Growing Up in New Zealand

# Now We Are Twelve

## Life in early adolescence

# *Now We Are 12*: Methods

**Authors:** Sarah-Jane Paine, Sarah Gerritsen, Carin Napier, Avinesh Pillai, Kate Prickett, Polly Atatoa Carr, Esther Yao, John Fenaughty, Susan Morton

Growing Up in New Zealand

University of Auckland Waipapa Taumata Rau New Zealand

uniservices IDEAS TO LIFE RANGAHAUA KIA WHAI HUA

# 1. Introduction

The *Now We Are 12* (*NWA12*) series is a reflection of our commitment to produce robust evidence that can be used to develop policies and programmes that will enhance the lives of young people and their whānau in Aotearoa New Zealand. Part of this commitment is ensuring that information provided is meaningful and relevant to the communities represented in this study. In *NWA12* this included consistent reporting of data for the major ethnic groupings and with respect to the gender identity reported by young people themselves.

This *NWA12* methods report outlines the process that was used to engage with key government agencies in the development of topics for the *NWA12* series. It also details the overarching approach that was used to analyse the 12-year data, both on its own (cross-sectional analysis) but, importantly, also in relation to earlier data collection waves (longitudinal analysis).

# 2. Consultation with policymakers

Although age-specific data collection waves (DCWs) can provide important cross-sectional information about young people and their whānau, the value of *Growing Up in New Zealand (GUiNZ)* comes from our ability to provide information that helps to understand how wellbeing is shaped by prior developmental trajectories which are themselves influenced by social, political, economic and environmental factors (1,2).

A series of five workshops were held with representatives from key government agencies in March 2022 to understand how information collected as part of the 12-year DCW might best contribute to current policy priorities in the areas of child and youth wellbeing. Suggestions were collated by the *GUiNZ* team and a long list of potential topics was identified using the following prioritisation criteria:

1. The topic is of high policy relevance and/or responds to a key priority area for the government;
2. The topic is aligned with the Child and Youth Wellbeing Framework;
3. The topic includes the possibility for strengths-based or rights-based analyses; and
4. The topic includes potential for longitudinal analysis (i.e., construct collected at multiple DCWs).

This long list and prioritisation process resulted in the identification of 10 topics in consultation with the *GUiNZ* Steering Group and Ministry of Social Development (MSD).

A detailed data analysis plan (DAP) was developed by each topic team outlining the child-focussed research questions, key variables, and proposed analytic methods for each topic. Internal peer review of the DAPs was undertaken by the *GUiNZ* Methods Sub-Committee. Following the main data collection period (September 2021 to July 2022; see *NWA12* Introduction), preliminary analyses began in August 2022 using interim 12-year datasets. Initial findings were presented and discussed with policy partners, non-governmental organisations and other key stakeholders during a series of workshops held in October/November 2022. Feedback and suggestions from these policy discussions were incorporated into the

DAPs, which were presented again to the *GUiNZ* Methods Sub-Committee prior to re-running analyses with the final datasets. Peer-review of a draft of each topic was undertaken by MSD and key agencies between December 2022 and February 2023, with feedback incorporated into the final reports prior to the release of the *NWA12* series.

# 3. Derivation of key sociodemographic variables

From the *GUiNZ* datasets, three sociodemographic variables were created and used across the entire *NWA12* series: (1) ethnic identity, (2) gender identity, and (3) socioeconomic position. Information about derived variables created for individual topics are provided in each paper's supplementary materials.

## 3.1 Ethnic identity

The concept of 'ethnicity' is widely used to measure and analyse differences between groups for research and policy purposes (3). Fundamental to the overarching intent of *GUiNZ* is the recognition that ethnicity is a complex, multi-faceted and fluid construct, and its conceptualisation, measurement and use in analysis require careful consideration (4,5). In *NWA12*, we are interested in understanding how data on ethnic identification (what ethnic group(s) one identifies with) and ethnic identity (how one thinks about their ethnic group(s)) can be used to inform policies and programmes that meet the needs and priorities of young people and whānau in Aotearoa New Zealand.

Self-identified ethnic identification information was collected in the Mother, Partner and Child 12-year questionnaires using the ethnicity question from the Statistics New Zealand Census of Population and Dwellings. This question allows respondents to identify with multiple ethnic groups and describe multiple 'Other' ethnic groups, entered as free text.[1] This information was classified using two different methods in the *NWA12* series.

**Total response ethnicity** was used to present descriptive information. Our use of total response classification provides a number of benefits, including that it maximises counts for groups that are typically under-represented in research (including those within the Pacific and Asian ethnic groupings). This classification also best represents the multiple ethnic identification patterns provided by *GUiNZ* participants.

However, total response groupings have a high degree of overlap due to multiple ethnic identification (e.g., young people who identify as Māori and Pacific are counted in both total response groupings). This means that total counts are larger than the base sample size, and the sum of proportions are greater than 100%. The degree of overlap is also patterned by ethnic group. In addition, comparing data between total response ethnic groupings is statistically challenging as the groups are not mutually exclusive. Because of the

[1] The Child questionnaire also allowed participants to select 'I don't know'. These responses were coded as 'missing' in the analyses ($n$ = 114, 2.5%).

greater number of European young people in the *GUiNZ* cohort (compared to any other ethnic group), for the purposes of this *NWA12* series we created a 'sole European' grouping to enable comparisons between each total response grouping and sole European. This method reduces the overlap between ethnic groups and is also suitable for examining equity and inequity in Aotearoa (6).

In this derived ethnicity variable, young people are counted in each of the ethnic groups that they identify with (at Level 1 of Statistics New Zealand's ethnic classification system (7)) to create the following groups:

- Total Māori
- Total Pacific
- Total Asian
- Total 'Middle Eastern/Latin American/African' (MELAA)
- Total 'Other', which combines other ethnic groups not included in the groupings above, but excludes those who identify solely within the European ethnic group (below)
- Sole European.

The **prioritised ethnicity** classification system was used to enable the incorporation of ethnicity into cross-sectional and longitudinal multivariable modelling whilst meeting the statistical assumption that independent variables have mutually exclusive groups. Under this system, young people who reported multiple ethnic groups are counted in only one group using the following prioritisation order: Māori, Pacific, Asian, 'Other' and European. In this derived variable, young people classified as MELAA were included in the 'Other' grouping due to small sample sizes.

More detailed information regarding the distribution of ethnic identification and ethnic identity in the *GUiNZ* cohort, including patterns of multiple ethnic identification, can be found in the *NWA12* paper '*Ethnic and Gender Identity at 12 Years Old*'.

## 3.2 Gender identity

Gender refers to the identities, norms, and expressions of behaviours and roles that are associated with people who identify as girls/women, boys/men, non-binary or who have a different gender identity. Gender includes how a person identifies their gender, as well as how they express their gender. A person's gender expression may or may not match their gender identity, and a person's gender identity may differ from their sex assigned at birth. Evidence shows that outcomes can be patterned differently by gender in comparison to sex, as well as for transgender and non-binary gender people compared to cisgender participants (8–11). Careful inclusive analyses and measurement is therefore critical to avoid incorrect conclusions that obscure differences for people by misdefining their sex, gender and gender modality (12,13).

Gender was measured in the 12-year DCW using the following question: '*Thinking about who you are, do you see yourself as a boy, a girl, or somewhere in between?*'. Responses to this question were on a unipolar spectrum: 'Boy', 'Mostly a boy', 'Somewhere in the middle', 'Mostly a girl', 'Girl', and 'I don't know'.

A **gender** variable was created for presentation of descriptive information and used in multivariable modelling across the *NWA12* series. This variable combined responses to the gender question described above and sex assigned at birth. This coding created five categories:

- **Cisgender girls**: determined by a 'Girl' response to the unipolar gender identity question, and 'Female' for the sex assigned at birth item.
- **Cisgender boys**: determined by a 'Boy' response to the unipolar gender identity question, and 'Male' for the sex assigned at birth item.
- **Trans girls**: determined by a 'Girl' or 'Mostly a girl' response to the unipolar gender identity question, and 'Male' for the sex assigned at birth item.
- **Trans boys**: determined by a 'Boy' or 'Mostly a boy' response to the unipolar gender identity question, and 'Female' for the sex assigned at birth item.
- **Non-binary/unsure**: determined by a 'Mostly a girl' response to the unipolar gender identity question, and 'Female' for the sex assigned at birth item; a 'Mostly a boy' response to the unipolar gender identity question, and 'Male' for the sex assigned at birth item; and 'Somewhere in the middle' or 'I don't know' responses to the unipolar gender identity question, irrespective of sex assigned at birth.

Further information on gender identity, including its distribution in the *GUiNZ* cohort, can be found in the *NWA12* paper '*Ethnic and Gender Identity at 12 Years Old*'.

## 3.3 Socioeconomic Position

Socioeconomic position (SEP) is an aggregate concept that acknowledges the importance of both resource-based and prestige-based measures, in childhood and adulthood, for understanding population patterns of wellbeing (14). Two SEP variables were used in the *NWA12* series.

The **New Zealand Deprivation Index** (NZDep) is an area-based measure of neighbourhood deprivation derived from the Census of Population and Dwellings (15). *GUiNZ* participants were assigned to one of 10 deciles (1=least deprived, 10=most deprived) based on their primary residential address. Deprivation deciles were then collapsed into quintiles ranging from Quintile 1 (representing addresses in the least deprived 20% of areas) to Quintile 5 (representing addresses in the most deprived 20% of areas).

NZDep is created after each Population Census. Therefore the choice of which NZDep Index to use in each topic was dependent on the research questions of interest. For example, topics using 12-year DCW data only used NZDep2018 (from the 2018 Census) – the closest NZDep measure to this timepoint. In contrast, topics

examining trends over time used the NZDep time period that preceded the experiences described in the analyses (e.g., longitudinal analyses using data from antenatal onwards used NZDep2006; analyses using data from the 8-year and 12-year DCWs used NZDep2013).

Family **material hardship** is also used in *GUiNZ* as a key SEP variable measuring absolute household deprivation, describing whether families are meeting their everyday consumption needs (e.g., able to afford basic food, clothing, housing, utilities, and other everyday costs).

Material hardship at the 12-year DCW was measured using the mother-reported DEP-17 scale developed by MSD (16), and was categorised into three categories in line with the cut-offs used in public sector reporting (17):

- No/little material hardship: ≤5 items answered affirmatively
- Material hardship: 6-8 items answered affirmatively
- Severe material hardship: ≥9 items answered affirmatively.

## 4. General analytical approach

The following section provides an overview of the analytical methods that were most commonly used across the *NWA12* topics. Methods specific to individual topics (e.g., validation of tools, sensitivity analyses, more complex modelling approaches) are detailed in the individual paper's supplementary materials. Due to the policy focus of the *NWA12* series, only participants living in Aotearoa New Zealand (*N* = 4,500) were included in the analyses.

**Descriptive summaries** (e.g., numbers and percentages for categorical variables; mean, standard deviation [SD], median and range for continuous variables) are presented by child ethnicity, gender identity and SEP (where possible). Chi-square tests were used to identify differences in proportions whereas t-tests (for two groups) and analysis of variance (ANOVA; among three or more groups) were used to test for differences between means. Suppression of counts less than 10 is used to ensure anonymity of participants in the *GUiNZ* cohort.

A key strength of the *GUiNZ* study design is that it enables collection of information from the same group of individuals at different points in time to understand how trajectories of wellbeing and development are shaped over time. Details about the specific methods used in each topic are provided as supplementary materials. However, our general approach to **longitudinal analyses** in this series included the following methods:

1. To understand young people's wellbeing experiences across the early life course from antenatal through age 12 years (i.e., trajectories of experience):

a. *Social sequence analysis:* a technique at considers timing and ordering of categorical experiences across multiple time points (18). Similar to latent class analysis, this technique groups children's trajectories into 'like' experiences (rather than understanding every single unique trajectory experience), distilling trajectories (typically) into between 3-8 trajectories.
b. *Manual coding:* for variables where there are few categories and less variation across time, and where there were particular trajectories identified as being of development significance and/or policy relevance, manual coding of unique trajectories of experiences was appropriate.

2. To identify which groups are most likely to experience certain trajectories:
   a. *Bivariate analysis:* simple cross tabulations between the wellbeing indicator of interest and key sociodemographic variables (e.g., ethnicity, gender, SEP).
   b. *Multinomial regression:* a multivariable regression approach to understand the likelihood of experiencing a certain trajectory across a set of sociodemographic variables *net of* other covariates.

3. To examine whether trajectories of experience are associated with child wellbeing outcomes:
   a. *Bivariate analysis:* simple cross tabulations between the trajectory experience and the child wellbeing outcome.
   b. *Multivariable regression:* ordinary least squares/multinomial/logit regression (depending on the child outcome measure) used to predict the likelihood of a child wellbeing outcome, with trajectory groups included as the key independent variable *net of* other covariates in the model (e.g., ethnicity, gender, SEP).

## 4.1 Missing data and imputation

Given that variables of interest were different across the *NWA12* series, and thus, variables and analyses had differing levels of missing data, each paper used the most appropriate missing data technique given their context. Each team met with the *GUiNZ* Methods Sub-Committee to discuss their missing data approach, which was selected in order to reduce complexity without substantively impacting findings and also understand potential sources of bias. Missing data techniques typically varied according to the different analytical approaches, for example:

- *Analyses with longitudinal components:* multiple imputation techniques were used because these analyses often had higher rates of missingness.
- *Analyses that produced bivariate cross-tabs:* listwise deletion (i.e., only incorporated respondents with no missing data on the variable(s) being examined) was used, and rates of missingness on key variables were included in a footnote.

- *Single-wave multivariate analyses:* analyses where there were higher rates of missingness used multiple imputation. Analyses with lower levels of missingness (i.e., less than 50 children with missing data across all model variables) used listwise deletion.

## 5. References


1. Kuh D, Ben-Shlomo Y, Lynch J, Hallqvist J, Power C. Life course epidemiology. J Epidemiol Community Health. 2003 Oct;57(10):778–83.

2. Marmot M, Allen J, Goldblatt P, Boyce T, McNeish D, Grady M. Fair society, healthy lives: The Marmot review. London, England: Institute of Health Equity; 2010.

3. Mays VM, Ponce NA, Washington DL, Cochran SD. Classification of race and ethnicity: Implications for public health. Annual Review of Public Health. 2003 Jan;24(1):83–110.

4. Atatoa Carr P, Langridge F, Neumann D, Paine SJ, Liang R, Taufa S, et al. 'Seeing' our tamariki in longitudinal studies: Exploring the complexity of ethnic identification trajectories within Growing Up in New Zealand. Journal of the Royal Society of New Zealand. 2022 May 27;52(3):237–53.

5. Yao ES, Meissel K, Bullen P, Atatoa Carr P, Clark TC, Morton SMB. Classifying multiple ethnic identifications: Methodological effects on child, adolescent, and adult ethnic distributions. Demographic Research. 2021 Mar 16;44:481–512.

6. Yao ES, Bullen P, Meissel K, Tiatia J, Fleming T, Clark TC. Effects of ethnic classification on substantive findings in adolescent mental health outcomes. Journal of Youth and Adolescence. 2022 Aug 19;51(8):1581–96.

7. Statistics New Zealand. Statistical standard for ethnicity. Wellington, New Zealand; 2005.

8. Clark TC, Lucassen MFG, Bullen P, Denny SJ, Fleming TM, Robinson EM, et al. The health and well-being of transgender high school students: Results from the New Zealand Adolescent Health Survey (Youth'12). Journal of Adolescent Health. 2014 Jul;55(1):93–9.

9. Pelletier R, Khan NA, Cox J, Daskalopoulou SS, Eisenberg MJ, Bacon SL, et al. Sex versus gender-related characteristics: Which predicts outcome after acute coronary syndrome in the young? Journal of the American College of Cardiology. 2016 Jan 19;67(2):127–35.

10. Veale J, Byrne J, Tan K, Guy S, Yee A, Nopera T, et al. Counting Ourselves: The health and wellbeing of trans and non-binary people in Aotearoa New Zealand. Hamilton, New Zealand: Transgender Health Research Lab, University of Waikato; 2019.

11. Fenaughty J, Sutcliffe K, Fleming T, Ker A, Lucassen M, Greaves L, et al. A Youth19 Brief: Transgender and diverse gender students. Victoria University of Wellington and the University of Auckland; 2021.

12. Clayton JA, Tannenbaum C. Reporting sex, gender, or both in clinical research? JAMA. 2016 Nov 8;316(18):1863–4.

13. Heidari S, Babor TF, De Castro P, Tort S, Curno M. Sex and gender equity in research: Rationale for the SAGER guidelines and recommended use. Research Integrity and Peer Review. 2016 May 3;1(1):2.

14. Krieger N, Williams DR, Moss NE. Measuring social class in US public health research: Concepts, methodologies, and guidelines. Annual Review of Public Health. 1997;18(1):341–78.

15. Atkinson J, Salmond C, Crampton P. NZDep2018 Index of Deprivation, Interim Research Report, December 2019. Wellington, New Zealand: University of Otago; 2019.

16. Statistics New Zealand. Measuring child poverty: Material hardship. 2019.

17. Perry B. Child poverty in New Zealand. Wellington, New Zealand: Ministry of Social Development; 2022.

18. Cornwell B. Social sequence analysis: Methods and applications. Cambridge, UK: Cambridge University Press; 2015.

## Suggested citation:

Paine, S.J., Gerritsen, S., Napier, C., Pillai, A., Prickett, K., Atatoa Carr, P., Yao, E., Fenaughty, J., Morton, S.M.B. 2023. Now We Are 12: Methods. Auckland: *Growing Up in New Zealand*. Available from: www.growingup.co.nz

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