Rural–urban variation in the utilisation of publicly funded healthcare services: an age-stratified population-level observational study

Garry Nixon, Gabrielle Davie, Jesse Whitehead, Rory Miller, Brandon de Graaf, Talis Liepins, Ross Lawrenson, Sue Crengle

ABSTRACT

AIM: To compare age-stratified public health service utilisation in Aotearoa New Zealand across the rural–urban spectrum.

METHODS: Routinely collected hospitalisation, allied health, emergency department and specialist outpatient data (2014–2018), along with Census denominators, were used to calculate utilisation rates for residents in the two urban and three rural categories in the Geographic Classification for Health.

RESULTS: Relative to their urban peers, rural Māori and rural non-Māori had lower all-cause, cardiovascular, mental health and ambulatory sensitive (ASH) hospitalisation rates. The age-standardised ASH rate ratios (major cities as the reference, 95% CIs) across the three rural categories were for Māori 0.79 (0.78, 0.80), 0.83 (0.82, 0.85) and 0.80 (0.77, 0.83), and for non-Māori 0.87 (0.86, 0.88), 0.80 (0.78, 0.81) and 0.50 (0.47, 0.53). Residents of the most remote communities had the lowest rates of specialist outpatient and emergency department attendance, an effect that was accentuated for Māori. Allied health service utilisation by those in rural areas was higher than that seen in the major cities.

CONCLUSIONS: The large rural–urban variation in health service utilisation demonstrated here is previously unrecognised and in contrast to comparable international data. New Zealand's most remote communities have the lowest rates of health service utilisation despite high amenable mortality rates. This raises questions about geographic equity in health service design and delivery and warrants further in-depth research.

In Aotearoa New Zealand, it is possible to monitor geographic variation in secondary health service utilisation due to the presence of a unique identifier for every health service user, well-maintained national administrative health datasets and a single public healthcare system. Contemporary monitoring has included "bench marking" the performance of the country's 20 district health boards (DHBs).[1] Regional disparities in the range and quality of health services that were identified have been termed a "postcode lottery" and were an important driver of the current health system reforms.[2] Despite the possibility that even greater variation may exist between urban and rural areas (either within a DHB or at a national level), few rural–urban analyses have been undertaken.

The evidence that does exist is contradictory. The NZ Health Survey 2002/2003, which used self-reported data from approximately 13,000 respondents, failed to demonstrate significant rural–urban differences in hospitalisation rates or access to a medical specialist.[3] In contrast, the *Rural Health: Challenges of Distance, Opportunities for Innovation* report published by the National Health Committee in 2010 used Mānatu Hauora – Ministry of Health administrative datasets and reported age-adjusted utilisation rates that were higher for rural than urban dwellers: outpatient services (11% higher), emergency department (ED) visits (20% higher) and public hospital use (excluding ED) (20% higher).[4] There is some evidence of lower rural utilisation rates for individual services at a regional level; for example, CT scanning in the Southern Region.[5]

A rural–urban classification designed specifically for use in health research and policy in New Zealand, the Geographic Classification for Health (GCH), was published in August 2022.[6] The GCH taxonomy comprises two urban categories, major urban centres (U1) and regional cities (U2), and three rural categories (R1, R2 and R3) that denote increasing rurality and remoteness. The GCH has "unmasked" rural–urban differences in

health outcomes that were obscured when other rural–urban classifications were used.[7] Mortality disparities identified by the GCH differ considerably across age bands, with younger rural residents having higher mortality rates than their urban peers, but older rural residents having mortality rates similar to or slightly lower than their urban peers.[8] Rural Māori have consistently poorer health outcomes than rural non-Māori, frequently exceeding the ethnic inequities observed in the urban context.[9]

In June 2022, New Zealand's parliament passed into law the *Pae Ora (Healthy Futures) Bill*.[10] After intense pressure from the rural health sector, the legislation was altered at its final reading to include provision for a Rural Health Strategy, which was subsequently released in July 2023.[11] The Strategy is a high-level document that will give rise to specific rural health policy and plans in the coming years. Accurate data on rural–urban variation in health service utilisation is now needed to provide an evidence base for this policy and health service planning.

The objective of this paper is to compare age-standardised and age-stratified utilisation rates across broad categories of publicly funded health services to identify areas of significant rural–urban health service variation that warrant further detailed examination.

Methods

This population-level observational study used deidentified routinely collected data from two New Zealand government agencies: Manatū Hauora – Ministry of Health and Statistics New Zealand (Stats NZ).

Numerators

Extracts of two administrative data collections were obtained from Manatū Hauora – Ministry of Health. This included data for 2015–2019 from the National Minimum Dataset (NMDS) of hospital discharges and the National Non-Admitted Patient Collection (NNPAC) of outpatient and ED attendances. Both datasets included the person's age at time of event, sex, ethnicity (Māori or non-Māori) and domicile (geographical unit representing the area encompassing their residential address, approximately 2,000 residents in each). Outcome measures derived from the NMDS were all-cause hospitalisations as well as cardiovascular (CVD), cancer, injury, mental and behavioural disorders and ambulatory sensitive hospitalisations (ASH). ASH are defined as hospitalisations of people less than 75 years of age "*resulting from diseases sensitive to prophylactic or therapeutic interventions that are deliverable in a primary healthcare setting*".[12] Rural patients are frequently transferred between institutions in order to access appropriate specialist care. This can result in the "overcounting" of rural events. To account for this, contemporaneous admissions for an individual were grouped as part of a single continuous episode of care.[13] Outcome measures derived from NNPAC were all specialist outpatient and ED attendances, and allied health outpatient events. The Allied Health indicator comprised of all NNPAC events with allied health purchase units, with the exclusion of community radiology. The service descriptions and their frequencies are presented in Appendix Table 1.

Age was categorised as follows: 0–29, 30–44, 45–59, 60–74 or 75+ years. Ethnicity was categorised as Māori or non-Māori. If any of the ethnicities recorded were Māori, the individual was classified was Māori.

Denominators

Census usually resident population counts for 2013 and 2018, aggregated, simultaneously, by age, sex, ethnicity and rurality, were obtained from Stats NZ. Age was obtained in 15-year bands. Census ethnicity was categorised as "Māori" or "non-Māori" using the same process used for the Manatū Hauora – Ministry of Health data. Annual estimates for 2015–2019 in each of the combinations of these variables (age [5], ethnicity [2] and rurality [5]) were obtained from linear interpolation of the Census 2013 and Census 2018 counts. Total person-years for each of the combinations was obtained from these annual estimates.

Rural–urban status

Rural and urban areas were defined according to the recently published five-level Geographic Classification for Health (GCH).[14] Using the domicile concordance file, the relevant GCH category was assigned to each individual's domicile code.[15]

Statistical analysis

In order to combine the numerator and denominator datasets, the person-level numerator dataset was collapsed, with counts of each outcome produced for each combination of the age (5), ethnicity (2) and rurality (5) categories (50 rows).

Crude rates were calculated separately for the total population, Māori and non-Māori for the age-strata within each of the outcome variables, per 100,000 person-years for the 6 NMDS outcomes and per 1,000 person-years for the 3 NNPAC outcomes. Incidence rate ratios (IRRs) and 95% Confidence intervals (CIs) per age group and outcome were calculated using Poisson regression and represent the ratio of the incidence rate in one of the GCH categories (U2, R1, R2, R3) divided by the incidence rate in U1 (reference category). For each outcome an overall age-standardised rate was calculated; the 2001 Census Māori population was used as the standard population for these directly standardised rates.

Data were prepared using SAS software version 9.4 for Linux.[16] Analysis was undertaken using Stata/SE v17.[17] Figures were produced using R.[18]

Results

There was an average of 1,079,000 all-cause hospitalisations per year for the period 2015–2019; 61% of hospitalisations were for residents of U1 (major cities), 20% were for U2 residents and 12%, 5% and 1% were for R1, R2 and R3 residents respectively. Of the 6.3 million specialist appointments per year, 56% were for U1 residents and 23%, 14%, 6% and 1% for U2, R1, R2 and R3 residents respectively. There were on average, 705,000 ED attendances per year, of which 53%, 26%, 13%, 7% and 1% were for U1, U2, R1, R2 and R3 residents respectively. Allied Health events were less likely to be for U1 residents; of the 980,000 per year, 41% were for U1 residents, 36% were for U2 residents and 14%, 8% and 1% were for R1, R2 and R3 residents respectively.

Age-standardised and age-stratified hospitalisation rates for each GCH category are presented separately for Māori (Appendix Table 2), non-Māori (Appendix Table 3) and for the total New Zealand population (Appendix Table 4). Age-standardised hospitalisation incidence rate ratios (IRRs) with U1 as the reference are presented in Figure 1. Results for non-admitted patient events are presented in the same format in Appendix Table 5, Appendix Table 6 and Figure 2.

For Māori, all-cause hospitalisation rates were highest for those living in U2 areas (regional centres), with the exception of 60+ years, where U1 and U2 rates were the same (Appendix Table 2). Māori all-cause hospitalisation rates for all rural strata were lower than the equivalent age-specific urban strata, the exception being R3 residents aged 75+ years, where all-cause hospitalisations were the same as those in the urban categories. A very similar pattern of lower rural hospitalisation rates was observed for non-Māori, with the exception of the 15–29-year-old age group in the R1 and R2 categories where the rates were higher than U1 but less than U2 (Appendix Table 3).

When the New Zealand population was considered as a whole, a clear gradient of reducing all-cause hospitalisation across the rural categories became apparent. Using U1 as the reference, within each age strata the rate for R2 residents was lower than R1, and the R3 rate lower again (Appendix Table 2). The rate for U2 residents was, however, 5% higher than for U1. Based on these data, if rural residents (R1, R2 and R3) had experienced the same crude rate of all-cause hospitalisation as those living in the cities (U1 and U2), the total number of hospitalisations nationwide would have risen by an average of 5,191 per year (or 0.5%).

Māori CVD hospitalisation rates for rural residents were lower than for U1 residents for 15/18 of the age by GCH combinations (6 age groups x 3 rural categories). At times the difference was large; for example, residents of R3 aged 60–74 years were 27% less likely (20% -33%) to have a CVD hospitalised episode of care than U1 residents of the same age. A similar pattern was observed for non-Māori.

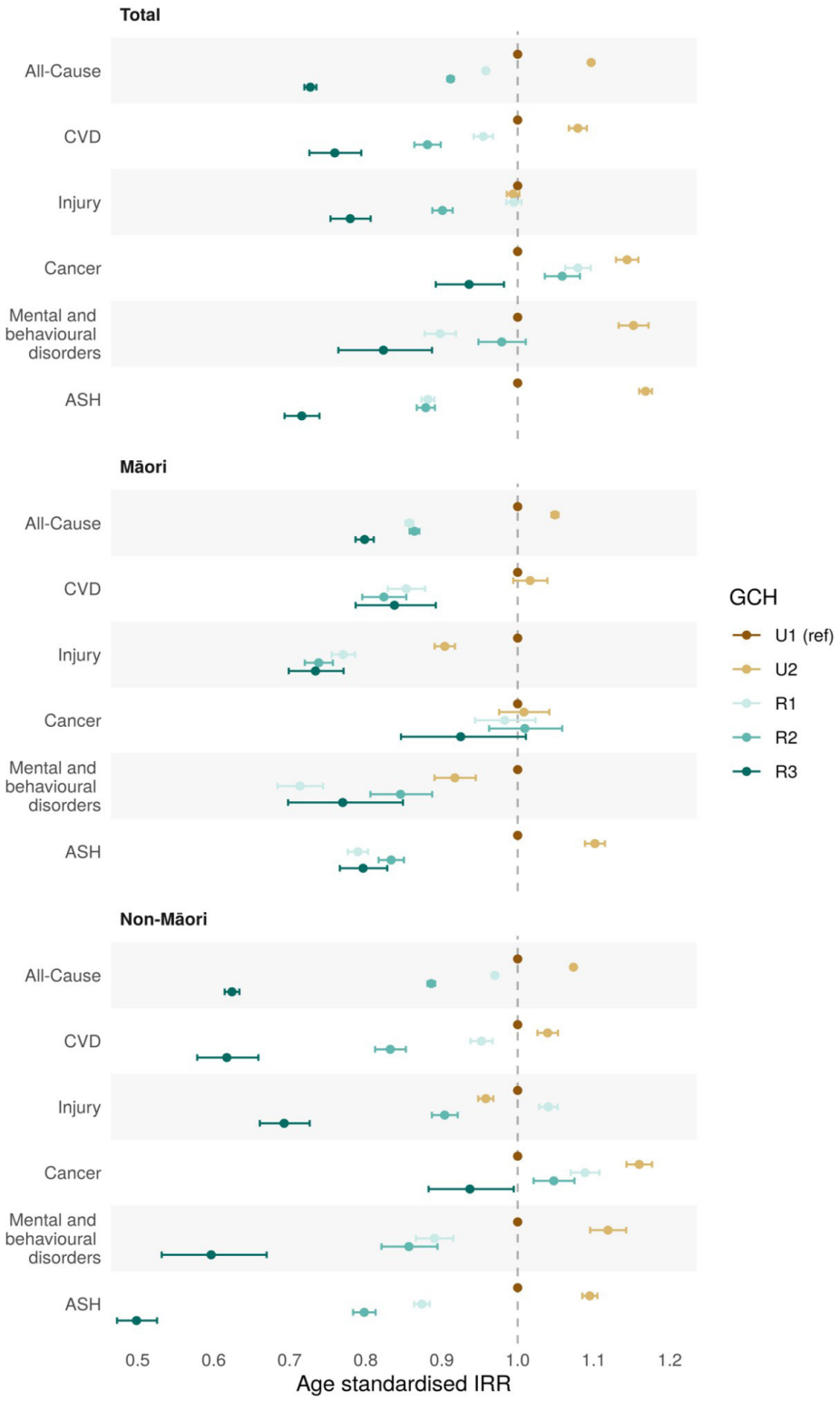
Māori living outside the major cities (U2 and R1–R3) had lower injury-related hospitalisation rates. A slightly different pattern was observed for non-Māori aged 15–44 years, who for those living in U2, R1 and R2 (but not R3) had injury-related rates of hospitalised episodes of care that were similar to or higher than the U1 rates.

For Māori and non-Māori there was no clear pattern of rural–urban variation in cancer hospitalisations, with the possible exception of the lower rural rates in the paediatric (0–14 year) population.

Rates of mental health and behavioural disorder hospitalised episodes of care were lower overall in the rural categories for both Māori and non-Māori. The overall age-adjusted rates for rural Māori, relative to U1 Māori, were estimated to be 0.71 (R1), 0.85 (R2) and 0.77 (R3).

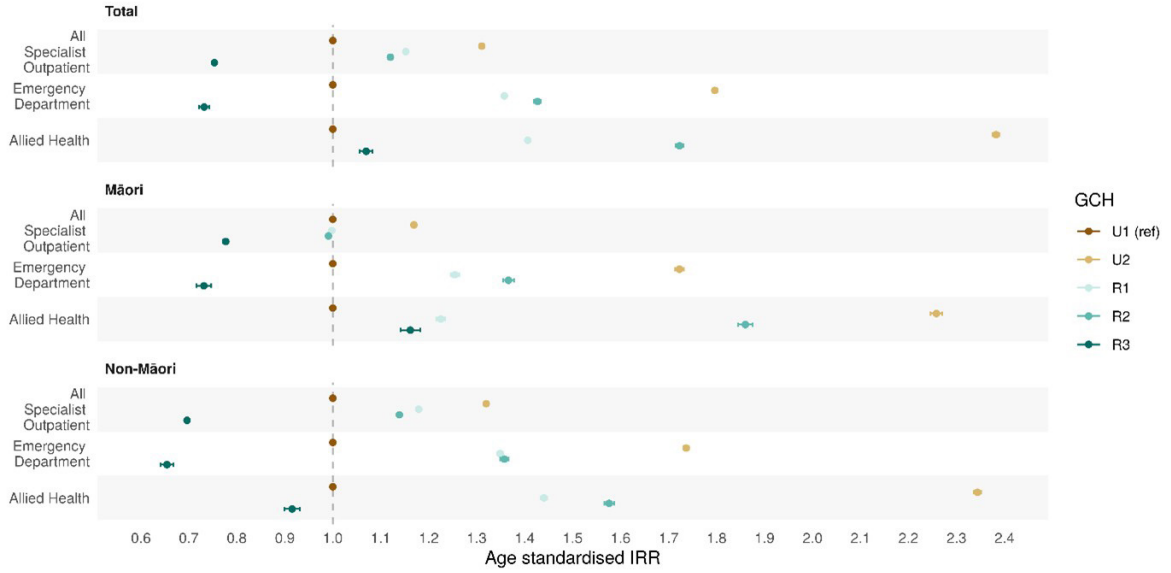
Ambulatory sensitive hospitalisation (ASH) rates for Māori across all rural strata were lower than U1 with IRRs that are consistently less than 0.9. In contrast, ASH rates for Māori living in U2 were at least 6% higher than the rates for Māori U1 residents. Non-Māori exhibit the same pattern

Figure 1: New Zealand total population, Māori and non-Māori, age-standardised hospitalised episodes of care incidence rate ratios by GCH category (IRRs; using U1 as reference).



ASH = Ambulatory Sensitive Hospitalisations. GCH = Geographic Classification for Health

Figure 2: New Zealand total population, Māori and non-Māori, age-standardised outpatient event rate ratios by GCH category (IRRs; using U1 as reference).



GCH = Geographic Classification for Health

with the exception of two strata (U2 10–14 years and R1 15–29 years) where the ASH rate was estimated to be similar to that of U1 residents. For non-Māori, a strong gradient of declining ASH rates across the GCH spectrum from U2 to R3 was evident. For each age strata, the rate for R3 residents was lower than for R2, R2 lower than R1, and R1 lower than U2. For example, in those aged 45–59 years the U2 to R3 IRRs were 1.09 (U2), 0.84 (R1), 0.76 (R2) and 0.43 (R3) respectively.

Residents of U2 communities had the highest utilisation rates for all three categories of non-admitted events, both for Māori and non-Māori. In some circumstances the rate for residents of U2 was triple that for U1 residents; Allied Health service utilisation in the 75+ year-old age group was one example of this. ED utilisation is also much higher for U2 residents, particularly in the 15–29-year-old strata where the IRR for Māori is 1.73 and for non-Māori 2.03.

Residents of R3 communities had the lowest rates of specialist outpatient and ED utilisation, with disparities most apparent in the middle years of life. Examples include the ED IRR for Māori aged between 30 and 59 years of 0.64 and the specialist outpatient IRR for non-Māori aged 45–79 years of 0.59, both compared to the respective rate for U1 residents. Non-Māori in R1 and R2 communities had specialist outpatient utilisation rates that were overall slightly higher than those in U1 but lower than those in U2. On the other hand, Māori aged 30–74 years in these communities had rates that were lower than respective age-strata for U1 Māori. For example, the IRR for 60–74-year-old R1 Māori is 0.90 compared to 60–74-year-old U1 Māori. Residents of R1 and R2 communities had ED utilisation rates that were consistently higher than U1 but lower than U2. The largest differences were seen for 15–29-year-old non-Māori living in R1 and R3 and >75-year-old Māori in R2; IRRs are 1.66, 1.63 and 1.83 respectively.

The utilisation of Allied Health services by residents in R1 and R2 areas were consistently higher than in U1 communities and in some instances approximated the U2 rate. As an example, Māori aged 15–29 years in R2 had a utilisation rate three times higher than U1 (2.99; CI 2.94–3.05); in comparison, the U2:U1 IRR for Māori of the same age group was 2.62 (CI 2.60–2.64).

Discussion

This study identified considerable variation in the rates of publicly funded health service utilisation across the New Zealand rural–urban spectrum. Regional centres (U2) had, overall, the highest hospitalisation rates, and rural areas the lowest. This was most evident for all-cause hospitalisations and ASH where, for non-Māori, clear gradients of declining rates of hospitalised

episodes of care with increasing rurality were apparent. ASH rates for some age strata in R3 communities were less than half the comparable U1 rates. Mental health, CVD and injury-related hospitalisation rates are also lower for residents of rural areas compared to U1 areas for the majority of strata, with cancer-related admissions proving an exception. Rates of non-admitted events were consistently higher for residents in U2 areas compared to U1 and all three rural categories. R3 communities had the lowest rates of specialist outpatient and ED utilisation. The pattern was more complex for R1 and R2 communities, where ED attendance was higher than that seen in U1, but for Māori, at least in the middle years of life, specialist outpatient attendance was lower. Allied Health service utilisation in rural areas was higher than in U1 but less than U2. No consistent pattern of variation was evident across the age strata within GCH categories.

The strengths of this study include the use of a fit-for-purpose geographic classification and the recency of the available data. Primary care utilisation data is a crucial piece of the puzzle, and its absence is a major limitation of this study. The utilisation of all the services considered in this study will be influenced by access to, and the quality of, primary care. Improved primary care data collection should be a priority for the new unified health system. It is the experience of rural health professionals that patients move between urban and rural areas, and between rural areas, in response to age and illness. Since the GCH category used was obtained from patients' addresses at the time the healthcare event occurred, this may go some way to explaining the variation in healthcare utilisation observed.[8] This migration and its effect on health data along with primary care utilisation will be the subject of research planned for the near future.[24] Possible differences in coding practice between rural and urban hospitals may also impact these rural–urban analyses.

The findings of lower rural hospitalisation rates in this study are consistent with one other New Zealand-based study that noted an association between proximity to care and higher ASH rates for children,[19] but stand in contrast to wider existing New Zealand (that report similar or higher rural rates)[3,4] and international literature (that report higher rural rates). Potentially preventable hospitalisation (PPH) rates, a similar measure to ASH, are between 1.8 and 2.6 times higher in rural and remote Australia than those seen in major cities.[20, 21] In line with our findings and older New Zealand data, rural resident ED attendance exceeds the urban rates in Australia; something that, along with the higher PPH rates has been attributed to poor access to acute primary care for rural Australians.[22] Canadian rural hospitalisation and ED rates mirror those seen in Australia.[23] In addition, rural Canadians have lower rates of specialist outpatient attendance.

Considerable care needs to be taken when interpreting these results from a policy perspective. For example, it should not be assumed that the lower rural ASH rates are indicative of access to quality primary and preventive care or healthier rural communities. These rural communities have New Zealand's highest amenable mortality rates.[8] Low ASH rates in this context are more likely to reflect a complex interaction of need, rural models of healthcare delivery and access, and may in part be a consequence of the widespread closure of rural hospital beds that occurred during previous health reforms.[25] Equally, the differences in access to Allied Health and specialist outpatient services need further in-depth research in order to understand the causes of the differences, and their implications for policy and service delivery. The high rural:urban mortality rate ratios for the younger age strata[8] were not matched with higher rates of health service utilisation in this study. This is unexpected and suggests that hospitalisation rates may not be reliable indicators of morbidity in the New Zealand rural context. Other health systems factors that differ between rural and urban areas may be impacting hospitalisation rates. Examples include the structure of the workforce, with a high proportion of locums and international medical graduates in rural areas, and the availability and uptake of private healthcare.[26,27]

Until recently, many rural communities shared a DHB with their nearest regional city (U2). The magnitude of the disparities identified in this study are at their greatest when U2 and rural communities are compared. This suggests that greater attention could have been paid to monitoring rural–urban variation within DHBs, rather than focussing on differences between DHBs. Variation in the utilisation of health services between neighbouring rural and urban communities may be larger than the variation between DHBs, and as such a greater example of "postcode lottery".

The R3 category, which covers 39% of New Zealand's land area but only 1% of the total population, is home to some of our most vulnerable

communities. It has the highest proportion of Māori (33%), and the highest proportion of residents living in the most deprived New Zealand Index of Deprivation (*NZDep*) quintile (Māori 73%, non-Māori 39%).[28,9] There is evidence that the Māori:non-Māori health outcome "equity gap" is greater in rural areas.[9] An association between rurality and higher amenable mortality rates (an effect more pronounced in younger age strata, for Māori and for more remote communities) has previously been demonstrated.[8] This study adds evidence of lower levels of actualised access to secondary care, either as inpatients or specialist outpatient clinics, for the same populations, and in doing so also raises questions about geographic equity in health service design and delivery.

This study has demonstrated large, and previously unrecognised, rural–urban differences in public health service utilisation in New Zealand. These differences are in marked contrast to those seen in comparable countries and warrant further exploration. New Zealand's new unitary health-care system and rural health strategy has created an opportunity to address any health disadvantage for rural communities that may be occurring as a result of these differences in health service utilisation.

COMPETING INTERESTS
The authors have no conflicts of interest to report.

ACKNOWLEDGEMENTS
Michelle Smith for helping administer the study and preparing the manuscript for submission. This project was funded by a grant from the Health Research Council of New Zealand (HRC19/488).

AUTHOR INFORMATION
Garry Nixon: Professor Rural Health, Department of General Practice and Rural Health, University of Otago, Dunedin, New Zealand.
Gabrielle Davie: Associate Professor and Biostatistician, Department of Preventive and Social Medicine, University of Otago, Dunedin, New Zealand.
Jesse Whitehead: Health Geographer, Te Ngira: Institute for Population Research, University of Waikato, Hamilton, New Zealand.
Rory Miller: Senior Lecturer and Rural Generalist, Department of General Practice and Rural Health, University of Otago, Dunedin, New Zealand.
Brandon de Graaf: Data analyst, Department of Preventive and Social Medicine, University of Otago, Dunedin, New Zealand.
Talis Liepins: Health Economist, Department of General Practice and Rural Health, University of Otago, Dunedin, New Zealand.
Ross Lawrenson: Professor Population Health, Waikato Medical Research Centre, University of Waikato, Hamilton, New Zealand.
Sue Crengle (Kāti Tahu, Kati Māmoe, Waitaha): Professor of Māori Health, Public Health Physician and GP, Ngāi Tahu Māori Health Research Unit, University of Otago, Dunedin, New Zealand.

CORRESPONDING AUTHOR
Garry Nixon: Central Otago Health Services Ltd, PO Box 30, Clyde 9341, New Zealand. Ph: +64 21 178 2662. E: garry.nixon@otago.ac.nz

URL
https://nzmj.org.nz/journal/vol-137-no-1590/rural-urban-variation-in-the-utilisation-of-publicly-funded-healthcare-services-an-age-stratified-population-level-observational

REFERENCES
1. Health Quality & Safety Commission New Zealand. Measures Library [Internet]. Wellington (NZ): Health Quality & Safety Commission New Zealand; 2023 [cited 2024 Feb]. Available from: https://reports.hqsc.govt.nz/measures-library/#!/.
2. Manatū Hauora – Ministry of Health. Health and disability system review - Interim Report Pūrongo mō tēnei wā [Internet]. Wellington (NZ): Health and Disability System Review; 2019 [cited 2024 Feb]. Available from: www.systemreview.health.govt.nz/interim-report.
3. Ministry of Health. Urban–Rural Health Comparisons: Key results of the 2002/03 New Zealand Health Survey [Internet]. Wellington (NZ): Ministry of Health; 2007 [cited 2024 Feb]. Available from: https://www.health.govt.nz/system/files/documents/publications/urban-rural-health-comparisons.pdf.
4. The National Health Committee. Rural Health: challenges of distance, opportunities for innovation [Internet]. Wellington (NZ): The National Health Committee; 2010 [cited 2024 Feb]. Available from: https://thehub.swa.govt.nz/resources/rural-health-challenges-of-distance-opportunities-for-innovation/.
5. Nixon G, Samaranayaka A, de Graaf B, et al. Geographic disparities in the utilisation of computed tomography scanning services in southern New Zealand. Health Policy. 2014;118(2):222-8. doi: 10.1016/j.healthpol.2014.05.002.
6. Whitehead J, Davie G, de Graaf B, et al. Defining rural in Aotearoa New Zealand: a novel geographic classification for health purposes. N Z Med J. 2022;135(1559):24-40.
7. Whitehead J, Davie G, de Graaf B, et al. Unmasking hidden disparities: a comparative observational study examining the impact of different rurality classifications for health research in Aotearoa New Zealand. BMJ Open. 2023;13(4):e067927. doi: 10.1136/bmjopen-2022-067927.
8. Nixon G, Davie G, Whitehead J, et al. Comparison of urban and rural mortality rates across the lifespan in Aotearoa / New Zealand: a population-level study. J Epidemiol Community Health. 2023;77(9):571-577. doi: 10.1136/jech-2023-220337.
9. Crengle S, Davie G, Whitehead J, et al. Mortality outcomes and inequities experienced by rural Māori in Aotearoa New Zealand. Lancet Reg Health West Pac. 2022;28:100570. doi: 10.1016/j.lanwpc.2022.100570.
10. *Pae Ora (Healthy Futures) Bill 2022* (NZ) s 40B [cited 2024 Feb]. Available from: https://www.legislation.govt.nz/act/public/2022/0030/latest/versions.aspx.
11. Manatū Hauora – Ministry of Health. Rural Health Strategy [Internet]. Wellington (NZ): Manatū Hauora – Ministry of Health; 2023 [cited 2024 Feb]. Available from: https://www.health.govt.nz/publication/rural-health-strategy.
12. Te Whatu Ora – Health New Zealand. Ambulatory Sensitive Hospital Admissions [Internet]. Wellington

(NZ): Te Whatu Ora – Health New Zealand; 2023 [cited 2024 Feb]. Available from: https://www.tewhatuora.govt.nz/our-health-system/health-system-indicators-framework/.
13. Lee S, Miller R, Lee M, et al. Outcomes after ST-elevation myocardial infarction presentation to hospitals with or without a routine primary percutaneous coronary intervention service (ANZACS-QI 46). N Z Med J. 2020;133(1524):64-81.
14. Nixon G, Whitehead J, Davie G, et al. Developing the geographic classification for health, a rural-urban classification for New Zealand health research and policy: A research protocol. Aust J Rural Health. 2021;29(6):939-46. doi: 10.1111/ajr.12778.
15. Rural-urban classification for NZ health research and policy. Downloads -Concordance files [Internet]. Dunedin (NZ): University of Otago; 2023 [cited 2024 Feb]. Available from: https://rhrn.nz/.
16. SAS software. SAS System for Linux version 9.4. Cary, NC (US): SAS Institute Inc.; 2023.
17. StataCorp. Stata Statistical Software: Release 17. College Station, TX (US): StataCorp LLC; 2021.
18. R Core Team. R: A language and environment for statistical computing. Vienna (AT): R Foundation for Statistical Computing; 2018.
19. Hobbs M, Tomintz M, Kingham S. Investigating the rates and spatial distribution of childhood ambulatory sensitive hospitalisations in New Zealand [Internet]. Canterbury (NZ): GEO Health Lab, University of Canterbury; 2018.
20. Metadata Online Registry. National Healthcare Agreement: PI 18- Selected potentially preventable hospitalisations, 2019. Canberra (AU): Australian Institute of Health and Welfare; 2019 [cited 2024 Feb]. Available from: https://meteor.aihw.gov.au/content/698904.
21. Australian Institute of Health and Welfare. Rural and Remote Health [Internet]. Canberra (AU): Australian Institute of Health and Welfare; 2022 [cited 2024 Feb]. Available from: https://www.aihw.gov.au/reports/rural-remote-australians/rural-and-remote-health#intro.
22. National Rural Health Alliance Inc. Australia's health system needs re-balancing: a report on the shortage of primary care services in rural and remote areas. Canberra (AU): National Rural Health Alliance; 2011 [cited 2024 Feb]. Available from: https://www.ruralhealth.org.au/sites/default/files/documents/nrha-policy-document/position/pos-full-complementary-report-27-feb-11.pdf.
23. Pong RW, DesMeules M, Heng D, et al. Patterns of health service utilization in rural Canada. Chronic Dis Inj Can. 2011;31 Suppl 1:1-36.
24. Health Research Council of New Zealand. Understanding the impact of rurality on health outcomes and healthcare delivery [Internet]. Auckland (NZ): Health Research Council; 2022 [cited 2024 Feb]. Available from: https://www.hrc.govt.nz/resources/research-repository/understanding-impact-rurality-health-outcomes-and-healthcare-delivery.
25. Barnett R, Barnett P. "If you want to sit on your butts you'll get nothing!" Community activism in response to threats of rural hospital closure in southern New Zealand. Health Place. 2003;9(2):59-71. doi: 10.1016/s1353-8292(02)00019-9.
26. Lawrenson RA, Nixon G, Steed RH. The rural hospital doctors workforce in New Zealand. Rural Remote Health. 2011;11(2):1588.
27. Keene L. Creeping Privatisation: Analysis of trends in planned care provision in Aotearoa New Zealand [Internet]. Wellington (NZ): Association of Salaried Medical Specialists; 2023 [cited 2024 Feb]. Available from: https://asms.org.nz/wp-content/uploads/2023/09/Creeping-Privatisation_final-Sept-2023.pdf.
28. Whitehead J, Atkinson J, Davie G, et al. Comparison of the sociodemographic composition of rural and urban Aotearoa New Zealand: Insights from applying the Geographic Classification for Health to Census 2018. N Z Popul Rev. 2023.

Appendices

Appendix Table 1: Distribution of events extracted from the National Non-Admitted Patient Collection (2015–2019) and included in the Allied Health Indicator.

Purchase unit description	Frequency	Percent
Dietetics	96,575	11.6
Occupational therapy	131,529	15.8
Optometrist clinic	14,004	1.7
Orthoptist	28,625	3.5
Physiotherapy	407,291	49.0
Podiatry	35,553	4.3
Prosthetic eyes	369	<1
Prosthetic services	436	<1
Psychologist services—non mental health	21,721	2.6
Social work	55,463	6.7
Speech therapy	38,909	4.7

Appendix Table 2: Māori population: frequencies and rates of hospitalised episodes of care for 2015–2019 (IR; per 100k person-years) and incidence rate ratios (IRRs; U1=ref) by GCH category.

Episodes of care	U1 (Ref.)		U2				R1				R2				R3			
	n	IR	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI
All Cause																		
Overall*	439,520	23,145	243,489	24,279	1.05	(1.04 , 1.05)	110,979	19,846	0.86	(0.86 , 0.87)	73,328	19,862	0.86	(0.86 , 0.87)	19,172	18,210	0.79	(0.79 , 0.81)
0–14 years	114,542	19,688	64,909	20,854	1.06	(1.05 , 1.07)	28,290	16,531	0.84	(0.83 , 0.85)	18,362	17,078	0.87	(0.85 , 0.88)	3,983	15,536	0.79	(0.76 , 0.81)
15–29 years	104,961	21,532	53,302	23,529	1.09	(1.08 , 1.10)	23,446	20,313	0.94	(0.93 , 0.96)	14,129	19,948	0.93	(0.91 , 0.94)	2,842	17,635	0.82	(0.79 , 0.85)
30–44 years	73,867	22,657	37,867	23,194	1.02	(1.01 , 1.04)	16,110	18,691	0.82	(0.81 , 0.84)	10,009	18,739	0.83	(0.81 , 0.84)	2,249	17,540	0.77	(0.74 , 0.81)
45–59 years	73,529	26,395	40,276	27,078	1.03	(1.01 , 1.04)	18,676	21,392	0.81	(0.80 , 0.82)	12,588	21,572	0.82	(0.80 , 0.83)	3,729	20,968	0.79	(0.77 , 0.82)
60–74 years	53,590	45,125	33,393	45,237	1.00	(0.99 , 1.02)	17,201	37,421	0.83	(0.82 , 0.84)	12,690	37,920	0.84	(0.82 , 0.86)	4,219	35,451	0.79	(0.76 , 0.81)
75+ years	19,031	69,741	13,742	70,407	1.01	(0.99 , 1.03)	7,256	62,065	0.89	(0.87 , 0.91)	5,550	60,755	0.87	(0.85 , 0.90)	2,150	68,778	0.99	(0.94 , 1.03)
CVD																		
Overall*	22,295	955	13,131	953	1.02	(0.99 , 1.04)	6,590	794	0.85	(0.83 , 0.88)	4,369	786	0.82	0.80, 0.85)	1,437	800	0.84	(0.79 , 0.89)
0–14 years	882	152	542	174	1.15	(1.03 , 1.28)	177	103	0.68	(0.58 , 0.80)	145	135	0.89	(0.75 , 1.06)	28	109	0.72	(0.49 , 1.05)
15–29 years	1,123	230	504	222	0.97	(0.87 , 1.07)	200	173	0.75	(0.65 , 0.87)	122	172	0.75	(0.62 , 0.90)	23	143	0.62	(0.41 , 0.94)
30–44 years	2,446	750	1,242	761	1.01	(0.95 , 1.09)	589	683	0.91	(0.83 , 1.00)	370	693	0.92	(0.83 , 1.03)	95	741	0.99	(0.80 , 1.21)
45–59 years	7,143	2,564	3,991	2,683	1.05	(1.01 , 1.09)	1,933	2,214	0.86	(0.82 , 0.91)	1,256	2,152	0.84	(0.79 , 0.89)	418	2,350	0.92	(0.83 , 1.01)
60–74 years	7,539	6,348	4,584	6,210	0.98	(0.94 , 1.01)	2,496	5,430	0.86	(0.82 , 0.89)	1,629	4,868	0.77	(0.73 , 0.81)	553	4,647	0.73	(0.67 , 0.80)
75+ years	3,162	11,588	2,268	11,620	1.00	(0.95 , 1.06)	1,195	10,222	0.88	(0.83 , 0.94)	847	9,272	0.80	(0.74 , 0.86)	320	10,237	0.88	(0.79 , 0.99)
Injury																		
Overall*	56,228	3,026	25,942	2,735	0.90	(0.89 , 0.92)	12,006	2,331	0.77	(0.76 , 0.79)	7,375	2,233	0.74	(0.72 , 0.76)	1,922	2,113	0.73	(0.70 , 0.77)
0–14 years	13,477	2,316	6,335	2,035	0.88	(0.85 , 0.91)	2,896	1,692	0.73	(0.70 , 0.76)	1,730	1,609	0.69	(0.66 , 0.73)	417	1,626	0.70	(0.64 , 0.77)
15–29 years	19,034	3,905	8,597	3,795	0.97	(0.95 , 1.00)	3,980	3,448	0.88	(0.85 , 0.91)	2,324	3,281	0.84	(0.80 , 0.88)	498	3,090	0.79	(0.72 , 0.87)
30–44 years	10,372	3,181	4,712	2,886	0.91	(0.88 , 0.94)	2,027	2,352	0.74	(0.70 , 0.78)	1,211	2,267	0.71	(0.67 , 0.76)	304	2,371	0.75	(0.66 , 0.84)
45–59 years	7,670	2,753	3,501	2,354	0.85	(0.82 , 0.89)	1,632	1,869	0.68	(0.64 , 0.72)	1,099	1,883	0.68	(0.64 , 0.73)	357	2,007	0.73	(0.66 , 0.81)
60–74 years	3,823	3,219	1,780	2,411	0.75	(0.71 , 0.79)	925	2,012	0.63	(0.58 , 0.67)	669	1,999	0.62	(0.57 , 0.67)	199	1,672	0.52	(0.45 , 0.60)
75+ years	1,852	6,787	1,017	5,211	0.77	(0.71 , 0.83)	546	4,670	0.69	(0.63 , 0.76)	342	3,744	0.55	(0.49 , 0.62)	147	4,702	0.69	(0.59 , 0.82)
Cancer																		
Overall*	10,368	453	6,062	457	1.01	(0.98 , 1.04)	3,476	445	0.98	(0.94 , 1.02)	2,434	457	1.01	(0.96 , 1.06)	739	419	0.93	(0.85 , 1.01)
0–14 years	745	128	319	102	0.80	(0.70 , 0.91)	181	106	0.83	(0.70 , 0.97)	116	108	0.84	(0.69 , 1.02)	12	47	0.37	(0.21 , 0.65)
15–29 years	492	101	234	103	1.02	(0.88 , 1.20)	155	134	1.33	(1.11 , 1.59)	86	121	1.20	(0.96 , 1.51)	7	43	0.43	(0.20 , 0.91)
30–44 years	1,074	329	562	344	1.04	(0.94 , 1.16)	269	312	0.95	(0.83 , 1.08)	187	350	1.06	(0.91 , 1.24)	62	484	1.47	(1.14 , 1.90)
45–59 years	3,352	1,203	1,864	1,253	1.04	(0.98 , 1.10)	1,046	1,198	1.00	(0.93 , 1.07)	775	1,328	1.10	(1.02 , 1.19)	188	1,057	0.88	(0.76 , 1.02)
60–74 years	3,606	3,036	2,324	3,148	1.04	(0.98 , 1.09)	1,379	3,000	0.99	(0.93 , 1.05)	1,003	2,997	0.99	(0.92 , 1.06)	357	3,000	0.99	(0.89 , 1.10)
75+ years	1,099	4,027	759	3,889	0.97	(0.88 , 1.06)	446	3,815	0.95	(0.85 , 1.06)	267	2,923	0.73	(0.63 , 0.83)	113	3,615	0.90	(0.74 , 1.09)
Mental and behavioural disorders																		
Overall*	14,246	749	6,645	687	0.92	(0.89 , 0.94)	2,752	535	0.71	(0.68 , 0.74)	2,048	634	0.85	(0.81 , 0.89)	474	577	0.77	(0.70 , 0.85)
0–14 years	512	88	210	67	0.77	(0.65 , 0.90)	91	53	0.60	(0.48 , 0.76)	79	73	0.83	(0.66 , 1.06)	12	47	0.53	(0.30 , 0.94)
15–29 years	5,848	1,200	2,645	1,168	0.97	(0.93 , 1.02)	1,196	1,036	0.86	(0.81 , 0.92)	763	1,077	0.90	(0.83 , 0.97)	197	1,222	1.02	(0.88 , 1.17)
30–44 years	4,261	1,307	1,799	1,102	0.84	(0.80 , 0.89)	698	810	0.62	(0.57 , 0.67)	596	1,116	0.85	(0.78 , 0.93)	97	757	0.58	(0.47 , 0.71)
45–59 years	2,441	876	1,371	922	1.05	(0.98 , 1.12)	433	496	0.57	(0.51 , 0.63)	391	670	0.76	(0.69 , 0.85)	128	720	0.82	(0.69 , 0.98)
60–74 years	900	758	459	622	0.82	(0.73 , 0.92)	195	424	0.56	(0.48 , 0.65)	163	487	0.64	(0.54 , 0.76)	30	252	0.33	(0.23 , 0.48)
75+ years	284	1,041	161	825	0.79	(0.65 , 0.96)	139	1,189	1.14	(0.93 , 1.40)	56	613	0.59	(0.44 , 0.78)	10	320	0.31	(0.16 , 0.58)
ASH																		
Overall*	74,458	4,024	43,390	4,433	1.10	(1.09 , 1.11)	17,499	3,177	0.79	(0.78 , 0.80)	11,934	3,354	0.83	(0.82 , 0.85)	3,153	3,205	0.80	(0.77 , 0.83)
0–14 years	25,607	4,401	15,144	4,865	1.11	(1.08 , 1.13)	6,217	3,633	0.83	(0.80 , 0.85)	4,202	3,908	0.89	(0.86 , 0.92)	1,003	3,912	0.89	(0.83 , 0.95)
15–29 years	12,664	2,598	6,650	2,935	1.13	(1.10 , 1.16)	2,328	2,017	0.78	(0.74 , 0.81)	1,351	1,907	0.73	(0.69 , 0.78)	299	1,855	0.71	(0.64 , 0.80)
30–44 years	10,558	3,238	5,822	3,566	1.10	(1.07 , 1.14)	2,049	2,377	0.73	(0.70 , 0.77)	1,469	2,749	0.85	(0.80 , 0.90)	289	2,250	0.69	(0.62 , 0.78)
45–59 years	14,570	5,230	8,479	5,700	1.09	(1.06 , 1.12)	3,446	3,947	0.75	(0.73 , 0.78)	2,472	4,235	0.81	(0.78 , 0.85)	716	4,023	0.77	(0.71 , 0.83)
60–74 years	11,060	9,313	7,296	9,884	1.06	(1.03 , 1.09)	3,459	7,525	0.81	(0.78 , 0.84)	2,441	7,294	0.78	(0.75 , 0.82)	847	7,113	0.76	(0.71 , 0.82)

*For "Overall", age standardised rates and age-standardised IRRs are presented; these were calculated using the 2001 Census Māori population as the standard population.

Appendix Table 3: Non-Māori population: frequencies and rates of hospitalised episodes of care for 2015–2019 (IR; per 100k person-years) and incidence rate ratios (IRRs; U1=ref) by GCH category.

Episodes of care	U1 (Ref.)		U2				R1				R2				R3			
	n	IR	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI
All Cause																		
Overall*	2,847,980	18,932	860,367	20,323	1.07	(1.07 , 1.08)	547,875	18,367	0.97	(0.97 , 0.97)	######	16,781	0.89	(0.88 , 0.89)	29,494	11,815	0.62	(0.61 , 0.63)
0–14 years	459,393	20,284	102,139	19,152	0.94	(0.94 , 0.95)	65,926	17,411	0.86	(0.85 , 0.87)	24,193	15,618	0.77	(0.76 , 0.78)	3,323	11,248	0.55	(0.54 , 0.57)
15–29 years	407,098	14,719	102,155	19,481	1.32	(1.31 , 1.33)	60,169	18,020	1.22	(1.21 , 1.23)	21,510	16,332	1.11	(1.09 , 1.12)	2,789	10,881	0.74	(0.71 , 0.77)
30–44 years	458,893	17,236	105,141	18,856	1.09	(1.09 , 1.10)	65,082	16,740	0.97	(0.96 , 0.98)	24,432	15,208	0.88	(0.87 , 0.89)	3,426	10,532	0.61	(0.59 , 0.63)
45–59 years	445,332	17,581	134,034	19,400	1.10	(1.10 , 1.11)	86,862	16,955	0.96	(0.96 , 0.97)	35,318	16,084	0.91	(0.90 , 0.92)	5,127	11,412	0.65	(0.63 , 0.67)
60–74 years	540,749	32,201	199,029	33,564	1.04	(1.04 , 1.05)	135,706	29,860	0.93	(0.92 , 0.93)	62,505	28,586	0.89	(0.88 , 0.90)	9,086	21,151	0.66	(0.64 , 0.67)
75+ years	536,515	68,557	217,869	70,357	1.03	(1.02 , 1.03)	134,130	64,367	0.94	(0.93 , 0.94)	54,796	62,574	0.91	(0.90 , 0.92)	5,743	48,624	0.71	(0.69 , 0.73)
CVD																		
Overall*	196,214	611	69,965	635	1.04	(1.03 , 1.05)	47,452	582	0.95	(0.94 , 0.97)	18,049	509	0.83	(0.81 , 0.85)	2,323	377	0.62	(0.58 , 0.66)
0–14 years	3,555	157	806	151	0.96	(0.89 , 1.04)	459	121	0.77	(0.70 , 0.85)	174	112	0.72	(0.61 , 0.83)	35	118	0.75	(0.54 , 1.05)
15–29 years	5,277	191	1,041	199	1.04	(0.97 , 1.11)	617	185	0.97	(0.89 , 1.05)	222	169	0.88	(0.77 , 1.01)	41	160	0.84	(0.62 , 1.14)
30–44 years	11,796	443	2,572	461	1.04	(1.00 , 1.09)	1,577	406	0.92	(0.87 , 0.96)	561	349	0.79	(0.72 , 0.86)	61	188	0.42	(0.33 , 0.54)
45–59 years	33,999	1,342	9,627	1,393	1.04	(1.01 , 1.06)	6,636	1,295	0.97	(0.94 , 0.99)	2,496	1,137	0.85	(0.81 , 0.88)	318	708	0.53	(0.47 , 0.59)
60–74 years	62,575	3,726	23,604	3,981	1.07	(1.05 , 1.08)	16,602	3,653	0.98	(0.96 , 1.00)	6,941	3,174	0.85	(0.83 , 0.87)	1,049	2,442	0.66	(0.62 , 0.70)
75+ years	79,012	10,096	32,315	10,436	1.03	(1.02 , 1.05)	21,561	10,347	1.02	(1.01 , 1.04)	7,655	8,742	0.87	(0.85 , 0.89)	819	6,934	0.69	(0.64 , 0.74)
Injury																		
Overall*	316,451	2,091	77,657	2,003	0.96	(0.95 , 0.97)	55,772	2,175	1.04	(1.03 , 1.05)	21,269	1,890	0.90	(0.89 , 0.92)	3,044	1,449	0.69	(0.66 , 0.73)
0–14 years	45,426	2,006	8,943	1,677	0.84	(0.82 , 0.86)	6,782	1,791	0.89	(0.87 , 0.92)	2,241	1,447	0.72	(0.69 , 0.75)	326	1,103	0.55	(0.49 , 0.61)
15–29 years	66,270	2,396	14,231	2,714	1.13	(1.11 , 1.15)	10,285	3,080	1.29	(1.26 , 1.31)	3,666	2,783	1.16	(1.12 , 1.20)	513	2,001	0.84	(0.77 , 0.91)
30–44 years	43,102	1,619	9,352	1,677	1.04	(1.01 , 1.06)	7,165	1,843	1.14	(1.11 , 1.17)	2,563	1,595	0.99	(0.95 , 1.03)	426	1,310	0.81	(0.74 , 0.89)
45–59 years	46,306	1,828	11,740	1,699	0.93	(0.91 , 0.95)	9,131	1,782	0.97	(0.95 , 1.00)	3,551	1,617	0.88	(0.85 , 0.92)	612	1,362	0.75	(0.69 , 0.81)
60–74 years	42,285	2,518	12,376	2,087	0.83	(0.81 , 0.85)	9,309	2,048	0.81	(0.80 , 0.83)	4,068	1,860	0.74	(0.72 , 0.76)	659	1,534	0.61	(0.56 , 0.66)
75+ years	73,062	9,336	21,015	6,786	0.73	(0.72 , 0.74)	13,100	6,287	0.67	(0.66 , 0.69)	5,180	5,915	0.63	(0.62 , 0.65)	508	4,301	0.46	(0.42 , 0.50)
Cancer																		
Overall*	136,285	418	53,322	485	1.16	(1.14 , 1.18)	35,841	455	1.09	(1.07 , 1.11)	15,494	438	1.05	(1.02 , 1.07)	2,424	392	0.94	(0.88 , 0.99)
0–14 years	2,741	121	494	93	0.77	(0.70 , 0.84)	349	92	0.76	(0.68 , 0.85)	134	87	0.71	(0.60 , 0.85)	20	68	0.56	(0.36 , 0.87)
15–29 years	2,220	80	584	111	1.39	(1.27 , 1.52)	525	157	1.96	(1.78 , 2.15)	152	115	1.44	(1.22 , 1.69)	35	137	1.70	(1.22 , 2.38)
30–44 years	6,856	258	1,909	342	1.33	(1.26 , 1.40)	1,025	264	1.02	(0.96 , 1.09)	465	289	1.12	(1.02 , 1.23)	82	252	0.98	(0.79 , 1.22)
45–59 years	24,063	950	8,110	1,174	1.24	(1.20 , 1.27)	5,435	1,061	1.12	(1.08 , 1.15)	2,254	1,026	1.08	(1.03 , 1.13)	400	890	0.94	(0.85 , 1.03)
60–74 years	48,633	2,896	19,969	3,368	1.16	(1.14 , 1.18)	14,543	3,200	1.10	(1.08 , 1.13)	6,785	3,103	1.07	(1.04 , 1.10)	1,174	2,733	0.94	(0.89 , 1.00)
75+ years	51,772	6,616	22,256	7,187	1.09	(1.07 , 1.10)	13,964	6,701	1.01	(0.99 , 1.03)	5,704	6,514	0.98	(0.96 , 1.01)	713	6,037	0.91	(0.85 , 0.98)
Mental and behavioural disorders																		
Overall*	60,602	369	16,203	413	1.12	(1.10 , 1.14)	10,162	328	0.89	(0.87 , 0.92)	3,635	316	0.86	(0.82 , 0.89)	461	220	0.60	(0.53 , 0.67)
0–14 years	1,703	75	386	72	0.96	(0.86 , 1.08)	229	60	0.80	(0.70 , 0.92)	74	48	0.64	(0.50 , 0.80)	12	41	0.54	(0.31 , 0.95)
15–29 years	17,282	625	3,984	760	1.22	(1.17 , 1.26)	1,974	591	0.95	(0.90 , 0.99)	775	588	0.94	(0.88 , 1.01)	105	410	0.66	(0.54 , 0.79)
30–44 years	12,813	481	2,966	532	1.11	(1.06 , 1.15)	1,630	419	0.87	(0.83 , 0.92)	658	410	0.85	(0.79 , 0.92)	97	298	0.62	(0.51 , 0.76)
45–59 years	11,811	466	3,515	509	1.09	(1.05 , 1.13)	1,869	365	0.78	(0.75 , 0.82)	902	411	0.88	(0.82 , 0.94)	110	245	0.53	(0.44 , 0.63)
60–74 years	7,577	451	2,425	409	0.91	(0.87 , 0.95)	1,742	383	0.85	(0.81 , 0.89)	627	287	0.64	(0.59 , 0.69)	71	165	0.37	(0.29 , 0.46)
75+ years	9,416	1,203	2,927	945	0.79	(0.75 , 0.82)	2,718	1,304	1.08	(1.04 , 1.13)	599	684	0.57	(0.52 , 0.62)	66	559	0.46	(0.36 , 0.59)
ASH																		
Overall*	315,631	2,591	91,074	2,837	1.09	(1.09 , 1.10)	52,510	2,265	0.87	(0.86 , 0.88)	20,966	2,068	0.80	(0.78 , 0.81)	2,570	1,292	0.50	(0.47 , 0.53)
0–14 years	79,578	3,514	18,528	3,474	0.99	(0.97 , 1.00)	11,234	2,967	0.84	(0.83 , 0.86)	4,235	2,734	0.78	(0.75 , 0.80)	537	1,818	0.52	(0.48 , 0.56)
15–29 years	43,261	1,564	11,351	2,165	1.38	(1.36 , 1.41)	5,289	1,584	1.01	(0.98 , 1.04)	1,917	1,456	0.93	(0.89 , 0.97)	208	810	0.52	(0.45 , 0.59)
30–44 years	44,057	1,655	11,157	2,001	1.21	(1.18 , 1.23)	5,601	1,441	0.87	(0.85 , 0.90)	2,048	1,274	0.77	(0.74 , 0.81)	244	749	0.45	(0.40 , 0.51)
45–59 years	65,258	2,576	19,481	2,820	1.09	(1.08 , 1.11)	11,088	2,164	0.84	(0.82 , 0.86)	4,278	1,948	0.76	(0.73 , 0.78)	500	1,113	0.43	(0.40 , 0.47)
60–74 years	83,477	4,971	30,558	5,153	1.04	(1.02 , 1.05)	19,299	4,246	0.85	(0.84 , 0.87)	8,489	3,882	0.78	(0.76 , 0.80)	1,082	2,519	0.51	(0.48 , 0.54)

*For "Overall", age standardised rates and age-standardised IRRs are presented; these were calculated using the 2001 Census Māori population as the standard population. No standardisation was undertaken for the age-stratified results.

Appendix Table 4: Total New Zealand population: overall age-standardised and age-stratified unadjusted episodes of care hospitalisation rates for 2015–2019 (IR; per 100k person-years) and incidence rate ratios (IRRs; using U1 as reference) by GCH category.

Episodes of care	U1 (Ref.)		U2				R1				R2				R3			
	n	IR	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI
All Cause																		
Overall*	3,287,500	19,405	1,103,856	21,280	1.10	(1.09 , 1.10)	658,854	18,589	0.96	(0.96 , 0.96)	296,082	17,690	0.91	(0.91 , 0.92)	48,666	14,110	0.73	(0.72 , 0.74)
0–14 years	573,935	20,162	167,048	19,779	0.98	(0.98 , 0.99)	94,216	17,137	0.85	(0.84 , 0.86)	42,555	16,216	0.80	(0.80 , 0.81)	7,306	13,240	0.66	(0.64 , 0.67)
15–29 years	512,059	15,740	155,457	20,702	1.32	(1.31 , 1.32)	83,615	18,609	1.18	(1.17 , 1.19)	35,639	17,596	1.12	(1.11 , 1.13)	5,631	13,488	0.86	(0.83 , 0.88)
30–44 years	532,760	17,828	143,008	19,838	1.11	(1.11 , 1.12)	81,192	17,094	0.96	(0.95 , 0.97)	34,441	16,089	0.90	(0.89 , 0.91)	5,675	12,514	0.70	(0.68 , 0.72)
45–59 years	518,861	18,455	174,310	20,760	1.12	(1.12 , 1.13)	105,538	17,601	0.95	(0.95 , 0.96)	47,906	17,236	0.93	(0.93 , 0.94)	8,856	14,122	0.77	(0.75 , 0.78)
60–74 years	594,339	33,055	232,422	34,856	1.05	(1.05 , 1.06)	152,907	30,554	0.92	(0.92 , 0.93)	75,195	29,825	0.90	(0.90 , 0.91)	13,305	24,254	0.73	(0.72 , 0.75)
75+ years	555,546	68,597	231,611	70,360	1.03	(1.02 , 1.03)	141,386	64,245	0.94	(0.93 , 0.94)	60,346	62,402	0.91	(0.90 , 0.92)	7,893	52,842	0.77	(0.75 , 0.79)
CVD																		
Overall*	218,509	641	83,096	692	1.08	(1.07 , 1.09)	54,042	612	0.95	(0.94 , 0.97)	22,418	565	0.88	(0.86 , 0.90)	3,760	487	0.76	(0.73 , 0.79)
0–14 years	4,437	156	1,348	160	1.02	(0.96 , 1.09)	636	116	0.74	(0.68 , 0.81)	319	122	0.78	(0.70 , 0.87)	63	114	0.73	(0.57 , 0.94)
15–29 years	6,400	197	1,545	206	1.05	(0.99 , 1.11)	817	182	0.92	(0.86 , 0.99)	344	170	0.86	(0.77 , 0.96)	64	153	0.78	(0.61 , 1.00)
30–44 years	14,242	477	3,814	529	1.11	(1.07 , 1.15)	2,166	456	0.96	(0.91 , 1.00)	931	435	0.91	(0.85 , 0.98)	156	344	0.72	(0.62 , 0.85)
45–59 years	41,142	1,463	13,618	1,622	1.11	(1.09 , 1.13)	8,569	1,429	0.98	(0.95 , 1.00)	3,752	1,350	0.92	(0.89 , 0.95)	736	1,174	0.80	(0.75 , 0.86)
60–74 years	70,114	3,899	28,188	4,227	1.08	(1.07 , 1.10)	19,098	3,816	0.98	(0.96 , 0.99)	8,570	3,399	0.87	(0.85 , 0.89)	1,602	2,920	0.75	(0.71 , 0.79)
75+ years	82,174	10,147	34,583	10,506	1.04	(1.02 , 1.05)	22,756	10,340	1.02	(1.00 , 1.03)	8,502	8,792	0.87	(0.85 , 0.89)	1,139	7,625	0.75	(0.71 , 0.80)
Injury																		
Overall*	372,679	2,219	103,599	2,205	0.99	(0.99 , 1.00)	67,778	2,207	0.99	(0.99 , 1.00)	28,644	1,999	0.90	(0.89 , 0.91)	4,966	1,730	0.78	(0.75 , 0.81)
0–14 years	58,903	2,069	15,278	1,809	0.87	(0.86 , 0.89)	9,678	1,760	0.85	(0.83 , 0.87)	3,971	1,513	0.73	(0.71 , 0.76)	743	1,346	0.65	(0.61 , 0.70)
15–29 years	85,304	2,622	22,828	3,040	1.16	(1.14 , 1.18)	14,265	3,175	1.21	(1.19 , 1.23)	5,990	2,957	1.13	(1.10 , 1.16)	1,011	2,422	0.92	(0.87 , 0.98)
30–44 years	53,474	1,789	14,064	1,951	1.09	(1.07 , 1.11)	9,192	1,935	1.08	(1.06 , 1.11)	3,774	1,763	0.99	(0.95 , 1.02)	730	1,610	0.90	(0.84 , 0.97)
45–59 years	53,976	1,920	15,241	1,815	0.95	(0.93 , 0.96)	10,763	1,795	0.93	(0.92 , 0.95)	4,650	1,673	0.87	(0.85 , 0.90)	969	1,545	0.80	(0.76 , 0.86)
60–74 years	46,108	2,564	14,156	2,123	0.83	(0.81 , 0.84)	10,234	2,045	0.80	(0.78 , 0.81)	4,737	1,879	0.73	(0.71 , 0.75)	858	1,564	0.61	(0.57 , 0.65)
75+ years	74,914	9,250	22,032	6,693	0.72	(0.71 , 0.73)	13,646	6,201	0.67	(0.66 , 0.68)	5,522	5,710	0.62	(0.60 , 0.63)	655	4,385	0.47	(0.44 , 0.51)
Cancer																		
Overall*	146,653	424	59,384	485	1.14	(1.13 , 1.16)	39,317	457	1.08	(1.06 , 1.10)	17,928	448	1.06	(1.04 , 1.08)	3,163	396	0.93	(0.89 , 0.98)
0–14 years	3,486	122	813	96	0.79	(0.73 , 0.85)	530	96	0.79	(0.72 , 0.86)	250	95	0.78	(0.68 , 0.88)	32	58	0.47	(0.33 , 0.67)
15–29 years	2,712	83	818	109	1.31	(1.21 , 1.41)	680	151	1.82	(1.67 , 1.97)	238	118	1.41	(1.23 , 1.61)	42	101	1.21	(0.89 , 1.64)
30–44 years	7,930	265	2,471	343	1.29	(1.23 , 1.35)	1,294	272	1.03	(0.97 , 1.09)	652	305	1.15	(1.06 , 1.24)	144	318	1.20	(1.01 , 1.41)
45–59 years	27,415	975	9,974	1,188	1.22	(1.19 , 1.25)	6,481	1,081	1.11	(1.08 , 1.14)	3,029	1,090	1.12	(1.08 , 1.16)	588	938	0.96	(0.89 , 1.04)
60–74 years	52,239	2,905	22,293	3,343	1.15	(1.13 , 1.17)	15,922	3,182	1.10	(1.08 , 1.11)	7,788	3,089	1.06	(1.04 , 1.09)	1,531	2,791	0.96	(0.91 , 1.01)
75+ years	52,871	6,528	23,015	6,992	1.07	(1.05 , 1.09)	14,410	6,548	1.00	(0.98 , 1.02)	5,971	6,174	0.95	(0.92 , 0.97)	826	5,530	0.85	(0.79 , 0.91)
Mental and behavioural disorders																		
Overall*	74,848	416	22,848	479	1.15	(1.13 , 1.17)	12,914	373	0.90	(0.88 , 0.92)	5,683	407	0.98	(0.95 , 1.01)	935	342	0.82	(0.76 , 0.89)
0–14 years	2,215	78	596	71	0.91	(0.83 , 0.99)	320	58	0.75	(0.67 , 0.84)	153	58	0.75	(0.64 , 0.88)	24	43	0.56	(0.37 , 0.84)
15–29 years	23,130	711	6,629	883	1.24	(1.21 , 1.28)	3,170	706	0.99	(0.96 , 1.03)	1,538	759	1.07	(1.01 , 1.12)	302	723	1.02	(0.91 , 1.14)
30–44 years	17,074	571	4,765	661	1.16	(1.12 , 1.19)	2,328	490	0.86	(0.82 , 0.90)	1,254	586	1.03	(0.97 , 1.09)	194	428	0.75	(0.65 , 0.86)
45–59 years	14,252	507	4,886	582	1.15	(1.11 , 1.19)	2,302	384	0.76	(0.72 , 0.79)	1,293	465	0.92	(0.87 , 0.97)	238	380	0.75	(0.66 , 0.85)
60–74 years	8,477	471	2,884	433	0.92	(0.88 , 0.96)	1,937	387	0.82	(0.78 , 0.86)	790	313	0.66	(0.62 , 0.71)	101	184	0.39	(0.32 , 0.48)
75+ years	9,700	1,198	3,088	938	0.78	(0.75 , 0.82)	2,857	1,298	1.08	(1.04 , 1.13)	655	677	0.57	(0.52 , 0.61)	76	509	0.42	(0.34 , 0.53)
ASH																		
Overall*	390,088	2,778	134,464	3,246	1.17	(1.16 , 1.18)	70,009	2,450	0.88	(0.87 , 0.89)	32,900	2,410	0.87	(0.87 , 0.89)	5,723	1,989	0.72	(0.69 , 0.74)
0–14 years	105,185	3,695	33,672	3,987	1.08	(1.07 , 1.09)	17,451	3,174	0.86	(0.85 , 0.87)	8,437	3,215	0.87	(0.85 , 0.89)	1,540	2,791	0.76	(0.72 , 0.79)
15–29 years	55,925	1,719	18,000	2,397	1.39	(1.37 , 1.42)	7,617	1,695	0.99	(0.96 , 1.01)	3,268	1,614	0.94	(0.91 , 0.97)	507	1,213	0.71	(0.65 , 0.77)
30–44 years	54,615	1,828	16,979	2,355	1.29	(1.27 , 1.31)	7,650	1,610	0.88	(0.86 , 0.90)	3,516	1,642	0.90	(0.87 , 0.93)	532	1,173	0.64	(0.59 , 0.70)
45–59 years	79,828	2,839	27,959	3,330	1.17	(1.16 , 1.19)	14,534	2,424	0.85	(0.84 , 0.87)	6,749	2,428	0.86	(0.83 , 0.88)	1,216	1,938	0.68	(0.65 , 0.72)
60–74 years	94,537	5,258	37,854	5,676	1.08	(1.07 , 1.09)	22,758	4,547	0.86	(0.85 , 0.88)	10,930	4,335	0.82	(0.81 , 0.84)	1,929	3,515	0.67	(0.64 , 0.70)

*For "Overall", age standardised rates and age-standardised IRRs are presented; these were calculated using the 2001 Census Māori population as the standard population. No standardisation was undertaken for the age-stratified results.

Appendix Table 5: Frequencies and rates of non-admitted patient events for 2015–2019 (IR; per 1000 person-years) and incidence rate ratios (IRRs; U1=ref) by GCH category.

Non-admitted patient events	U1 (Ref.)		U2				R1				R2				R3			
	n	IR	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI
Māori																		
All Specialist Outpatient																		
Overall*	2,192,998	1,205	1,385,001	1,468	1.17	(1.17, 1.17)	677,243	1,308	1.00	(1.00, 1.00)	461,941	1,388	0.99	(0.99, 0.99)	109,074	1,248	0.78	(0.77, 0.78)
0–14 years	402,494	692	296,045	951	1.37	(1.37, 1.38)	135,051	789	1.14	(1.13, 1.15)	77,821	724	1.05	(1.04, 1.05)	12,001	468	0.68	(0.66, 0.69)
15–29 years	284,934	585	162,549	718	1.23	(1.22, 1.24)	72,559	629	1.08	(1.07, 1.08)	45,171	638	1.09	(1.08, 1.10)	7,647	474	0.81	(0.79, 0.83)
30–44 years	324,186	994	178,077	1091	1.10	(1.09, 1.10)	80,299	932	0.94	(0.93, 0.94)	47,953	898	0.90	(0.89, 0.91)	11,462	894	0.90	(0.88, 0.92)
45–59 years	559,467	2008	318,204	2139	1.07	(1.06, 1.07)	161,667	1,852	0.92	(0.92, 0.93)	115,004	1,971	0.98	(0.98, 0.99)	25,824	1,452	0.72	(0.71, 0.73)
60–74 years	482,470	4063	313,011	4240	1.04	(1.04, 1.05)	168,319	3,662	0.90	(0.90, 0.91)	126,348	3,776	0.93	(0.92, 0.94)	38,544	3,239	0.80	(0.79, 0.81)
75+ years	139,447	5110	117,115	6000	1.17	(1.17, 1.18)	59,348	5,076	0.99	(0.98, 1.00)	49,644	5,434	1.06	(1.05, 1.07)	13,596	4,349	0.85	(0.84, 0.87)
Emergency Department																		
Overall*	313,820	172	275,893	293	1.72	(1.71, 1.73)	109,262	211	1.25	(1.25, 1.26)	76,734	231	1.37	(1.36, 1.38)	10,522	120	0.73	(0.72, 0.75)
0–14 years	88,511	152	85,195	274	1.80	(1.78, 1.82)	35,184	206	1.35	(1.33, 1.37)	24,745	230	1.51	(1.49, 1.53)	2,790	109	0.72	(0.69, 0.74)
15–29 years	104,482	214	84,116	371	1.73	(1.72, 1.75)	32,254	279	1.30	(1.29, 1.32)	20,110	284	1.32	(1.30, 1.34)	2,886	179	0.84	(0.81, 0.87)
30–44 years	57,774	177	47,862	293	1.65	(1.63, 1.67)	16,974	197	1.11	(1.09, 1.13)	11,786	221	1.25	(1.22, 1.27)	1,459	114	0.64	(0.61, 0.68)
45–59 years	40,984	147	35,581	239	1.63	(1.60, 1.65)	14,277	164	1.11	(1.09, 1.13)	10,365	178	1.21	(1.18, 1.23)	1,667	94	0.64	(0.61, 0.67)
60–74 years	17,779	150	17,852	242	1.62	(1.58, 1.65)	7,840	171	1.14	(1.11, 1.17)	7,099	212	1.42	(1.38, 1.46)	1,316	111	0.74	(0.70, 0.78)
75+ years	4,290	157	5,287	271	1.72	(1.65, 1.79)	2,733	234	1.49	(1.42, 1.56)	2,629	288	1.83	(1.74, 1.92)	404	129	0.82	(0.74, 0.91)
Allied Health																		
Overall*	252,549	139	321,129	340	2.26	(2.25, 2.27)	99,457	192	1.23	(1.22, 1.23)	100,709	303	1.86	(1.85, 1.87)	18,548	212	1.16	(1.14, 1.18)
0–14 years	53,466	92	50,052	161	1.75	(1.73, 1.77)	17,115	100	1.09	(1.07, 1.11)	11,502	107	1.16	(1.14, 1.19)	2,000	78	0.85	(0.81, 0.89)
15–29 years	34,325	70	41,573	184	2.61	(2.60, 2.64)	12,086	105	1.49	(1.46, 1.52)	14,937	211	2.99	(2.94, 3.05)	1,716	106	1.51	(1.44, 1.59)
30–44 years	35,669	109	43,539	267	2.44	(2.40, 2.47)	11,071	128	1.17	(1.15, 1.20)	11,893	223	2.04	(1.99, 2.08)	2,013	157	1.43	(1.37, 1.50)
45–59 years	60,815	218	75,960	511	2.34	(2.31, 2.36)	21,712	249	1.14	(1.12, 1.16)	22,465	385	1.76	(1.74, 1.79)	4,103	231	1.06	(1.02, 1.09)
60–74 years	52,247	440	75,387	1021	2.32	(2.30, 2.35)	25,128	547	1.24	(1.22, 1.26)	26,731	799	1.82	(1.79, 1.26)	5,543	466	1.06	(1.03, 1.09)
75+ years	16,027	587	34,618	1774	3.02	(2.96, 3.08)	12,345	1,056	1.80	(1.76, 1.84)	13,181	1,443	2.46	(2.40, 2.51)	3,173	1,015	1.73	(1.66, 1.80)
Non-Māori																		
All Specialist Outpatient																		
Overall*	15,324,673	1,208	5,734,071	1,787	1.32	(1.32, 1.32)	3,713,238	1,631	1.18	(1.18, 1.18)	1,561,613	1,605	1.14	(1.14, 1.14)	169,568	905	0.70	(0.69, 0.70)
0–14 years	1,650,083	729	560,805	1052	1.44	(1.44, 1.45)	362,750	958	1.31	(1.31, 1.32)	145,341	938	1.29	(1.28, 1.32)	17,620	596	0.82	(0.81, 0.83)
15–29 years	1,283,301	464	360,353	687	1.48	(1.48, 1.49)	203,866	611	1.32	(1.31, 1.32)	76,887	584	1.26	(1.25, 1.27)	8,878	346	0.75	(0.73, 0.76)
30–44 years	1,768,777	664	473,913	850	1.28	(1.28, 1.28)	274,581	706	1.06	(1.06, 1.07)	109,392	681	1.02	(1.02, 1.03)	12,939	398	0.60	(0.59, 0.61)
45–59 years	2,924,266	1154	914,740	1324	1.15	(1.14, 1.15)	609,450	1,190	1.03	(1.03, 1.03)	253,205	1,153	1.00	(0.99, 1.00)	30,549	680	0.59	(0.58, 0.60)
60–74 years	4,060,916	2418	1,610,536	2716	1.12	(1.12, 1.13)	1,127,455	2,481	1.03	(1.02, 1.03)	498,857	2,281	0.94	(0.94, 0.95)	61,443	1,430	0.59	(0.59, 0.60)
75+ years	3,637,330	4648	1,813,724	5857	1.26	(1.26, 1.26)	1,135,136	5,447	1.17	(1.17, 1.17)	477,931	5,458	1.17	(1.17, 1.18)	38,139	3,229	0.69	(0.69, 0.70)
Emergency Department Attendances																		
Overall*	1,562,716	123	655,567	204	1.74	(1.73, 1.74)	351,769	155	1.35	(1.34, 1.35)	155,853	160	1.36	(1.35, 1.37)	14,796	79	0.65	(0.64, 0.67)
0–14 years	359,988	159	132,402	248	1.56	(1.55, 1.57)	71,985	190	1.20	(1.19, 1.21)	30,119	194	1.22	(1.21, 1.24)	2,543	86	0.54	(0.52, 0.56)
15–29 years	408,663	148	157,091	300	2.03	(2.02, 2.04)	82,038	246	1.66	(1.65, 1.68)	31,672	240	1.63	(1.61, 1.65)	3,099	121	0.82	(0.79, 0.85)
30–44 years	278,814	105	107,187	192	1.84	(1.82, 1.85)	55,426	143	1.36	(1.35, 1.37)	22,312	139	1.33	(1.31, 1.34)	2,334	72	0.69	(0.66, 0.71)
45–59 years	235,875	93	104,751	152	1.63	(1.62, 1.64)	57,325	112	1.20	(1.19, 1.21)	25,979	118	1.27	(1.25, 1.29)	2,629	59	0.63	(0.60, 0.65)
60–74 years	170,116	101	89,152	150	1.48	(1.47, 1.50)	51,474	113	1.12	(1.11, 1.13)	27,256	125	1.23	(1.21, 1.25)	2,935	68	0.67	(0.65, 0.70)
75+ years	109,260	140	64,984	210	1.50	(1.49, 1.52)	33,521	161	1.15	(1.14, 1.17)	18,515	211	1.51	(1.49, 1.54)	1,256	106	0.76	(0.72, 0.81)
Allied Health																		
Overall*	1,777,788	140	1,444,581	450	2.34	(2.34, 2.35)	564,850	248	1.44	(1.43, 1.45)	288,914	297	1.58	(1.57, 1.59)	31,799	170	0.92	(0.90, 0.93)
0–14 years	209,429	92	85,193	160	1.73	(1.71, 1.74)	44,817	118	1.28	(1.27, 1.29)	17,237	111	1.20	(1.18, 1.22)	1,617	55	0.59	(0.56, 0.62)
15–29 years	146,445	53	84,685	161	3.05	(3.02, 3.08)	32,243	97	1.82	(1.80, 1.85)	15,991	121	2.29	(2.26, 2.33)	1,959	76	1.44	(1.38, 1.51)
30–44 years	207,548	78	112,915	202	2.60	(2.58, 2.62)	44,348	114	1.46	(1.45, 1.48)	20,460	127	1.63	(1.61, 1.66)	2,442	75	0.96	(0.93, 1.00)
45–59 years	316,604	125	214,996	311	2.49	(2.48, 2.50)	93,424	182	1.46	(1.45, 1.50)	44,684	203	1.63	(1.61, 1.64)	5,348	119	0.95	(0.93, 0.98)
60–74 years	453,706	270	399,328	673	2.49	(2.48, 2.50)	171,730	378	1.40	(1.39, 1.41)	91,029	416	1.54	(1.53, 1.55)	10,981	256	0.95	(0.93, 0.96)
75+ years	444,056	567	547,464	1768	3.12	(3.10, 3.13)	178,288	856	1.51	(1.50, 1.52)	99,513	1,136	2.00	(1.99, 2.02)	9,452	800	1.41	(1.38, 1.44)

*For "Overall", age standardised rates and age-standardised IRRs are presented; these were calculated using the 2001 Census Māori population as the standard population.

Appendix Table 6: Total New Zealand population: overall age-standardised and age-stratified unadjusted rates of non-admitted patient events (IR; per 1,000 person-years) and incidence rate ratios (IRRs; using U1 as reference) by GCH category.

Non-admitted patient events	U1 (Ref.)		U2				R1				R2				R3			
	n	IR	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI	n	IR	IRR	95% CI
Total New Zealand population																		
All Specialist Outpatient																		
Overall*	17,517,671	1,207	7,119,072	1,715	1.31	(1.31, 1.31)	4,390,481	1,571	1.15	(1.15, 1.15)	2,023,554	1,550	1.12	(1.12, 1.12)	278,642	1,014	0.75	(0.75, 0.76)
0–14 years	2,052,577	721	856,850	1015	1.41	(1.40, 1.41)	497,801	905	1.26	(1.25, 1.26)	223,162	850	1.18	(1.17, 1.18)	29,621	537	0.74	(0.74, 0.75)
15–29 years	1,568,235	482	522,902	696	1.44	(1.44, 1.45)	276,425	615	1.28	(1.27, 1.28)	122,058	603	1.25	(1.24, 1.26)	16,525	396	0.82	(0.81, 0.83)
30–44 years	2,092,963	700	651,990	904	1.29	(1.29, 1.29)	354,880	747	1.07	(1.06, 1.07)	157,345	735	1.05	(1.04, 1.05)	24,401	538	0.77	(0.76, 0.78)
45–59 years	3,483,733	1239	1,232,944	1468	1.19	(1.18, 1.19)	771,117	1,286	1.04	(1.04, 1.04)	368,209	1,325	1.07	(1.07, 1.07)	56,373	899	0.73	(0.72, 0.73)
60–74 years	4,543,386	2527	1,923,547	2885	1.14	(1.14, 1.14)	1,295,774	2,589	1.02	(1.02, 1.03)	625,205	2,480	0.98	(0.98, 1.03)	99,987	1,823	0.72	(0.72, 0.73)
75+ years	3,776,777	4663	1,930,839	5866	1.26	(1.26, 1.26)	1,194,484	5,428	1.16	(1.16, 1.17)	527,575	5,456	1.17	(1.17, 1.17)	51,735	3,464	0.74	(0.74, 0.75)
Emergency Department																		
Overall*	1,876,536	129	931,460	224	1.80	(1.79, 1.80)	461,031	165	1.36	(1.35, 1.36)	232,587	178	1.43	(1.42, 1.43)	25,318	92	0.73	(0.72, 0.74)
0–14 years	448,499	158	217,597	258	1.64	(1.63, 1.64)	107,169	195	1.24	(1.23, 1.25)	54,864	209	1.33	(1.32, 1.34)	5,333	97	0.61	(0.60, 0.63)
15–29 years	513,145	158	241,207	321	2.04	(2.03, 2.05)	114,292	254	1.61	(1.60, 1.62)	51,782	256	1.62	(1.61, 1.64)	5,985	143	0.91	(0.89, 0.93)
30–44 years	336,588	113	155,049	215	1.91	(1.90, 1.92)	72,400	152	1.35	(1.34, 1.36)	34,098	159	1.41	(1.40, 1.43)	3,793	84	0.74	(0.72, 0.77)
45–59 years	276,859	98	140,332	167	1.70	(1.69, 1.71)	71,602	119	1.21	(1.20, 1.22)	36,344	131	1.33	(1.31, 1.34)	4,296	69	0.70	(0.68, 0.72)
60–74 years	187,895	105	107,004	160	1.54	(1.52, 1.55)	59,314	119	1.13	(1.12, 1.14)	34,355	136	1.30	(1.29, 1.32)	4,251	77	0.74	(0.72, 0.76)
75+ years	113,550	140	70,271	213	1.52	(1.51, 1.54)	36,254	165	1.17	(1.16, 1.19)	21,144	219	1.56	(1.54, 1.58)	1,660	111	0.79	(0.76, 0.83)
Allied Health																		
Overall*	2,030,337	140	1,765,710	425	2.38	(2.38, 2.39)	664,307	238	1.41	(1.40, 1.41)	389,623	298	1.72	(1.71, 1.73)	50,347	183	1.07	(1.06, 1.08)
0–14 years	262,895	92	135,245	160	1.73	(1.72, 1.75)	61,932	113	1.22	(1.21, 1.23)	28,739	110	1.19	(1.17, 1.20)	3,617	66	0.71	(0.69, 0.73)
15–29 years	180,770	56	126,258	168	3.03	(3.00, 3.05)	44,329	99	1.78	(1.76, 1.79)	30,928	153	2.75	(2.72, 2.78)	3,675	88	1.58	(1.53, 1.64)
30–44 years	243,217	81	156,454	217	2.67	(2.65, 2.68)	55,419	117	1.43	(1.42, 1.45)	32,353	151	1.86	(1.84, 1.88)	4,455	98	1.21	(1.17, 1.24)
45–59 years	377,419	134	290,956	347	2.58	(2.57, 2.59)	115,136	192	1.43	(1.42, 1.44)	67,149	242	1.80	(1.79, 1.81)	9,451	151	1.12	(1.10, 1.15)
60–74 years	505,953	281	474,715	712	2.53	(2.52, 2.54)	196,858	393	1.40	(1.39, 1.41)	117,760	467	1.66	(1.65, 1.67)	16,524	301	1.07	(1.05, 1.09)
75+ years	460,083	568	582,082	1768	3.11	(3.10, 3.12)	190,633	866	1.52	(1.52, 1.53)	112,694	1,165	2.05	(2.04, 2.06)	12,625	845	1.49	(1.46, 1.51)

*For "Overall", age standardised rates and age-standardised IRRs are presented; these were calculated using the 2001 Census Māori population as the standard population. No standardisation was undertaken for the age-stratified results.