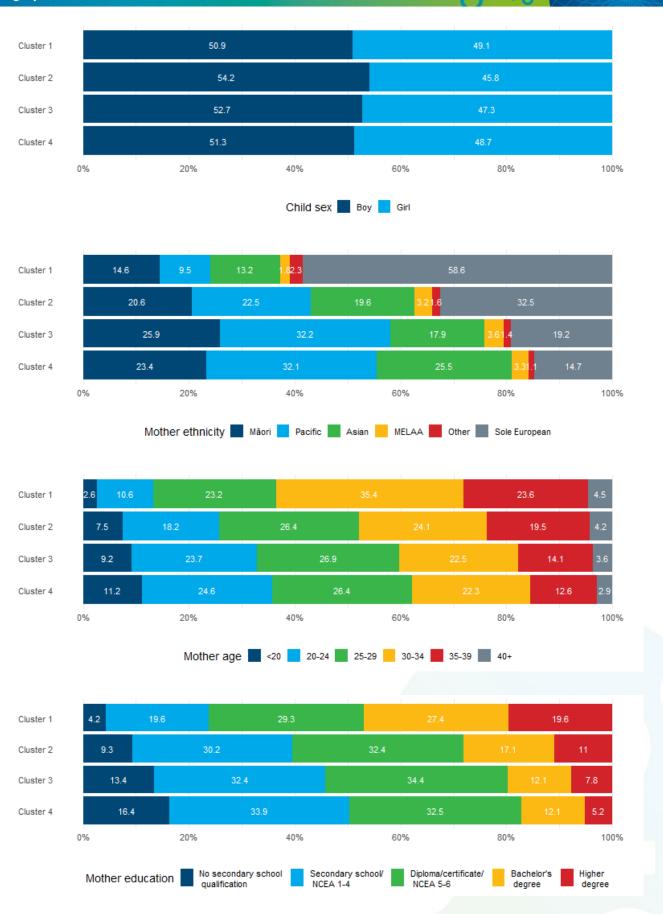
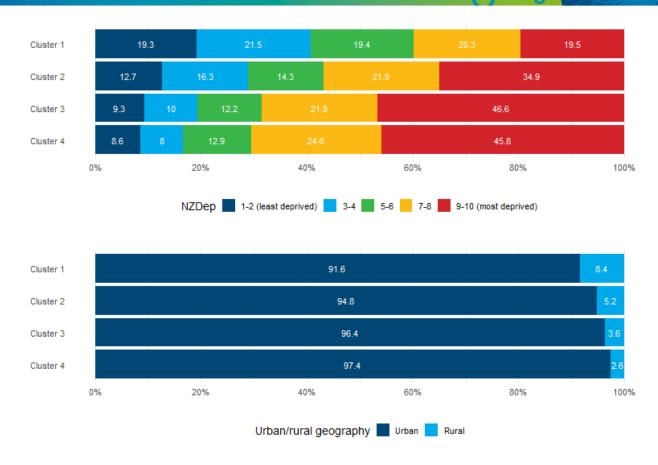


Figure 5. Sequence frequency plots of the four clusters of longitudinal response patterns

As shown in Figure 6, households where mothers identified with a non-European ethnic group, were younger, and reported lower educational attainment, were more likely to be in clusters representing lower participation over time. In addition, households living in areas of higher socioeconomic deprivation and urban areas were also more likely to have lower participation. There was no clear association between child sex assigned at birth and longitudinal participation. Note that except for child sex (taken from perinatal data), all characteristics were again taken from the antenatal DCW to minimise missing data.





Note: Except for child sex, all characteristics were taken from the antenatal DCW. Child sex was taken from perinatal data. Ethnicity refers to mother's total response ethnicity (except for European, where the derived Sole European category was used; see *NWA12* Methods).

Figure 6. Antenatal characteristics by the four clusters of longitudinal participation

5. Conclusion

The *Growing Up in New Zealand* Now We are Twelve findings are presented in nine Snapshots, with a staggered release on the GUiNZ website www.growingup.co.nz between April and June 2023. These Snapshots cover the breadth of multidisciplinary information collected from the cohort at the 12-year DCW and focus on nine policy-relevant topics. While these Snapshots provide a detailed picture of the 'lived realities' of the cohort at this age, it's important to note that they present only some of the data available. There is a lot more for researchers to explore. These 'lived realities' can be used to provide policy stakeholders with context-relevant information about being a young person growing up in New Zealand today. The Snapshots provide selective longitudinal analysis of the status of the young people in the *GUINZ* cohort as they move into adolescence.

The NWA12 series also includes a Methods paper and a Rangatahi Māori paper. The Methods paper outlines the process of engaging with key government agencies in developing each Snapshot topic paper. It details the overarching approach used to analyse the 12-year data, both on its own (cross-sectional analysis) and, importantly, in relation to earlier data collection waves (longitudinal analysis). The Rangatahi Māori

paper focuses on who the Māori cohort are at 12 years and the effects of structural disadvantage on mental wellbeing.

Snapshot 1: Describes the ethnic and gender identities of 12-year-olds in the GUINZ cohort.

Snapshot 2: Provides the first contemporary study/exploration of material hardship in Aotearoa New Zealand, from birth through to early adolescence.

Snapshot 3: Examines food insecurity among young people in the GUINZ cohort and if government assistance and food programmes in schools help.

Snapshot 4: Provides insight into young people's housing quality, residential mobility and homeless experience.

Snapshot 5: Explores young people's self-reported experiences of depression and anxiety symptoms and factors that may influence these conditions from age 8 to 12.

Snapshot 6: Explores who was most worried about the COVID-19 pandemic and how this relates to young people's wellbeing.

Snapshot 7: Provides an overview of young people's engagement in school and identifies key factors associated with school engagement.

Snapshot 8: Highlights the impact of disability on young people and their family.

Snapshot 9: Examines the networks of social and familial relationships young people experience at age 12.

The Snapshots will be released over a period of three months (April to June 2023) on the *GUINZ* website.

The 12-year data will be available in July 2023, and more information about how to access the data is available on the *GUINZ* website www.growingup.co.nz.

5. References

- 1. Morton SMB, Atatoa Carr PE, Grant CC, Robinson EM, Bandara DK, Bird A, et al. Cohort profile: Growing Up in New Zealand. International Journal of Epidemiology. 2013 Feb 1;42(1):65-75.
- 2. Paine SJ, Neumann D, Langridge F, Peters A, Kingi TK. Kaitiakitanga principles for protecting and promoting tamariki and rangatahi wellbeing in *Growing Up in New Zealand*. Journal of the Royal Society of New Zealand. 2022 May 27;52(3):254–64.

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For further information, please contact dataaccess@growingup.co.nz





