

Factors that affect mental wellbeing for people who have interacted with mental health and addiction services: Methodology report and data appendices

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Disclaimer

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers.

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit <https://www.stats.govt.nz/integrated-data/>.

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Background

Te Hiringa Mahara (Mental Health and Wellbeing Commission) assesses mental health and wellbeing outcomes for the people of Aotearoa and advocates for the collective interests of people who experience mental distress and/or addiction, and the people (including whānau) who support them.

Prior to 2026, we assessed and reported on wellbeing for the whole population (Te Hiringa Mahara, 2021b), and for selected priority populations: Pacific people (Te Hiringa Mahara, 2024a), and rangatahi and youth (Te Hiringa Mahara, 2024b), and then for tāngata whaiora (Te Hiringa Mahara, 2025). These reports presented key wellbeing statistics, and change over time in those statistics, guided by the He Ara Oranga framework (Te Hiringa Mahara, 2021a).

In 2026 we updated the descriptive statistics on wellbeing for tāngata whaiora, incorporating newly-available data from the 2023 General Social Survey (GSS) (Te Hiringa Mahara, 2026a) and we carried out statistical modelling to estimate the strength of relationships between mental wellbeing and other factors for tāngata whaiora (Te Hiringa Mahara, 2026b). The goal of this work was to help guide choices about what factors our advocacy and cross-government effort should focus on to improve wellbeing for tāngata whaiora.

This report describes how we carried out this work, including the update of descriptive statistics and the statistical modelling. Appendices provide the full statistical modelling results that our report '**What matters for mental wellbeing: analysis of factors related to mental wellbeing for tāngata whaiora**' draws from.

How we used administrative data to define a cohort of people who had interacted with mental health and addiction services

We used data on specialist services, hospitalisations, and pharmaceuticals to flag for interactions with MHA services

We used health data in the Integrated Data Infrastructure (IDI) (Stats NZ, 2026) to define a group of people who had interacted with MHA services. We used the secondary specialist mental health and addiction contacts IDI Code module to create a flag for people who had interacted with specialist MHA services (Stats NZ, 2025). We also used elements of the method published by Bowden et al. (Bowden et al., 2020), with modifications to improve applicability to the adult population developed by Amanda Eng, Gary Cheung and Amy Chan (unpublished draft), to create flags for people who had mental health or addiction-related hospital admissions, or pharmaceutical dispensings.

This generated two cohorts of people who had interacted with services, and one cohort who had not, as described in Table 1.

Table 1. cohorts of people defined by their interactions with MHA services, as flagged by administrative data in the IDI

| Cohort name | Characteristics |
|-----------------------|--|
| 'Specialist services' | Activity in the PRIMHD dataset in the 5 years before their survey interview, as defined by the Stats NZ code module: Secondary specialist mental health and addiction contacts (Stats NZ, 2025). |
| 'Any services' | Met criteria for the 'Specialist services' cohort AND/OR Were admitted to a public hospital, with a primary or secondary diagnosis and age matching criteria in Appendix 1, as recorded in the publicly funded hospital discharges dataset in the IDI AND/OR Received at least two dispensings, within a 12-month period, of any of the pharmaceuticals in Appendix 2, and met Appendix 2 age criteria at the time of the dispensing, as recorded in the Pharmaceutical (PHARM) dataset in the IDI. ¹ |

¹ Based on advice from lived experience and other experts, we excluded diagnostic codes and pharmaceuticals classified as indicating sleep problems. We did this based on advice that the use of these medications in adults was not necessarily indicative of mental distress or mental health needs. Also based on lived experience and other expert advice, we reclassified the 25 milligram formulation of quetiapine into sleep problems and excluded it along with other indicators of sleep problems.

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| 'No services' | Did not meet criteria for inclusion in the 'Any services' cohort. |
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There are caveats with this method and the cohorts it collates only approximate tāngata whaiora

This method provides an approximation to a cohort of tāngata whaiora. In our analysis, we found clear differences in the aggregate characteristics of people in the different cohorts. However, we note several caveats with the method.

- The specialist and any services cohorts do not include tāngata whaiora who had not interacted with health services. This may be a large group, given the prevalence of unmet need for MHA services (Manatū Hauora, 2025).
- The specialist and any services cohorts do not include tāngata whaiora who interacted with primary care or primary mental health services, unless they were prescribed one of the specified pharmaceuticals. This may also be a large group, given the increasing uptake of primary mental health services through the Access and Choice programme.
- The classification of pharmaceuticals into medications that are prescribed for mental health or addiction problems is approximate because many drugs have multiple uses.

We updated descriptive statistics comparing wellbeing for people who had, and had not, interacted with MHA services in the last 5-years

We collated indicators of wellbeing from three national surveys:

- The General Social Survey (GSS), conducted in 2018, 2021, and 2023
- The Household Economic Survey (HES), conducted in 2018/19, 2019/20, 2020/21, 2021/22, 2022/23, and 2023/24
- Te Kupenga (TK), conducted in 2018.

Data from GSS 2023 and the HES 2022/23 and 2023/24 were new for this update.

We compared wellbeing factors among people who had, and had not, interacted with MHA services in the 5 years prior to their survey interview. We chose a 5-year period (rather than a shorter time) because the impacts of mental health, substance and gambling issues on wellbeing can last for years and because it gave us a larger cohort, providing better statistical power for the analysis.

The results we present in our infographic (Te Hiringa Mahara, 2026a) compare findings for the three groups in Table 1.

Wellbeing indicators for the descriptive statistics were selected based on previous work and lived experience advice

We selected wellbeing indicators from those that were published in the baseline wellbeing outcomes report: Te Rau Tira (Te Hiringa Mahara, 2021b) and added new indicators that had become available in the 2021-2023 GSS on people's sense of belonging and sense of control. We were restricted to indicators derived from IDI datasets because we required its linked data to flag for whether people had interacted with services (as described in Table 1).

We consulted with our Lived Experience Data Reference Group, first to prioritise the indicators and then, after we had extracted data from the IDI, to identify key themes emerging from the findings.

Table 2 lists the Te ao Māori indicators that were selected for the infographic and their rationale for inclusion. Table 3 does the same for the He Ara Oranga shared perspective indicators.

Table 2. Te ao Māori indicators

| Indicator | He Ara Oranga domain | Rationale for inclusion |
|---|------------------------------------|---|
| The proportion of Māori who think spirituality/taha wairua is very important or quite important | Whakaora, whakatipu, kia manawaroa | Taha wairua is a key component of Māori concepts of wellbeing, for example in the Te Whare Tapa Whā model of Māori health (Mason Durie, 1998) |
| The proportion of Māori who can speak te Reo Māori well | Whakaora, whakatipu, kia manawaroa | Te Reo Māori is part of a kete, including tikanga Māori, matauranga Māori, toitu te Tiriti. that indicate being grounded in te ao Māori, something that is central to Māori wellbeing |
| The proportion of Māori who think it is important to be involved in things to do with Māori culture | Whakaora, whakatipu, kia manawaroa | Connection to culture is a source of strength for Māori. This indicator was considered to be the best approximation of connection to Māori culture. |

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| <p>The proportion of Māori who rate their own health as good, very good, or excellent</p> | <p>Whakapuāwaitanga me te pae ora</p> | <p>Taha tinana is an area of inequity and a key component of Māori concepts of wellbeing, for example in the Te Whare Tapa Whā model of Māori health (Mason Durie, 1998)</p> |
| <p>The proportion of Māori experiencing good material wellbeing</p> | <p>Whakapuāwaitanga me te pae ora</p> | <p>Rated by the LEDRG as one of the top determinants of wellbeing.</p> |
| <p>The proportion of Māori who think their whānau get along well together</p> | <p>Whanaungatanga me te arohatanga</p> | <p>The LEDRG identified whānau-based indicators as key, commenting on the importance of whānau for tangata whaiora wellbeing and recovery, and the dearth of statistics at the whānau level.</p> |
| <p>The proportion of Māori who find it very easy to find someone to support them in times of need</p> | <p>Whanaungatanga me te arohatanga</p> | <p>This indicator related to concepts of whānau connection</p> |
| <p>The proportion of Māori who feel they have the right amount of contact with whānau</p> | <p>Whanaungatanga me te arohatanga</p> | <p>The LEDRG identified whānau-based indicators as key, commenting on the importance of whānau for tangata whaiora wellbeing and recovery, and the dearth of statistics at the whānau level.</p> |
| <p>The proportion of Māori who think their whānau are doing well</p> | <p>Whanaungatanga me te arohatanga</p> | <p>The LEDRG identified whānau-based indicators as key, commenting on the importance of whānau for tangata whaiora wellbeing and recovery, and the dearth of statistics at the whānau level.</p> |

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|--|-----------------------------|---|
| The proportion of Māori who report knowledge of own iwi | Wairuatanga me te manawaroa | Whānau, hapū, and iwi are important components of Māori identity and relate to connections to people and whenua. |
| The proportion of Māori who think things are getting better for their whānau | Tūmanako me te ngākaupai | The LEDRG identified whānau-based indicators as key, commenting on the importance of whānau for tangata whaiora wellbeing and recovery, and the dearth of statistics at the whānau level. |

Table 3. Shared perspective indicators

| Indicator | He Ara Oranga domain | Rationale for inclusion |
|--|-------------------------|---|
| The proportion of people who report high levels of trust in most other people | Being safe and nurtured | Trust is related to discrimination and social connection which were rated by the LEDRG as a top determinant of wellbeing |
| The proportion of people who report feeling lonely a little or none of the time in the last four weeks | Being safe and nurtured | Loneliness and social connection were rated highly as a critical determinant of emotional wellbeing. |
| The proportion of people experiencing good material wellbeing | Having what is needed | Material wellbeing was rated by the LEDRG as a top indicator. Related concepts including crowded housing and access to fresh food were also discussed but were less highly rated. |
| The proportion of households that feel their income is enough or more than enough to meet their everyday needs | Having what is needed | Material wellbeing was rated by the LEDRG as a top indicator. Related concepts including crowded housing and access to fresh food were also discussed but were less highly rated. |

| | | |
|---|--|---|
| The proportion of people who have gone without fresh fruit and vegetables a little or a lot in last year to keep costs down | Having what is needed | Reflects material wellbeing and access to the basics, which was rated highly by the LEDRG. |
| The proportion of adults who rated their health status as good, very good or excellent | Having what is needed | Important because health status is a known area of inequity for tāngata whaiora. |
| The proportion of people who report experiencing discrimination in the last year | Having one's rights and dignity fully realised | Rated by the LEDRG as a top determinant of wellbeing. |
| The proportion of people who rate their family wellbeing highly | Healing, growth and being resilient | Wellbeing of family and whānau was considered a key factor in wellbeing for people with lived experience |
| The proportion of people who say it would be easy or very easy to talk to someone if they felt down or a bit depressed | Healing, growth and being resilient | Access to informal supports was identified as an important factor in maintaining wellbeing |
| The proportion of people who report high positive mental wellbeing | Healing, growth and being resilient | This is a key wellbeing outcome indicator. |
| The proportion of people who think it is easy to be themselves in Aotearoa | Being connected and valued | Rated by the LEDRG as a top indicator of wellbeing and particularly important for people experiencing multiple forms of discrimination and marginalisation. |

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|--|----------------------------|---|
| The proportion of people who report a sense of belonging to NZ | Being connected and valued | This indicator relates to a sense of connection, which was discussed as vital to maintaining wellbeing |
| The proportion of people who feel the things they do are worthwhile | Having hope and purpose | This indicator relates to a sense of purpose, which is key to enabling people to feeling that they have a place in the world. |
| The proportion of people who feel they have control over their lives | Having hope and purpose | Control was noted as a key issue for tāngata whaiora, who can be in situations where they are under the control of the MHA system, which can negatively affect wellbeing. |
| The proportion of people who report high life satisfaction | Having hope and purpose | This is a key wellbeing outcome indicator. |

Descriptive data was extracted from the IDI and analysed using standard statistical methods

We extracted indicator data from the GSS, TK and HES datasets in the IDI and used linked data in the Public Hospital Discharges, Pharmaceuticals, and Secondary specialist mental health and addiction IDI Code module datasets to assign survey respondents to the cohorts in Table 1. Additional data in the IDI central tables was used to derive some demographic variables.

Where possible, data for each cohort and indicator combination was further disaggregated by:

- Respondent age group (15 to 24-year-olds, 25 to 64-year-olds, and 65+ year olds)
- Ethnicity (Asian, European, Māori, MELAA/other, and Pacific), using total ethnicity.
- Disabled and non-disabled (defining disabled people as those who had a lot of difficulty or could not do at all any of the activities in the Washington Group Short Set on Functioning (Washington Group on Disability Statistics, 2022)
- LGB and non-LGB for 2018 data (defining LGB people as those whose sexuality was gay, lesbian, bisexual, or other)

- LGTTQIA+ and non-LGTTQIA+ for 2021-onwards data (defining LGTTQIA+ people as those whose sexuality was gay, lesbian, bisexual, or other, or whose gender was transgender male, transgender female, another gender, or whose sex at birth was not male or female). Data on transgender-related variables was not gathered in any of the surveys prior to 2021.
- Male and female genders
- urban or rural location of residence.

For each indicator, estimates were computed of the percentage of people who met criteria for the indicator. Estimates were weighted to be representative of the population of Aotearoa, using each dataset's survey weights (provided by Stats NZ).

Standard errors and 95% confidence intervals were computed using the replicate survey weights provided by Stats NZ for that purpose (Statistics New Zealand, 2013). Unless otherwise stated, all differences between groups, described in the infographic, were significant at the 5% level.

Aggregate statistics were confidentialised in accordance with Stats NZ rules (Stats NZ, 2022), before being output from the secure Stats NZ data-lab environment.

Regression modelling method

We used multiple regression to quantify relationships between mental wellbeing and other wellbeing factors

Multiple regression is a standard statistical method for estimating quantitative relationships between an outcome variable and other variables. In this work we used it to quantify the relationships between mental wellbeing (our outcome variable) and the other wellbeing factors described in the He Ara Oranga framework (Te Hiringa Mahara, 2021a). Multiple regression allows us to estimate the extent to which each wellbeing factor is associated with higher or lower mental wellbeing, while accounting for effects associated with other wellbeing and demographic factors.

We estimated relationships between mental wellbeing and other factors for the te ao Māori and shared perspectives of He Ara Oranga, across various cohorts

Our modelling used GSS and TK survey datasets in the IDI.

- We used 2018, 2021 and 2023 GSS data to estimate associations between mental wellbeing and the other shared perspective wellbeing factors in Table 3.
- We used 2018 TK data to estimate associations between mental wellbeing and the te ao Māori wellbeing factors in Table 2.

We modelled associations separately for the ‘specialist services’, ‘any services’, and ‘no services’ cohorts defined in Table 1. Our published report focuses on results for the specialist services cohort, but we found very similar relationships for the other cohorts. For the shared perspective, we modelled associations for all people in each cohort and, where sample sizes allowed, separately for Māori in each cohort. Again, we found similar relationships across the models.

Full results tables for the models described in Te Hiringa Mahara (2026b) are given in Appendix 3. The complete list of logistic regression models that were estimated for this work is provided in Appendix 4.

We used a binary indicator based on the WHO-5 index of mental wellbeing as the outcome variable

The outcome variable for the logistic regression modelling is based on the WHO-5 index of mental wellbeing, which collates responses to five questions about a person’s experience of subjective wellbeing in the past two weeks (World Health Organization, 2024). The index results in a percentage score for each person, ranging from zero to 100, where zero represents the worst possible mental wellbeing and 100 represents the best possible mental wellbeing.

Consistent with our previous work, we created a binary variable from these scores, flagging a respondent as having ‘good mental wellbeing’ if they scored over 50. This was used as the outcome variable for the logistic regression models.

We investigated using multiple linear regression with a numeric outcome variable covering the full range of WHO-5 percentage scores, but we found that this was not valid as the assumptions of normality required for linear regression were violated.

Independent variables were selected for the models based on their conceptual relevance and contribution to model fit

The independent variables used in the models are defined in Table 3 (te ao Māori models) and Table 4 (shared perspective models).

Some GSS and Te Kupenga variables from the He Ara Oranga framework were not used in the modelling because of their conceptual overlap with the outcome variable or with other independent variables. Those that were not excluded for conceptual reasons then underwent a forward selection process, which excluded a few additional variables. In this process, variables were progressively introduced into the model and the best combination was selected based on model fit diagnostics (adjusted R^2 and area under the curve (AUC)), and checking for collinearity using variance inflation factors (VIFs). Survey year controls were introduced first, followed by demographic controls, and then each wellbeing factor. A factor was included in the model if it improved model fit and did not introduce excessive multicollinearity (as indicated by a $VIF > 5$). It was rejected if it worsened the model fit or introduced excessive multicollinearity.

Tables 4 and 5 list the variables that were excluded and the reasons for their exclusion.

Variable selection was carried out on an initial model using data from all survey respondents. The selected model was then used for each cohort, to provide some comparability between them.

Variables for discrimination, trust, housing, and experience of crime were included in the te ao Māori models, even though they have not previously been a component of our monitoring against the te ao Māori domains of He Ara Oranga. This was to reduce the risk of endogeneity (where these variables are unobserved but correlated with an included variable, biasing the results for the included variable).

With GSS data, we ran models for the total sample and for Māori. Controls for ethnicity were not included, primarily to provide better comparability between the total and Māori models. This means that we do not control for differences in mental wellbeing associated specifically with ethnicity (for example, cultural differences in how people respond to the WHO-5). However, the broad level 1 ethnicity categories may be a poor proxy for these differences anyway and prior work has found that

differences in mental wellbeing by level 1 ethnicity become insignificant once other factors are controlled for (Brown, 2019).

Table 3. independent variables used in the te ao Māori models

| Variable | Definition |
|-----------------------------|---|
| <i>Demographic controls</i> | |
| Gender | Gender of the respondent, with categories: female, male. The sample size for other genders was too small to be used and transgender variables are not available from TK 2018. |
| Age group | Age of the respondent, with the categories: 15-24 years, 25-34 years, 35-44 years 45-54 years, 55-64 years, 65+ years. |
| Rurality | Rural or urban location of the respondent's residence (categories: rural, urban) |
| Highest qualification | Whether the respondent had a qualification at National Qualifications Framework (NQF) level 2 or above (categories: has L2+ qualification, does not have a L2+ qualification) |
| PHO enrolled | Whether the respondent was enrolled at a Primary Health Organisation (PHO) in the quarter of, or prior to, the survey date. This was used to control for the effects of enrolment on the transience indicator, as address change data in the IDI uses PHO enrolment as a primary source, and so address changes for people who were not enrolled may be less likely to have been recorded in administrative data. |
| <i>Wellbeing factors</i> | |
| Good health | Overall self-rated health is good, very good or excellent. |
| Not material hardship | Not living in material hardship: score on the material wellbeing index (MWI-9) is 10 or more, out of 20 (Perry, 2015). |
| House no major problems | Respondent reports that the house they live in does not have a major problem, where a major problem includes: house gets cold enough to see their breath, or the house is always damp, or the house grows mould of an area larger than an A4 sheet of paper, or the house does not have all basic amenities. |
| Low transience | Respondent changed address 2 or fewer times in the 3 years preceding the survey date. |
| Not crowded | Respondent does not live in a crowded household (where one or more bedrooms are needed) according to the Canadian Occupancy Standard. This is the standard crowding |

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| | measure used by Stats NZ and it takes account of the number of people in the household, their ages and genders, and the number of bedrooms in the house, allowing for bedroom sharing by couples and younger children (Canada Mortgage and Housing Corporation, n.d.; Goodyear et al., 2011) |
| Right contact whānau | Respondent reports that they have about the right amount of contact with whānau (not too much or too little) |
| Easy to get support | Respondent reports that it is easy or very easy to find support, when needed, with things like moving or lifting objects, transporting children, looking after pets, or collecting mail and checking the house while away. |
| Whānau doing well | Respondent rates how well their whānau are doing as 7 or more out of 10, where 0 means extremely badly and 10 means extremely well. |
| Whānau get along | Respondent reports that their whānau get along with each other well or very well. |
| Trust in others | Respondent rates general trust in other people as 7 or more out of 10, where 0 means people can never be trusted, and 10 means people can always be trusted. |
| No discrimination | Respondent reports that they did not experience discrimination in the last year. |
| No crime | Respondent reports that they were not a victim of crime in the last year. |
| Wairua important | Feels that spirituality is quite important or very important. |
| Māori culture important | Respondent feels it is quite or very important to be involved in things to do with Māori culture. |
| Understand te reo Māori | Respondent reports that they can understand te Reo Māori well or very well. |
| Know iwi | Respondent knows their iwi. |
| Environmental planning | Respondent has participated in environmental planning on behalf of their iwi, hapū or marae, during the last year. |
| Registered iwi | Respondent reports that they are registered with their iwi. |

Table 3. independent variables used in the shared perspective models

| Variable | Definition |
|-----------------------------|---|
| <i>Survey year controls</i> | |
| Survey year | Year in which the GSS was fielded (categories: 2018, 2021, 2023) |
| <i>Demographic controls</i> | |
| Gender | Gender of the respondent, with categories: female, male. The sample size for other genders was too small to be used and transgender variables were only available from 2021 onwards. |
| Age group | Age of the respondent, with the categories: 15-24 years, 25-34 years, 35-44 years 45-54 years, 55-64 years, 65+ years. |
| Rurality | Rural or urban location of the respondent's residence (categories: rural, urban) |
| Highest qualification | Whether the respondent had a qualification at National Qualifications Framework (NQF) level 2 or above (categories: has L2+ qualification, does not have a L2+ qualification) |
| PHO enrolled | Whether the respondent was enrolled at a Primary Health Organisation (PHO) in the quarter of, or prior to, the survey date. This was used to control for the effects of enrolment on the transience indicator, as address change data in the IDI uses PHO enrolment as a primary source, and so address changes for people who were not enrolled may be less likely to have been recorded in administrative data. |
| <i>Wellbeing factors</i> | |
| Good health | Overall self-rated health is good, very good or excellent. |
| Not material hardship | Not living in material hardship: score on the material wellbeing index (MWI-9) is 10 or more, out of 20 (Perry, 2015). |
| Not lonely | Respondent felt lonely none or only a little of the time in the last 4 weeks. |
| Right amount friends | Respondent reports that they have about the right amount of contact with friends (not too much or too little) |

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| Easy to talk | Respondent reports that it is easy or very easy to talk to someone if feeling down or depressed. |
| Easy to be self | Respondent reports that it is easy or very easy to be themselves in New Zealand. |
| High family wellbeing | Respondent rates how well their family are doing as 7 or more out of 10, where 0 means extremely badly and 10 means extremely well. |
| Trust in others | Respondent rates general trust in other people as 7 or more out of 10, where 0 means people can never be trusted, and 10 means people can always be trusted. |
| No discrimination | Respondent reports that they did not experience discrimination in the last year. |
| Not fear crime | Respondent rates the effect of worrying about crime on their quality of life as 3 or less out of 10, where 0 means no effect and 10 means a large effect. |
| Not crowded | Respondent does not live in a crowded household (where one or more bedrooms is needed) according to the Canadian Occupancy Standard. This is the standard crowding measure used by Stats NZ and it takes account of the number of people in the household, their ages and genders, and the number of bedrooms in the house, allowing for bedroom sharing by couples and younger children (Canada Mortgage and Housing Corporation, n.d.; Goodyear et al., 2011) |
| House no major problems | Respondent reports that the house they live in does not have a major problem, where a major problem includes: it gets cold enough to see their breath, or it is always damp, or it grows mould of an area larger than an A4 sheet of paper, or it needs major repair work. |
| Low transience | The respondent changed address 2 or fewer times in the 3 years preceding the survey date. |
| Leisure right amount | Respondent reports that they had the right amount of free time over the last four weeks (not too much or too little). Not asked in GSS 2018. |
| Good life control | Respondent rates their sense of control over their life as 7 or more out of 10, where 0 means no control at all and 10 means complete control. Not asked in GSS 2018. |

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| Belong NZ | Respondent rates their sense of belonging to New Zealand as-a-whole as 7 or more out of 10, where 0 means no sense of belonging and 10 means a very strong sense of belonging. Not asked in GSS 2018. |
|-----------|---|

Table 4. independent variables that were rejected from the te ao Māori models

| Variable | Reason for exclusion |
|--|---|
| Māori who can speak te Reo Māori well or very well | Collinear with Understand te reo Māori and understand te reo Māori provided a better model fit. |
| Māori who report knowledge of own hapū | Collinear with Know iwi and Know iwi provided a better model fit. |
| Māori who think things are getting better for their whānau | Did not improve model fit. |
| Māori who report no experience of racism in the last year | Collinear with No discrimination and No discrimination provided a better model fit. |

Table 5. independent variables that were rejected from the shared perspective models

| Variable | Reason for exclusion |
|---|---|
| People who report good life satisfaction | Not trialled because of its potential to bias the model due to strong conceptual overlap with the mental wellbeing outcome indicator (Beltran-Castillon et al., 2021; Brown, 2019; McLeod, 2018). |
| People who report life is worthwhile | Not trialled because of its potential to bias the model due to strong conceptual overlap with the mental wellbeing outcome indicator (Beltran-Castillon et al., 2021; Brown, 2019; McLeod, 2018). |
| People who have gone without fresh fruit and vegetables a little or a lot in last year to keep costs down | Not trialled because it is a component of the MWI-9 and therefore an overlap with Not material hardship |

| | |
|--|---|
| People whose income is enough or more than enough to meet their everyday needs | Not trialled because of conceptual overlap with Not material hardship |
| People who find it very easy to get to their nearest park or green space | Not trialled because variable is only available in GSS 2018 |
| People who report no experience of racism in the last year | Collinear with No discrimination and No discrimination provided a better model fit. |

Modelling used weighted data and results were confidentialised and output following Stats NZ rules

All models used the GSS and TK person weights and replicate person weights provided by Stats NZ in the IDI. The use of person weights allows the results to be more representative of the population of Aotearoa, and the use of replicate weights for estimating errors means that the estimates of statistical significance and confidence intervals account for the complex survey designs of the GSS and TK. The R *survey* package was used for this purpose (Lumley, 2026).

Results were confidentialised in accordance with Stats NZ rules (Stats NZ, 2022), before being output from the secure Stats NZ data-lab environment.

Contact

The code that we used for this work is available upon request.

Please contact us on kiaora@mhwc.govt.nz if you would like more information.

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[affordable-housing/national-occupancy-standard](https://www.cmhc-schl.gc.ca/professionals/industry-innovation-and-leadership/industry-expertise/affordable-housing/provincial-territorial-agreements/investment-in-affordable-housing/national-occupancy-standard)

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Appendix 1. Diagnostic codes and age criteria used to classify people into the ‘any services’ cohort

People with activity in the PRIMHD or Public Hospital Discharges dataset who had been assigned the following diagnostic codes and met the age criteria, at the time of their interaction with services, were classified into the cohort of people who had interacted with ‘any’ mental health and addiction services.

| Clinical code | Clinical coding system | Minimum age | Type of MHA event |
|---------------|------------------------|-------------|-------------------|
| 3003 | DSM-IV | 5 | Anxiety |
| 3007 | DSM-IV | | Anxiety |
| 3083 | DSM-IV | | Anxiety |
| 29384 | DSM-IV | | Anxiety |
| 30000 | DSM-IV | | Anxiety |
| 30001 | DSM-IV | 10 | Anxiety |
| 30002 | DSM-IV | | Anxiety |
| 30016 | DSM-IV | | Anxiety |
| 30019 | DSM-IV | | Anxiety |
| 30021 | DSM-IV | 10 | Anxiety |
| 30022 | DSM-IV | 10 | Anxiety |
| 30023 | DSM-IV | 5 | Anxiety |
| 30029 | DSM-IV | | Anxiety |
| 30081 | DSM-IV | | Anxiety |
| 30082 | DSM-IV | | Anxiety |
| 30780 | DSM-IV | | Anxiety |
| 30789 | DSM-IV | | Anxiety |
| 30921 | DSM-IV | | Anxiety |
| 30924 | DSM-IV | | Anxiety |
| 30928 | DSM-IV | | Anxiety |
| 30981 | DSM-IV | | Anxiety |
| 31323 | DSM-IV | | Anxiety |
| F064 | ICD-10 | | Anxiety |
| F4000 | ICD-10 | 10 | Anxiety |
| F4001 | ICD-10 | 10 | Anxiety |
| F401 | ICD-10 | 5 | Anxiety |
| F402 | ICD-10 | | Anxiety |
| F408 | ICD-10 | | Anxiety |
| F409 | ICD-10 | | Anxiety |
| F410 | ICD-10 | 10 | Anxiety |
| F411 | ICD-10 | | Anxiety |
| F412 | ICD-10 | | Anxiety |
| F413 | ICD-10 | | Anxiety |
| F418 | ICD-10 | | Anxiety |
| F419 | ICD-10 | | Anxiety |

| | | | |
|-------|--------|----|-------------------|
| F420 | ICD-10 | 5 | Anxiety |
| F421 | ICD-10 | 5 | Anxiety |
| F422 | ICD-10 | 5 | Anxiety |
| F428 | ICD-10 | 5 | Anxiety |
| F429 | ICD-10 | 5 | Anxiety |
| F430 | ICD-10 | | Anxiety |
| F431 | ICD-10 | | Anxiety |
| F432 | ICD-10 | | Anxiety |
| F438 | ICD-10 | | Anxiety |
| F439 | ICD-10 | | Anxiety |
| F450 | ICD-10 | | Anxiety |
| F451 | ICD-10 | | Anxiety |
| F452 | ICD-10 | | Anxiety |
| F4530 | ICD-10 | | Anxiety |
| F4531 | ICD-10 | | Anxiety |
| F4532 | ICD-10 | | Anxiety |
| F4533 | ICD-10 | | Anxiety |
| F4534 | ICD-10 | | Anxiety |
| F4535 | ICD-10 | | Anxiety |
| F4538 | ICD-10 | | Anxiety |
| F4539 | ICD-10 | | Anxiety |
| F454 | ICD-10 | | Anxiety |
| F458 | ICD-10 | | Anxiety |
| F459 | ICD-10 | | Anxiety |
| F480 | ICD-10 | | Anxiety |
| F680 | ICD-10 | | Anxiety |
| F681 | ICD-10 | | Anxiety |
| F930 | ICD-10 | | Anxiety |
| F931 | ICD-10 | | Anxiety |
| F932 | ICD-10 | | Anxiety |
| 2967 | DSM-IV | 15 | Bipolar disorders |
| 29600 | DSM-IV | 15 | Bipolar disorders |
| 29601 | DSM-IV | 15 | Bipolar disorders |
| 29602 | DSM-IV | 15 | Bipolar disorders |
| 29603 | DSM-IV | 15 | Bipolar disorders |
| 29604 | DSM-IV | 15 | Bipolar disorders |
| 29605 | DSM-IV | 15 | Bipolar disorders |
| 29606 | DSM-IV | 15 | Bipolar disorders |
| 29640 | DSM-IV | 15 | Bipolar disorders |
| 29641 | DSM-IV | 15 | Bipolar disorders |
| 29642 | DSM-IV | 15 | Bipolar disorders |
| 29643 | DSM-IV | 15 | Bipolar disorders |
| 29644 | DSM-IV | 15 | Bipolar disorders |
| 29645 | DSM-IV | 15 | Bipolar disorders |

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|-------|--------|----|-------------------|
| 29646 | DSM-IV | 15 | Bipolar disorders |
| 29650 | DSM-IV | 15 | Bipolar disorders |
| 29651 | DSM-IV | 15 | Bipolar disorders |
| 29652 | DSM-IV | 15 | Bipolar disorders |
| 29653 | DSM-IV | 15 | Bipolar disorders |
| 29654 | DSM-IV | 15 | Bipolar disorders |
| 29655 | DSM-IV | 15 | Bipolar disorders |
| 29656 | DSM-IV | 15 | Bipolar disorders |
| 29660 | DSM-IV | 15 | Bipolar disorders |
| 29661 | DSM-IV | 15 | Bipolar disorders |
| 29662 | DSM-IV | 15 | Bipolar disorders |
| 29663 | DSM-IV | 15 | Bipolar disorders |
| 29664 | DSM-IV | 15 | Bipolar disorders |
| 29665 | DSM-IV | 15 | Bipolar disorders |
| 29666 | DSM-IV | 15 | Bipolar disorders |
| 29680 | DSM-IV | 15 | Bipolar disorders |
| 29689 | DSM-IV | 15 | Bipolar disorders |
| 30113 | DSM-IV | 15 | Bipolar disorders |
| F0632 | ICD-10 | 15 | Bipolar disorders |
| F0631 | ICD-10 | 15 | Bipolar disorders |
| F300 | ICD-10 | 15 | Bipolar disorders |
| F301 | ICD-10 | 15 | Bipolar disorders |
| F302 | ICD-10 | 15 | Bipolar disorders |
| F308 | ICD-10 | 15 | Bipolar disorders |
| F309 | ICD-10 | 15 | Bipolar disorders |
| F310 | ICD-10 | 15 | Bipolar disorders |
| F311 | ICD-10 | 15 | Bipolar disorders |
| F312 | ICD-10 | 15 | Bipolar disorders |
| F313 | ICD-10 | 15 | Bipolar disorders |
| F314 | ICD-10 | 15 | Bipolar disorders |
| F315 | ICD-10 | 15 | Bipolar disorders |
| F316 | ICD-10 | 15 | Bipolar disorders |
| F317 | ICD-10 | 15 | Bipolar disorders |
| F318 | ICD-10 | 15 | Bipolar disorders |
| F319 | ICD-10 | 15 | Bipolar disorders |
| F340 | ICD-10 | 15 | Bipolar disorders |
| 311 | DSM-IV | 5 | Depression |
| 3004 | DSM-IV | 5 | Depression |
| 3090 | DSM-IV | 5 | Depression |
| 29620 | DSM-IV | 5 | Depression |
| 29621 | DSM-IV | 5 | Depression |
| 29622 | DSM-IV | 5 | Depression |
| 29623 | DSM-IV | 5 | Depression |
| 29624 | DSM-IV | 5 | Depression |

| | | | |
|-------|--------|----|------------|
| 29625 | DSM-IV | 5 | Depression |
| 29626 | DSM-IV | 5 | Depression |
| 29630 | DSM-IV | | Depression |
| 29631 | DSM-IV | | Depression |
| 29632 | DSM-IV | | Depression |
| 29633 | DSM-IV | | Depression |
| 29634 | DSM-IV | | Depression |
| 29635 | DSM-IV | | Depression |
| 29636 | DSM-IV | 15 | Depression |
| 29690 | DSM-IV | 5 | Depression |
| 30928 | DSM-IV | | Depression |
| F0633 | ICD-10 | | Depression |
| F251 | ICD-10 | 5 | Depression |
| F320 | ICD-10 | 5 | Depression |
| F3200 | ICD-10 | 5 | Depression |
| F3201 | ICD-10 | 15 | Depression |
| F321 | ICD-10 | 5 | Depression |
| F3210 | ICD-10 | 5 | Depression |
| F3211 | ICD-10 | 15 | Depression |
| F322 | ICD-10 | 5 | Depression |
| F3220 | ICD-10 | 5 | Depression |
| F3221 | ICD-10 | 15 | Depression |
| F323 | ICD-10 | 5 | Depression |
| F3230 | ICD-10 | 5 | Depression |
| F3231 | ICD-10 | 15 | Depression |
| F328 | ICD-10 | 5 | Depression |
| F3280 | ICD-10 | 5 | Depression |
| F3281 | ICD-10 | 15 | Depression |
| F329 | ICD-10 | 5 | Depression |
| F3290 | ICD-10 | 5 | Depression |
| F3291 | ICD-10 | 15 | Depression |
| F330 | ICD-10 | 15 | Depression |
| F331 | ICD-10 | 15 | Depression |
| F332 | ICD-10 | 15 | Depression |
| F333 | ICD-10 | 15 | Depression |
| F334 | ICD-10 | 15 | Depression |
| F338 | ICD-10 | 15 | Depression |
| F339 | ICD-10 | 15 | Depression |
| F341 | ICD-10 | 15 | Depression |
| F348 | ICD-10 | 15 | Depression |
| F349 | ICD-10 | 15 | Depression |
| F380 | ICD-10 | 5 | Depression |
| F381 | ICD-10 | 15 | Depression |
| F388 | ICD-10 | 5 | Depression |

| | | | |
|--------------|--------|----|-----------------------|
| F39 | ICD-10 | 5 | Depression |
| F412 | ICD-10 | | Depression |
| 3093 | DSM-IV | | Disruptive behaviours |
| 3094 | DSM-IV | | Disruptive behaviours |
| 3129 | DSM-IV | | Disruptive behaviours |
| 3149 | DSM-IV | | Disruptive behaviours |
| 31230 | DSM-IV | | Disruptive behaviours |
| 31232 | DSM-IV | | Disruptive behaviours |
| 31233 | DSM-IV | | Disruptive behaviours |
| 31234 | DSM-IV | | Disruptive behaviours |
| 31281 | DSM-IV | | Disruptive behaviours |
| 31282 | DSM-IV | | Disruptive behaviours |
| 31289 | DSM-IV | | Disruptive behaviours |
| 31381 | DSM-IV | | Disruptive behaviours |
| 31400 | DSM-IV | | Disruptive behaviours |
| 31401 | DSM-IV | | Disruptive behaviours |
| F631 | ICD-10 | | Disruptive behaviours |
| F632 | ICD-10 | | Disruptive behaviours |
| F638 | ICD-10 | | Disruptive behaviours |
| F639 | ICD-10 | | Disruptive behaviours |
| F900 | ICD-10 | | Disruptive behaviours |
| F901 | ICD-10 | | Disruptive behaviours |
| F908 | ICD-10 | | Disruptive behaviours |
| F909 | ICD-10 | | Disruptive behaviours |
| F910 | ICD-10 | | Disruptive behaviours |
| F911 | ICD-10 | | Disruptive behaviours |
| F912 | ICD-10 | | Disruptive behaviours |
| F913 | ICD-10 | | Disruptive behaviours |
| F918 | ICD-10 | | Disruptive behaviours |
| F920 | ICD-10 | | Disruptive behaviours |
| F928 | ICD-10 | | Disruptive behaviours |
| F929 | ICD-10 | | Disruptive behaviours |
| V7102 | DSM-IV | | Disruptive behaviours |
| 3071 | DSM-IV | 10 | Eating problems |
| 30750 | DSM-IV | 10 | Eating problems |
| 30751 | DSM-IV | 10 | Eating problems |
| 30752 | DSM-IV | | Eating problems |
| 30753 | DSM-IV | | Eating problems |
| 30759 | DSM-IV | | Eating problems |
| F500 | ICD-10 | 10 | Eating problems |
| F501 | ICD-10 | 10 | Eating problems |
| F502 | ICD-10 | 10 | Eating problems |
| F503 | ICD-10 | 10 | Eating problems |
| F508 | ICD-10 | | Eating problems |

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|--------------|--------|----|---------------------|
| F509 | ICD-10 | | Eating problems |
| F982 | ICD-10 | | Eating problems |
| F983 | ICD-10 | | Eating problems |
| 3094 | DSM-IV | | Emotional Problems |
| 3099 | DSM-IV | | Emotional Problems |
| 29383 | DSM-IV | | Emotional Problems |
| F063 | ICD-10 | | Emotional Problems |
| F0630 | ICD-10 | | Emotional Problems |
| F0634 | ICD-10 | | Emotional Problems |
| F0639 | ICD-10 | | Emotional Problems |
| F252 | ICD-10 | 10 | Emotional Problems |
| F258 | ICD-10 | 10 | Emotional Problems |
| F920 | ICD-10 | | Emotional Problems |
| F928 | ICD-10 | | Emotional Problems |
| F929 | ICD-10 | | Emotional Problems |
| F938 | ICD-10 | | Emotional Problems |
| F939 | ICD-10 | | Emotional Problems |
| 3009 | DSM-IV | | Mental health nfd* |
| 7999 | DSM-IV | | Mental health nfd* |
| V7109 | DSM-IV | | Mental health nfd* |
| 2930 | DSM-IV | | Other mental health |
| 2939 | DSM-IV | | Other mental health |
| 3073 | DSM-IV | | Other mental health |
| 3076 | DSM-IV | | Other mental health |
| 3077 | DSM-IV | | Other mental health |
| 3139 | DSM-IV | | Other mental health |
| 7876 | DSM-IV | | Other mental health |
| 29389 | DSM-IV | | Other mental health |
| 29910 | DSM-IV | | Other mental health |
| 30720 | DSM-IV | | Other mental health |
| 30721 | DSM-IV | | Other mental health |
| 30722 | DSM-IV | | Other mental health |
| 30723 | DSM-IV | | Other mental health |
| 31231 | DSM-IV | 10 | Other mental health |
| 31239 | DSM-IV | | Other mental health |
| 31382 | DSM-IV | | Other mental health |
| 31389 | DSM-IV | | Other mental health |
| 78009 | DSM-IV | | Other mental health |
| F050 | ICD-10 | | Other mental health |
| F051 | ICD-10 | | Other mental health |
| F058 | ICD-10 | | Other mental health |
| F059 | ICD-10 | | Other mental health |
| F060 | ICD-10 | | Other mental health |
| F061 | ICD-10 | | Other mental health |

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|-------|--------|----|-----------------------|
| F062 | ICD-10 | | Other mental health |
| F065 | ICD-10 | | Other mental health |
| F066 | ICD-10 | | Other mental health |
| F068 | ICD-10 | | Other mental health |
| F069 | ICD-10 | | Other mental health |
| F071 | ICD-10 | | Other mental health |
| F072 | ICD-10 | | Other mental health |
| F078 | ICD-10 | | Other mental health |
| F079 | ICD-10 | | Other mental health |
| F09 | ICD-10 | | Other mental health |
| F488 | ICD-10 | | Other mental health |
| F489 | ICD-10 | | Other mental health |
| F630 | ICD-10 | 10 | Other mental health |
| F633 | ICD-10 | | Other mental health |
| F842 | ICD-10 | | Other mental health |
| F843 | ICD-10 | | Other mental health |
| F950 | ICD-10 | | Other mental health |
| F951 | ICD-10 | | Other mental health |
| F952 | ICD-10 | | Other mental health |
| F958 | ICD-10 | | Other mental health |
| F959 | ICD-10 | | Other mental health |
| F980 | ICD-10 | | Other mental health |
| F981 | ICD-10 | | Other mental health |
| F984 | ICD-10 | | Other mental health |
| F988 | ICD-10 | | Other mental health |
| F989 | ICD-10 | | Other mental health |
| F99 | ICD-10 | | Other mental health |
| 3010 | DSM-IV | 18 | Personality disorders |
| 3014 | DSM-IV | 18 | Personality disorders |
| 3016 | DSM-IV | 18 | Personality disorders |
| 3017 | DSM-IV | 18 | Personality disorders |
| 3019 | DSM-IV | 18 | Personality disorders |
| 30120 | DSM-IV | 18 | Personality disorders |
| 30122 | DSM-IV | 18 | Personality disorders |
| 30150 | DSM-IV | 18 | Personality disorders |
| 30181 | DSM-IV | 18 | Personality disorders |
| 30182 | DSM-IV | 18 | Personality disorders |
| 30183 | DSM-IV | 18 | Personality disorders |
| F070 | ICD-10 | 18 | Personality disorders |
| F600 | ICD-10 | 18 | Personality disorders |
| F601 | ICD-10 | 18 | Personality disorders |
| F602 | ICD-10 | 18 | Personality disorders |
| F6030 | ICD-10 | 18 | Personality disorders |
| F6031 | ICD-10 | 18 | Personality disorders |

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|-------|--------|----|-----------------------|
| F604 | ICD-10 | 18 | Personality disorders |
| F605 | ICD-10 | 18 | Personality disorders |
| F606 | ICD-10 | 18 | Personality disorders |
| F607 | ICD-10 | 18 | Personality disorders |
| F608 | ICD-10 | 18 | Personality disorders |
| F609 | ICD-10 | 18 | Personality disorders |
| F61 | ICD-10 | 18 | Personality disorders |
| F620 | ICD-10 | 18 | Personality disorders |
| F621 | ICD-10 | 18 | Personality disorders |
| F628 | ICD-10 | 18 | Personality disorders |
| F629 | ICD-10 | 18 | Personality disorders |
| 2913 | DSM-IV | 10 | Psychosis |
| 2915 | DSM-IV | 10 | Psychosis |
| 2971 | DSM-IV | 10 | Psychosis |
| 2973 | DSM-IV | 10 | Psychosis |
| 2988 | DSM-IV | 10 | Psychosis |
| 2989 | DSM-IV | 10 | Psychosis |
| 29211 | DSM-IV | 10 | Psychosis |
| 29212 | DSM-IV | 10 | Psychosis |
| 29381 | DSM-IV | 10 | Psychosis |
| 29382 | DSM-IV | 10 | Psychosis |
| 29510 | DSM-IV | 10 | Psychosis |
| 29520 | DSM-IV | 10 | Psychosis |
| 29530 | DSM-IV | 10 | Psychosis |
| 29540 | DSM-IV | 10 | Psychosis |
| 29560 | DSM-IV | 10 | Psychosis |
| 29570 | DSM-IV | 10 | Psychosis |
| 29590 | DSM-IV | 10 | Psychosis |
| F105 | ICD-10 | 10 | Psychosis |
| F115 | ICD-10 | 10 | Psychosis |
| F125 | ICD-10 | 10 | Psychosis |
| F135 | ICD-10 | 10 | Psychosis |
| F145 | ICD-10 | 10 | Psychosis |
| F155 | ICD-10 | 10 | Psychosis |
| F165 | ICD-10 | 10 | Psychosis |
| F175 | ICD-10 | 10 | Psychosis |
| F185 | ICD-10 | 10 | Psychosis |
| F195 | ICD-10 | 10 | Psychosis |
| F200 | ICD-10 | 10 | Psychosis |
| F201 | ICD-10 | 10 | Psychosis |
| F202 | ICD-10 | 10 | Psychosis |
| F203 | ICD-10 | 10 | Psychosis |
| F204 | ICD-10 | 10 | Psychosis |
| F205 | ICD-10 | 10 | Psychosis |

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|------|--------|----|-----------|
| F206 | ICD-10 | 10 | Psychosis |
| F208 | ICD-10 | 10 | Psychosis |
| F209 | ICD-10 | 10 | Psychosis |
| F21 | ICD-10 | 10 | Psychosis |
| F220 | ICD-10 | 10 | Psychosis |
| F228 | ICD-10 | 10 | Psychosis |
| F229 | ICD-10 | 10 | Psychosis |
| F230 | ICD-10 | 10 | Psychosis |
| F231 | ICD-10 | 10 | Psychosis |
| F232 | ICD-10 | 10 | Psychosis |
| F233 | ICD-10 | 10 | Psychosis |
| F238 | ICD-10 | 10 | Psychosis |
| F239 | ICD-10 | 10 | Psychosis |
| F24 | ICD-10 | 10 | Psychosis |
| F250 | ICD-10 | 10 | Psychosis |
| F251 | ICD-10 | 10 | Psychosis |
| F252 | ICD-10 | 10 | Psychosis |
| F258 | ICD-10 | 10 | Psychosis |
| F259 | ICD-10 | 10 | Psychosis |
| F28 | ICD-10 | 10 | Psychosis |
| F29 | ICD-10 | 10 | Psychosis |
| X60 | ICD-10 | | Self-harm |
| X61 | ICD-10 | | Self-harm |
| X62 | ICD-10 | | Self-harm |
| X63 | ICD-10 | | Self-harm |
| X64 | ICD-10 | | Self-harm |
| X65 | ICD-10 | | Self-harm |
| X66 | ICD-10 | | Self-harm |
| X67 | ICD-10 | | Self-harm |
| X68 | ICD-10 | | Self-harm |
| X69 | ICD-10 | | Self-harm |
| X70 | ICD-10 | | Self-harm |
| X71 | ICD-10 | | Self-harm |
| X72 | ICD-10 | | Self-harm |
| X73 | ICD-10 | | Self-harm |
| X74 | ICD-10 | | Self-harm |
| X75 | ICD-10 | | Self-harm |
| X76 | ICD-10 | | Self-harm |
| X77 | ICD-10 | | Self-harm |
| X78 | ICD-10 | | Self-harm |
| X79 | ICD-10 | | Self-harm |
| X80 | ICD-10 | | Self-harm |
| X81 | ICD-10 | | Self-harm |
| X82 | ICD-10 | | Self-harm |

| | | | | |
|-------|--------|----|--------------------|----------------------------------|
| X83 | ICD-10 | | Self-harm | |
| X84 | ICD-10 | | Self-harm | |
| Y870 | ICD-10 | | Self-harm | |
| 347 | DSM-IV | | Sleep problems | |
| 30742 | DSM-IV | | Sleep problems | |
| 30744 | DSM-IV | | Sleep problems | |
| 30745 | DSM-IV | | Sleep problems | |
| 30746 | DSM-IV | | Sleep problems | |
| 30747 | DSM-IV | | Sleep problems | |
| 78052 | DSM-IV | | Sleep problems | |
| 78059 | DSM-IV | | Sleep problems | Excluded from our analysis |
| F510 | ICD-10 | | Sleep problems | |
| F511 | ICD-10 | | Sleep problems | |
| F512 | ICD-10 | | Sleep problems | |
| F513 | ICD-10 | | Sleep problems | |
| F514 | ICD-10 | | Sleep problems | |
| F515 | ICD-10 | | Sleep problems | |
| F518 | ICD-10 | | Sleep problems | |
| F519 | ICD-10 | | Sleep problems | |
| 2910 | DSM-IV | 10 | Substance problems | |
| 2913 | DSM-IV | 10 | Substance problems | |
| 2915 | DSM-IV | 10 | Substance problems | |
| 2919 | DSM-IV | 10 | Substance problems | |
| 2920 | DSM-IV | 10 | Substance problems | |
| 2929 | DSM-IV | 10 | Substance problems | |
| 29181 | DSM-IV | 10 | Substance problems | |
| 29189 | DSM-IV | 10 | Substance problems | |
| 29211 | DSM-IV | 10 | Substance problems | |
| 29212 | DSM-IV | 10 | Substance problems | |
| 29281 | DSM-IV | 10 | Substance problems | |
| 29284 | DSM-IV | 10 | Substance problems | |
| 29289 | DSM-IV | 10 | Substance problems | |
| 30300 | DSM-IV | 10 | Substance problems | |
| 30390 | DSM-IV | 10 | Substance problems | |
| 30400 | DSM-IV | 10 | Substance problems | |
| 30410 | DSM-IV | 10 | Substance problems | |
| 30420 | DSM-IV | 10 | Substance problems | |
| 30430 | DSM-IV | 10 | Substance problems | |
| 30440 | DSM-IV | 10 | Substance problems | |
| 30450 | DSM-IV | 10 | Substance problems | |
| 30460 | DSM-IV | 10 | Substance problems | |
| 30480 | DSM-IV | 10 | Substance problems | |
| 30490 | DSM-IV | 10 | Substance problems | |
| 30500 | DSM-IV | 10 | Substance problems | |

| | | | |
|-------|--------|----|--------------------|
| 30520 | DSM-IV | 10 | Substance problems |
| 30530 | DSM-IV | 10 | Substance problems |
| 30540 | DSM-IV | 10 | Substance problems |
| 30550 | DSM-IV | 10 | Substance problems |
| 30560 | DSM-IV | 10 | Substance problems |
| 30570 | DSM-IV | 10 | Substance problems |
| 30590 | DSM-IV | 10 | Substance problems |
| F100 | ICD-10 | 10 | Substance problems |
| F101 | ICD-10 | 10 | Substance problems |
| F102 | ICD-10 | 10 | Substance problems |
| F103 | ICD-10 | 10 | Substance problems |
| F104 | ICD-10 | 10 | Substance problems |
| F105 | ICD-10 | 10 | Substance problems |
| F106 | ICD-10 | 10 | Substance problems |
| F107 | ICD-10 | 10 | Substance problems |
| F108 | ICD-10 | 10 | Substance problems |
| F109 | ICD-10 | 10 | Substance problems |
| F110 | ICD-10 | 10 | Substance problems |
| F111 | ICD-10 | 10 | Substance problems |
| F112 | ICD-10 | 10 | Substance problems |
| F113 | ICD-10 | 10 | Substance problems |
| F114 | ICD-10 | 10 | Substance problems |
| F115 | ICD-10 | 10 | Substance problems |
| F116 | ICD-10 | 10 | Substance problems |
| F117 | ICD-10 | 10 | Substance problems |
| F118 | ICD-10 | 10 | Substance problems |
| F119 | ICD-10 | 10 | Substance problems |
| F120 | ICD-10 | 10 | Substance problems |
| F121 | ICD-10 | 10 | Substance problems |
| F122 | ICD-10 | 10 | Substance problems |
| F123 | ICD-10 | 10 | Substance problems |
| F124 | ICD-10 | 10 | Substance problems |
| F125 | ICD-10 | 10 | Substance problems |
| F126 | ICD-10 | 10 | Substance problems |
| F127 | ICD-10 | 10 | Substance problems |
| F128 | ICD-10 | 10 | Substance problems |
| F129 | ICD-10 | 10 | Substance problems |
| F130 | ICD-10 | 10 | Substance problems |
| F131 | ICD-10 | 10 | Substance problems |
| F132 | ICD-10 | 10 | Substance problems |
| F133 | ICD-10 | 10 | Substance problems |
| F134 | ICD-10 | 10 | Substance problems |
| F135 | ICD-10 | 10 | Substance problems |
| F136 | ICD-10 | 10 | Substance problems |

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|------|--------|----|--------------------|
| F137 | ICD-10 | 10 | Substance problems |
| F138 | ICD-10 | 10 | Substance problems |
| F139 | ICD-10 | 10 | Substance problems |
| F140 | ICD-10 | 10 | Substance problems |
| F141 | ICD-10 | 10 | Substance problems |
| F142 | ICD-10 | 10 | Substance problems |
| F143 | ICD-10 | 10 | Substance problems |
| F144 | ICD-10 | 10 | Substance problems |
| F145 | ICD-10 | 10 | Substance problems |
| F146 | ICD-10 | 10 | Substance problems |
| F147 | ICD-10 | 10 | Substance problems |
| F148 | ICD-10 | 10 | Substance problems |
| F149 | ICD-10 | 10 | Substance problems |
| F150 | ICD-10 | 10 | Substance problems |
| F151 | ICD-10 | 10 | Substance problems |
| F152 | ICD-10 | 10 | Substance problems |
| F153 | ICD-10 | 10 | Substance problems |
| F154 | ICD-10 | 10 | Substance problems |
| F155 | ICD-10 | 10 | Substance problems |
| F156 | ICD-10 | 10 | Substance problems |
| F157 | ICD-10 | 10 | Substance problems |
| F158 | ICD-10 | 10 | Substance problems |
| F159 | ICD-10 | 10 | Substance problems |
| F160 | ICD-10 | 10 | Substance problems |
| F161 | ICD-10 | 10 | Substance problems |
| F162 | ICD-10 | 10 | Substance problems |
| F163 | ICD-10 | 10 | Substance problems |
| F164 | ICD-10 | 10 | Substance problems |
| F165 | ICD-10 | 10 | Substance problems |
| F166 | ICD-10 | 10 | Substance problems |
| F167 | ICD-10 | 10 | Substance problems |
| F168 | ICD-10 | 10 | Substance problems |
| F169 | ICD-10 | 10 | Substance problems |
| F180 | ICD-10 | 10 | Substance problems |
| F181 | ICD-10 | 10 | Substance problems |
| F182 | ICD-10 | 10 | Substance problems |
| F183 | ICD-10 | 10 | Substance problems |
| F184 | ICD-10 | 10 | Substance problems |
| F185 | ICD-10 | 10 | Substance problems |
| F186 | ICD-10 | 10 | Substance problems |
| F187 | ICD-10 | 10 | Substance problems |
| F188 | ICD-10 | 10 | Substance problems |
| F189 | ICD-10 | 10 | Substance problems |
| F190 | ICD-10 | 10 | Substance problems |

| | | | |
|-------------|--------|----|--------------------|
| F191 | ICD-10 | 10 | Substance problems |
| F192 | ICD-10 | 10 | Substance problems |
| F193 | ICD-10 | 10 | Substance problems |
| F194 | ICD-10 | 10 | Substance problems |
| F195 | ICD-10 | 10 | Substance problems |
| F196 | ICD-10 | 10 | Substance problems |
| F197 | ICD-10 | 10 | Substance problems |
| F198 | ICD-10 | 10 | Substance problems |
| F199 | ICD-10 | 10 | Substance problems |
| F550 | ICD-10 | 10 | Substance problems |
| F551 | ICD-10 | 10 | Substance problems |
| F552 | ICD-10 | 10 | Substance problems |
| F553 | ICD-10 | 10 | Substance problems |
| F554 | ICD-10 | 10 | Substance problems |
| F555 | ICD-10 | 10 | Substance problems |
| F556 | ICD-10 | 10 | Substance problems |
| F558 | ICD-10 | 10 | Substance problems |
| F559 | ICD-10 | 10 | Substance problems |

* Mental health not further defined

Appendix 2. Pharmaceuticals and age criteria used to classify people into the ‘any services’ cohort

People who had been dispensed the following pharmaceuticals and who met the age criteria at the time of dispensing were classified into the cohort of people who had interacted with mental health and addiction services.

| Chemical ID | Minimum age | Maximum age | Type of MHA event | Comment |
|-------------|-------------|-------------|--------------------|---------|
| 6006 | | | Anxiety | |
| 1166 | | | Anxiety | |
| 1780 | | | Anxiety | |
| 2632 | | | Anxiety | |
| 1911 | | | Anxiety | |
| 1080 | 15 | | Anxiety | |
| 1730 | 10 | | Anxiety | |
| 1316 | 10 | | Anxiety | |
| 2636 | 5 | 9 | Anxiety | |
| 1437 | | | Depression | |
| 1438 | | | Depression | |
| 3753 | | | Depression | |
| 1824 | | | Depression | |
| 2285 | | | Depression | |
| 2301 | | | Depression | |
| 3901 | | | Depression | |
| 1760 | | | Depression | |
| 2638 | | | Depression | |
| 1180 | | | Depression | |
| 3785 | | | Depression | |
| 1379 | 15 | | Depression | |
| 1642 | 20 | | Depression | |
| 1059 | 18 | | Depression | |
| 2636 | 10 | | Emotional problems | |
| 3926 | 10 | | Emotional problems | |
| 3927 | 10 | | Emotional problems | |
| 1030 | 10 | | Emotional problems | |
| 1193 | 10 | | Emotional problems | |
| 1190 | 10 | | Emotional problems | |
| 1955 | | | Emotional problems | |
| 6009 | | | Emotional problems | |
| 1069 | | | Emotional problems | |
| 1125 | 15 | | Emotional problems | |
| 2367 | | | Substance problems | |
| 1432 | | | Substance problems | |
| 1841 | | | Substance problems | |

| | | | |
|------|----|-----------------------|--|
| 3950 | | Substance problems | |
| 1795 | | Substance problems | |
| 3793 | | Substance problems | |
| 1252 | | Substance problems | |
| 1273 | | Substance problems | |
| 3887 | 5 | Disruptive behaviours | |
| 1809 | | Disruptive behaviours | |
| 3880 | | Disruptive behaviours | |
| 1389 | | Disruptive behaviours | |
| 3884 | | Psychosis | |
| 1078 | | Psychosis | |
| 1532 | | Psychosis | |
| 2820 | | Psychosis | |
| 1732 | | Psychosis | |
| 1990 | | Psychosis | |
| 1994 | | Psychosis | |
| 2255 | | Psychosis | |
| 2260 | | Psychosis | |
| 1533 | | Psychosis | |
| 1535 | | Psychosis | |
| 1950 | | Psychosis | |
| 3873 | | Psychosis | |
| 1007 | | Psychosis | |
| 1226 | | Psychosis | |
| 1283 | | Psychosis | |
| 1583 | | Psychosis | |
| 1799 | | Psychosis | |
| 2298 | | Psychosis | |
| 2530 | | Psychosis | |
| 3803 | | Psychosis | |
| 3898 | | Psychosis | |
| 3940 | | Psychosis | |
| 4025 | | Psychosis | |
| 8792 | | Psychosis | |
| 3735 | | Sleep problems | Zopiclone. Excluded from our analysis |
| 2484 | 15 | Sleep problems | |
| 2466 | 15 | Mental health nfd* | |
| 3878 | 5 | Mental health nfd* | |
| 1315 | 5 | Mental health nfd* | |
| 1140 | 5 | Mental health nfd* | |
| 1183 | 5 | Mental health nfd* | Quetiapine. The 25mg formulation of this drug was excluded from our analysis |
| 1011 | 5 | Mental health nfd* | |
| 1729 | | Mental health nfd* | |

| | | |
|------|----|--------------------|
| 1731 | | Mental health nfd* |
| 2295 | | Mental health nfd* |
| 1397 | | Mental health nfd* |
| 1865 | | Mental health nfd* |
| 2224 | | Mental health nfd* |
| 2436 | | Mental health nfd* |
| 3892 | | Mental health nfd* |
| 6007 | 15 | Mental health nfd* |

Appendix 3. Model results

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, pooled 2018, 2021, 2023 GSS samples

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Survey year controls</i> | | | | |
| 2021 (base: 2018) | 0.731 | (0.465, 1.147) | 0.1698 | |
| 2023 (base: 2018) | 1.028 | (0.692, 1.528) | 0.8884 | |
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 3.087 | (2.114, 4.51) | 0 | * |
| 25-34 years (base: 15-24) | 1.191 | (0.694, 2.043) | 0.5221 | |
| 35-44 years (base: 15-24) | 0.871 | (0.481, 1.58) | 0.6458 | |
| 45-54 years (base: 15-24) | 1.166 | (0.661, 2.056) | 0.5912 | |
| 55-64 years (base: 15-24) | 0.594 | (0.31, 1.138) | 0.1148 | |
| 65+ years (base: 15-24) | 0.825 | (0.415, 1.641) | 0.5796 | |
| Rural (base: urban) | 0.834 | (0.435, 1.597) | 0.5785 | |
| Highest qualification L2+ (base: no L2+ qualification) | 0.83 | (0.533, 1.29) | 0.4023 | |
| PHO enrolled | 0.361 | (0.087, 1.497) | 0.1577 | |
| <i>Wellbeing factors</i> | | | | |
| Good health | 3.883 | (2.65, 5.69) | 0 | * |
| Not material hardship | 1.52 | (1.009, 2.291) | 0.0452 | * |
| Not lonely | 2.737 | (1.753, 4.272) | 0 | * |
| Right amount friends | 1.007 | (0.683, 1.485) | 0.9708 | |
| Easy to talk | 2.236 | (1.529, 3.269) | 0.0001 | * |
| Easy to be self | 1.502 | (0.959, 2.352) | 0.075 | |
| High family wellbeing | 1.314 | (0.904, 1.908) | 0.15 | |
| No discrimination | 0.997 | (0.639, 1.556) | 0.9894 | |
| Trust in others | 1.882 | (1.316, 2.693) | 0.0007 | * |
| Not fear crime | 1.145 | (0.804, 1.629) | 0.4482 | |
| Not crowded | 0.9 | (0.355, 2.282) | 0.8215 | |
| House no major problems | 1.023 | (0.699, 1.498) | 0.904 | |
| Low transience | 0.305 | (0.115, 0.808) | 0.0176 | * |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R²: 0.27, AUC: 0.76, unweighted n: 1347, weighted n: 78200

Associations between wellbeing factors and the probability of having good mental wellbeing. Māori specialist services cohort, pooled 2018, 2021, 2023 GSS samples

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|-----------------|---------|----------------|
| <i>Survey year controls</i> | | | | |
| 2021 (base: 2018) | 0.523 | (0.196, 1.396) | 0.1928 | |
| 2023 (base: 2018) | 1.68 | (0.705, 4.002) | 0.2374 | |
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 2.798 | (1.308, 5.986) | 0.0087 | * |
| 25-34 years (base: 15-24) | 5.114 | (1.748, 14.958) | 0.0034 | * |
| 35-44 years (base: 15-24) | 1.361 | (0.390, 4.751) | 0.625 | |
| 45-54 years (base: 15-24) | 1.829 | (0.478, 7.001) | 0.3732 | |
| 55-64 years (base: 15-24) | 0.955 | (0.220, 4.143) | 0.9499 | |
| 65+ years (base: 15-24) | 1.738 | (0.104, 29.106) | 0.697 | |
| Rural (base: urban) | 0.781 | (0.193, 3.159) | 0.7261 | |
| Highest qualification L2+ (base: no L2+ qualification) | 1.038 | (0.431, 2.497) | 0.9331 | |
| PHO enrolled | 0.56 | (0.060, 5.243) | 0.6074 | |
| <i>Wellbeing factors</i> | | | | |
| Good health | 4.27 | (1.816, 10.038) | 0.0011 | * |
| Not material hardship | 1.767 | (0.798, 3.909) | 0.1576 | |
| House no major problems | 1.093 | (0.440, 2.719) | 0.8456 | |
| Low transience | 0.605 | (0.104, 3.516) | 0.5713 | |
| Not crowded | 1.506 | (0.499, 4.549) | 0.4629 | |
| Not lonely | 2.987 | (1.059, 8.420) | 0.0388 | * |
| Right amount friends | 1.418 | (0.604, 3.333) | 0.4177 | |
| Easy to talk | 2.52 | (1.077, 5.899) | 0.0335 | * |
| Easy to be self | 2.302 | (0.961, 5.515) | 0.0612 | |
| High family wellbeing | 0.481 | (0.204, 1.136) | 0.0939 | |
| Trust in others | 2.927 | (1.173, 7.302) | 0.0219 | * |
| No discrimination | 1.394 | (0.537, 3.622) | 0.4901 | |
| Not fear crime | 1.119 | (0.461, 2.721) | 0.8009 | |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R²: 0.35, AUC: 0.77, unweighted n: 339, weighted n: 206,000

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, pooled 2021 and 2023 GSS samples

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Survey year controls</i> | | | | |
| 2023 (base: earlier years) | 1.457 | (0.754, 2.814) | 0.2586 | |
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 5.094 | (3.076, 8.434) | 0 | * |
| 25-34 years (base: 15-24) | 1.601 | (0.73, 3.511) | 0.2361 | |
| 35-44 years (base: 15-24) | 1.108 | (0.492, 2.498) | 0.8015 | |
| 45-54 years (base: 15-24) | 1.29 | (0.543, 3.061) | 0.5591 | |
| 55-64 years (base: 15-24) | 0.528 | (0.19, 1.468) | 0.2171 | |
| 65+ years (base: 15-24) | 0.558 | (0.172, 1.802) | 0.3243 | |
| Rural (base: urban) | 0.804 | (0.295, 2.188) | 0.6647 | |
| Highest qualification L2+ (base: no L2+ qualification) | 0.787 | (0.393, 1.578) | 0.4949 | |
| PHO enrolled | 0.612 | (0.134, 2.793) | 0.5209 | |
| <i>Wellbeing factors</i> | | | | |
| Good health | 3.884 | (2.247, 6.712) | 0 | * |
| Not material hardship | 1.171 | (0.684, 2.007) | 0.5603 | |
| Not lonely | 3.194 | (1.566, 6.513) | 0.0018 | * |
| Right amount friends | 0.87 | (0.501, 1.51) | 0.6153 | |
| Easy to talk | 2.618 | (1.547, 4.429) | 0.0005 | * |
| Easy to be self | 1.404 | (0.714, 2.76) | 0.3211 | |
| High family wellbeing | 0.924 | (0.53, 1.611) | 0.778 | |
| Trust in others | 2.026 | (1.206, 3.404) | 0.0083 | * |
| No discrimination | 1.021 | (0.484, 2.156) | 0.9553 | |
| Not fear crime | 0.823 | (0.488, 1.388) | 0.4604 | |
| Not crowded | 0.915 | (0.184, 4.563) | 0.9128 | |
| House no major problems | 1.104 | (0.631, 1.933) | 0.7251 | |
| Low transience | 0.362 | (0.098, 1.331) | 0.1242 | |
| Leisure right amount | 1.871 | (0.983, 3.56) | 0.0562 | |
| Good life control | 1.988 | (1.133, 3.49) | 0.0174 | * |
| Belong NZ | 1.724 | (0.967, 3.074) | 0.0646 | |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R2: 0.33, AUC: 0.78, unweighted n: 756

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, pooled 2018, 2021, 2023 GSS samples (excluding good health variable)

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Survey year controls</i> | | | | |
| 2021 (base: 2018) | 0.72 | (0.475, 1.093) | 0.121 | |
| 2023 (base: 2018) | 0.954 | (0.651, 1.400) | 0.8086 | |
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 2.804 | (1.946, 4.039) | 0 | * |
| 25-34 years (base: 15-24) | 1.063 | (0.625, 1.807) | 0.8192 | |
| 35-44 years (base: 15-24) | 0.796 | (0.438, 1.447) | 0.4498 | |
| 45-54 years (base: 15-24) | 0.98 | (0.567, 1.693) | 0.9419 | |
| 55-64 years (base: 15-24) | 0.467 | (0.261, 0.836) | 0.011 | * |
| 65+ years (base: 15-24) | 0.63 | (0.317, 1.255) | 0.1858 | |
| Rural (base: urban) | 0.749 | (0.407, 1.377) | 0.3467 | |
| Highest qualification L2+ (base: no L2+ qualification) | 0.868 | (0.576, 1.308) | 0.4939 | |
| PHO enrolled | 0.279 | (0.060, 1.306) | 0.1036 | |
| <i>Wellbeing factors</i> | | | | |
| Not material hardship | 1.669 | (1.122, 2.483) | 0.0122 | * |
| Not lonely | 3.049 | (1.948, 4.773) | 0 | * |
| Right amount friends | 1.036 | (0.710, 1.512) | 0.8516 | |
| Easy to talk | 2.345 | (1.614, 3.406) | 0 | * |
| Easy to be self | 1.477 | (0.941, 2.319) | 0.0887 | |
| High family wellbeing | 1.464 | (1.026, 2.087) | 0.0358 | * |
| Trust in others | 1.82 | (1.287, 2.574) | 0.0009 | * |
| No discrimination | 1.11 | (0.716, 1.720) | 0.637 | |
| Not fear crime | 1.194 | (0.833, 1.713) | 0.3295 | |
| Not crowded | 0.838 | (0.339, 2.072) | 0.6978 | |
| House no major problems | 1.194 | (0.816, 1.746) | 0.3571 | |
| Low transience | 0.289 | (0.112, 0.745) | 0.0108 | * |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R2: 0.23, AUC: 0.75, unweighted n: 1347, weighted n: 782000

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, pooled 2021 and 2023 GSS samples (excluding good health variable)

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Survey year controls</i> | | | | |
| 2023 (base: 2021) | 1.434 | (0.769, 2.674) | 0.2531 | |
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 4.58 | (2.803, 7.485) | 0 | * |
| 25-34 years (base: 15-24) | 1.373 | (0.620, 3.041) | 0.4294 | |
| 35-44 years (base: 15-24) | 0.962 | (0.437, 2.116) | 0.922 | |
| 45-54 years (base: 15-24) | 1.039 | (0.441, 2.445) | 0.93 | |
| 55-64 years (base: 15-24) | 0.417 | (0.168, 1.032) | 0.0582 | |
| 65+ years (base: 15-24) | 0.415 | (0.143, 1.202) | 0.1037 | |
| Rural (base: urban) | 0.642 | (0.246, 1.680) | 0.3621 | |
| Highest qualification L2+ (base: no L2+ qualification) | 0.855 | (0.452, 1.619) | 0.6267 | |
| PHO enrolled | 0.466 | (0.084, 2.588) | 0.3776 | |
| <i>Wellbeing factors</i> | | | | |
| Not material hardship | 1.253 | (0.750, 2.092) | 0.3846 | |
| Not lonely | 3.546 | (1.810, 6.948) | 0.0003 | * |
| Right amount friends | 0.937 | (0.554, 1.584) | 0.8044 | |
| Easy to talk | 2.652 | (1.592, 4.418) | 0.0003 | * |
| Easy to be self | 1.349 | (0.688, 2.645) | 0.3789 | |
| High family wellbeing | 1.035 | (0.614, 1.745) | 0.8949 | |
| Trust in others | 1.84 | (1.151, 2.940) | 0.0115 | * |
| No discrimination | 1.163 | (0.583, 2.319) | 0.6636 | |
| Not fear crime | 0.888 | (0.526, 1.500) | 0.6539 | |
| Not crowded | 0.922 | (0.182, 4.678) | 0.921 | |
| House no major problems | 1.253 | (0.729, 2.155) | 0.4099 | |
| Low transience | 0.362 | (0.095, 1.384) | 0.1352 | |
| Leisure right amount | 1.79 | (1.009, 3.175) | 0.0468 | * |
| Good life control | 2.522 | (1.451, 4.384) | 0.0013 | * |
| Belong NZ | 1.852 | (1.043, 3.287) | 0.0357 | * |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R2: 0.30, AUC: 0.80, unweighted n: 756, weighted n: 538,000

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, GSS 2018 sample

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 1.518 | (0.832, 2.770) | 0.1707 | |
| 25-34 years (base: 15-24) | 0.631 | (0.282, 1.408) | 0.2567 | |
| 35-44 years (base: 15-24) | 0.336 | (0.154, 0.734) | 0.0068 | * |
| 45-54 years (base: 15-24) | 0.579 | (0.250, 1.344) | 0.2 | |
| 55-64 years (base: 15-24) | 0.415 | (0.186, 0.927) | 0.0324 | * |
| 65+ years (base: 15-24) | 0.866 | (0.315, 2.377) | 0.7767 | |
| Rural (base: urban) | 0.636 | (0.232, 1.741) | 0.3731 | |
| Highest qualification L2+ (base: no L2+ qualification) | 1.136 | (0.618, 2.089) | 0.6785 | |
| PHO enrolled | 0.164 | (0.009, 2.848) | 0.2109 | |
| <i>Wellbeing factors</i> | | | | |
| Good health | 3.239 | (1.623, 6.465) | 0.0011 | * |
| Not material hardship | 2.027 | (1.067, 3.851) | 0.0315 | * |
| House no major problems | 0.799 | (0.436, 1.467) | 0.4646 | |
| Low transience | 0.375 | (0.073, 1.934) | 0.2374 | |
| Not crowded | 0.601 | (0.185, 1.954) | 0.3924 | |
| Not lonely | 2.363 | (1.253, 4.459) | 0.0086 | * |
| Right amount friends | 1.145 | (0.638, 2.056) | 0.6455 | |
| Easy to talk | 2.039 | (1.092, 3.810) | 0.026 | * |
| Easy to be self | 1.609 | (0.792, 3.267) | 0.1856 | |
| High family wellbeing | 1.754 | (0.952, 3.231) | 0.071 | |
| Trust in others | 1.232 | (0.771, 1.969) | 0.379 | |
| No discrimination | 1.201 | (0.611, 2.362) | 0.5912 | |
| Not fear crime | 1.776 | (1.050, 3.005) | 0.0327 | * |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R2: 0.27, AUC: 0.75, unweighted n: 588, weighted n: 242,000

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, Te Kupenga 2018 survey

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 2.691 | (1.406, 5.149) | 0.0033 | * |
| 25-34 years (base: 15-24) | 1.103 | (0.483, 2.519) | 0.8144 | |
| 35-44 years (base: 15-24) | 0.908 | (0.404, 2.040) | 0.8128 | |
| 45-54 years (base: 15-24) | 1.107 | (0.428, 2.862) | 0.8317 | |
| 55-64 years (base: 15-24) | 3.305 | (1.314, 8.312) | 0.0118 | * |
| 65+ years (base: 15-24) | 0.498 | (0.089, 2.775) | 0.421 | |
| Rural (base: urban) | 1.091 | (0.597, 1.994) | 0.774 | |
| Highest qualification L2+ (base: no L2+ qualification) | 0.76 | (0.460, 1.258) | 0.2817 | |
| PHO enrolled | 0.972 | (0.322, 2.933) | 0.9588 | |
| <i>Wellbeing factors</i> | | | | |
| Good health | 4.899 | (2.633, 9.116) | 0 | * |
| Not material hardship | 2.574 | (1.408, 4.705) | 0.0026 | * |
| House no major problems | 1.215 | (0.768, 1.922) | 0.3998 | |
| Low transience | 0.605 | (0.244, 1.501) | 0.2737 | |
| Not crowded | 0.483 | (0.211, 1.104) | 0.0836 | |
| Right contact whānau | 2.039 | (1.102, 3.772) | 0.0239 | * |
| Easy to get support | 1.863 | (1.051, 3.304) | 0.0337 | * |
| Whānau doing well | 1.944 | (1.120, 3.373) | 0.0188 | * |
| Whānau get along | 1.517 | (0.803, 2.864) | 0.1957 | |
| Trust in others | 1.172 | (0.609, 2.257) | 0.6301 | |
| No discrimination | 1.279 | (0.731, 2.238) | 0.3833 | |
| No crime | 1.202 | (0.689, 2.098) | 0.5122 | |
| Wairua important | 1.478 | (0.760, 2.875) | 0.2458 | |
| Māori culture important | 1.151 | (0.617, 2.146) | 0.6539 | |
| Understand te reo Māori | 0.778 | (0.353, 1.713) | 0.528 | |
| Know iwi | 0.456 | (0.185, 1.124) | 0.0871 | |
| Environmental planning | 3.22 | (1.314, 7.893) | 0.0113 | * |
| Registered iwi | 1.193 | (0.664, 2.144) | 0.5502 | |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R2: 0.27, AUC: 0.78, unweighted n: 630, weighted n: 48,500

Associations between wellbeing factors and the probability of having good mental wellbeing. Specialist services cohort, Te Kupenga 2018 survey (excluding good health variable)

| Predictor | Odds ratio | 95% CI | p-value | 5% Significant |
|--|------------|----------------|---------|----------------|
| <i>Demographic controls</i> | | | | |
| Male (base: female) | 2.556 | (1.410, 4.630) | 0.0024 | * |
| 25-34 years (base: 15-24) | 1.027 | (0.478, 2.206) | 0.9453 | |
| 35-44 years (base: 15-24) | 0.865 | (0.398, 1.879) | 0.7106 | |
| 45-54 years (base: 15-24) | 0.912 | (0.367, 2.265) | 0.8414 | |
| 55-64 years (base: 15-24) | 2.126 | (0.856, 5.283) | 0.1029 | |
| 65+ years (base: 15-24) | 0.384 | (0.057, 2.603) | 0.3225 | |
| Rural (base: urban) | 1.272 | (0.690, 2.344) | 0.436 | |
| Highest qualification L2+ (base: no L2+ qualification) | 0.828 | (0.504, 1.362) | 0.4526 | |
| PHO enrolled | 0.708 | (0.236, 2.131) | 0.5346 | |
| <i>Wellbeing factors</i> | | | | |
| Not material hardship | 2.431 | (1.354, 4.362) | 0.0034 | * |
| House no major problems | 1.25 | (0.823, 1.900) | 0.291 | |
| Low transience | 0.659 | (0.317, 1.371) | 0.2603 | |
| Not crowded | 0.48 | (0.234, 0.982) | 0.0445 | * |
| Right contact whānau | 2.255 | (1.288, 3.949) | 0.005 | * |
| Easy to get support | 1.976 | (1.165, 3.349) | 0.0122 | * |
| Whānau doing well | 2.088 | (1.214, 3.592) | 0.0085 | * |
| Whānau get along | 2.076 | (1.140, 3.780) | 0.0176 | * |
| Trust in others | 1.25 | (0.672, 2.326) | 0.4763 | |
| No discrimination | 1.331 | (0.808, 2.192) | 0.2567 | |
| No crime | 1.435 | (0.858, 2.399) | 0.1658 | |
| Wairua important | 1.508 | (0.798, 2.849) | 0.2025 | |
| Māori culture important | 1.103 | (0.616, 1.975) | 0.739 | |
| Understand te reo Māori | 0.797 | (0.378, 1.680) | 0.5469 | |
| Know iwi | 0.609 | (0.235, 1.574) | 0.3011 | |
| Environmental planning | 2.778 | (1.116, 6.915) | 0.0286 | * |
| Registered iwi | 1.051 | (0.599, 1.844) | 0.8614 | |

Outcome variable: WHO-5 binary

Method: logistic regression

Model statistics: Pseudo R2: 0.22, AUC: 0.75, unweighted n: 630, weighted n: 48,500

Appendix 4. Full list of logistic regression models analysed for this work

| Model name | cohort | Survey/s | Independent variable selection comment |
|--|-----------------------------|----------------------|--|
| primhd-2018-21-23 | Specialist services | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| primhd-2018 | Specialist services | GSS 2018 | Uses variables present in all survey years |
| primhd-2021_23 common var | Specialist services | GSS 2021, 2023 | Uses variables present in all survey years |
| primhd-2021_23 extra | Specialist services | GSS 2021, 2023 | Adds variables that became available for 2021-23 |
| M primhd-2018-21-23 | Specialist services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| primhd-2018-21-23 exclude health | Specialist services | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| primhd-2018 exclude health | Specialist services | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |
| primhd-2021_23 common var exclude health | Specialist services | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| primhd-2021_23 extra exclude health | Specialist services | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| M primhd-2018-21-23 exclude health | Specialist services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| phd2-2018-21-23 | Any services | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| phd2-2018 | Any services | GSS 2018 | Uses variables present in all survey years |
| phd2-2021_23 common var | Any services | GSS 2021, 2023 | Uses variables present in all survey years |
| phd2-2021_23 extra | Any services | GSS 2021, 2023 | Adds variables that became available for 2021-23 |
| M phd2-2018-21-23 | Any services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| M phd2-2018 | Any services & Māori | GSS 2018 | Uses variables present in all survey years |
| M phd2-2021_23 common var | Any services & Māori | GSS 2021, 2023 | Uses variables present in all survey years |
| M phd2-2021_23 extra | Any services & Māori | GSS 2021, 2023 | Adds variables that became available for 2021-23 |
| phd2-2018-21-23 exclude health | Any services | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| phd2-2018 exclude health | Any services | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |
| phd2-2021_23 common var exclude health | Any services | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| phd2-2021_23 extra exclude health | Any services | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| M phd2-2018-21-23 exclude health | Any services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| M phd2-2018 exclude health | Any services & Māori | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |

| | | | |
|--|------------------------------------|-------------------------|---|
| M phd2-2021_23 common var exclude health | Any services & Māori | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| M phd2-2021_23 extra exclude health | Any services & Māori | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| no primhd-2018-21- 23 | Not specialist services | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| no primhd-2018 | Not specialist services | GSS 2018 | Uses variables present in all survey years |
| no primhd-2021_23 common var | Not specialist services | GSS 2021, 2023 | Uses variables present in all survey years |
| no primhd-2021_23 extra | Not specialist services | GSS 2021, 2023 | Adds variables that became available for 2021-23 |
| M no primhd-2018- 21-23 | Not specialist services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| M no primhd-2018 | Not specialist services & Māori | GSS 2018 | Uses variables present in all survey years |
| M no primhd- 2021_23 common var | Not specialist services & Māori | GSS 2021, 2023 | Uses variables present in all survey years |
| M no primhd- 2021_23 extra | Not specialist services & Māori | GSS 2021, 2023 | Adds variables that became available for 2021-23 |
| no primhd-2018-21- 23 exclude health | Not specialist services | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| no primhd-2018 exclude health | Not specialist services | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |
| no primhd-2021_23 common var exclude health | Not specialist services | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| no primhd-2021_23 extra exclude health | Not specialist services | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| M no primhd-2018- 21-23 exclude health | Not specialist services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| M no primhd-2018 exclude health | Not specialist services & Māori | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |
| M no primhd- 2021_23 common var exclude health | Not specialist services & Māori | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| M no primhd- 2021_23 extra exclude health | Not specialist services & Māori | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| no phd2-2018-21-23 | No services | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| no phd2-2018 | No services | GSS 2018 | Uses variables present in all survey years |
| no phd2-2021_23 common var | No services | GSS 2021, 2023 | Uses variables present in all survey years |
| no phd2-2021_23 extra | No services | GSS 2021, 2023 | Adds variables that became available for 2021-23 |
| M no phd2-2018-21- 23 | No services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years |
| M no phd2-2018 | No services & Māori | GSS 2018 | Uses variables present in all survey years |
| M no phd2-2021_23 common var | No services & Māori | GSS 2021, 2023 | Uses variables present in all survey years |
| M no phd2-2021_23 extra | No services & Māori | GSS 2021, 2023 | Adds variables that became available for 2021-23 |

| | | | |
|---|------------------------------------|-------------------------|---|
| no phd2-2018-21-23 exclude health | No services | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| no phd2-2018 exclude health | No services | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |
| no phd2-2021_23 common var exclude health | No services | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| no phd2-2021_23 extra exclude health | No services | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| M no phd2-2018-21- 23 exclude health | No services & Māori | GSS 2018, 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| M no phd2-2018 exclude health | No services & Māori | GSS 2018 | Uses variables present in all survey years, excluding 'good health' |
| M no phd2-2021_23 common var exclude health | No services & Māori | GSS 2021, 2023 | Uses variables present in all survey years, excluding 'good health' |
| M no phd2-2021_23 extra exclude health | No services & Māori | GSS 2021, 2023 | Adds variables that became available for 2021-23, and excludes 'good health' |
| TK_primhd-2018 | Specialist services & Māori | TK 2018 | All te ao Māori variables |
| TK_primhd-2018 exclude health | Specialist services & Māori | TK 2018 | All te ao Māori variables excluding 'good health' |
| TK_phd2-2018 | Any services & Māori | TK 2018 | All te ao Māori variables |
| TK_phd2-2018 exclude health | Any services & Māori | TK 2018 | All te ao Māori variables excluding 'good health' |
| TK_no primhd-2018 | Not specialist services & Māori | TK 2018 | All te ao Māori variables |
| TK_no primhd-2018 exclude health | Not specialist services & Māori | TK 2018 | All te ao Māori variables excluding 'good health' |
| TK_no phd2-2018 | No services & Māori | TK 2018 | All te ao Māori variables |
| TK_no phd2-2018 exclude health | No services & Māori | TK 2018 | All te ao Māori variables excluding 'good health' |