Premature mortality in adults using New Zealand psychiatric services

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Abstract

Aims People with experience of mental illness, in particular those accessing mental health services, have increased mortality compared to the general population, but no studies have examined the situation in New Zealand. This study uses a complete national dataset to estimate mortality rates from natural and external causes for adults using psychiatric services compared to the general New Zealand population.

Methods Routinely collected data on adults aged 18–64 using secondary mental health services between January 2002 and December 2010 were linked to death registrations over the same period. Indirect standardisation was used to estimate the mortality ratio (SMR) for those with any contact with mental health services over this period compared to the New Zealand population.

Results Both men and women using mental health services in New Zealand have more than twice the mortality rate of the total population [combined SMR 2.14 (95% CI 2.09–2.19)], with an increased risk of death from cancer and cardiovascular disease [SMRs=1.31(1.24–1.37), and 1.69 (1.60–1.79) respectively], and external causes (suicide and accidents) [SMR 3.11 (3.00–3.23)]. People with a diagnosis of a psychotic disorder had three times the overall death rate of the population.

Conclusions This study confirms that those using mental health services in New Zealand are dying prematurely from both natural and external causes, and provides evidence which supports calls for coordinated action on this issue.

It has been called the “scandal of premature mortality”\(^1\): people who experience mental health problems, in particular those whose illness is severe enough to lead to contact with psychiatric services, are dying prematurely.\(^2\)

While this is in part due to higher rates of suicide, chronic medical conditions such as heart disease and cancer are also important contributors to premature deaths in this population.\(^3\) There is also evidence that the difference between the mortality of those using psychiatric services and that of the general population has not diminished over time despite major changes to psychiatric care in the past century.\(^4,5\)

Studies in multiple countries including Australia,\(^6\) the United Kingdom,\(^7\) and the United States\(^8\) have demonstrated this inequality in health outcomes. However, most published studies have been restricted to subnational data, either collected regionally or by specific mental health services (for example\(^3\)), whereas in New Zealand national level data are available on public inpatient and community psychiatric service use, providing an opportunity to investigate mortality on a complete national dataset. Despite this, mortality amongst those using mental health services in New Zealand has not been explored.
New Zealand has a public health care system in which primary care attracts a part-charge at the point of access, but all public secondary services, including mental health care, are provided free of charge.

Most mental health care, particularly for those with more severe illness, is provided by the public and not for profit sectors, and is increasingly provided in the community. Public services are designed to cater for the 3% of the population with the highest mental health needs. This study examines mortality rates and causes of death for adults using psychiatric services in New Zealand from 2002 to 2010 and compares them to the total New Zealand population.

Methods
This study examines mortality in a cohort of adults in contact with specialist adult public psychiatric services, both community and inpatient, over a 9-year period.

Participants
Adults who had any recorded contact with New Zealand adult public psychiatric services between January 2002 and December 2010, and who were aged 18–64 at the time of contact with services, were eligible for inclusion. People were excluded if they had a recorded principal psychiatric diagnosis of dementia or another organic disorder, without a diagnosis of a non-organic psychotic disorder, or a principal psychiatric diagnosis of intellectual disability without another principal psychiatric diagnosis. On the assumption that some psychiatric service use is secondary to terminal illness, people were also excluded if their first recorded psychiatric service use was within 3 months prior to their death from a natural cause (excluding psychiatric causes), if they did not have a diagnosis of schizophrenia or bipolar disorder (as these diagnoses imply a longer standing mental illness). Data on mental health service use in 2001 were used to provide a look-back period for the purposes of establishing whether there was mental health service use more than 3 months before a person’s date of death for those who died in 2002.

Data sources
All data were extracted from collections held by the New Zealand Ministry of Health, which were linked using the National Health Index (NHI) (a unique health identifier), and subsequently anonymised. Data on psychiatric service use came from the Ministry of Health data sets on mental health service use. The MHINC (Mental Health Information National Collection) was established in July 2000. In July 2008 this was superseded by PRIMHD (Project for Integration of Mental Health Data) and all MHINC data mapped into this new system.

Data on mortality and cause of death were drawn from the New Zealand Mortality Data Collection. The 2006 New Zealand Census was used for the national denominator population for comparisons.

Variables
Demographic variables: age, sex, ethnicity and area of residence were drawn from the NHI master record. For all analyses presented by sex, those with unknown sex (n=6) were excluded. Prioritised ethnicity as recorded on the NHI record was grouped into the four principal ethnic groups in New Zealand: Māori (the indigenous population), Pacific, Asian and European (including New Zealand European). For the analyses presented here, these were collapsed into Māori and non-Māori (all other) ethnic groups. The New Zealand Deprivation Index 2006 (NZDep2006)10 was used to assign a deprivation score to the area of residence.

Prioritised diagnosis—Multiple psychiatric diagnoses can be recorded for each individual on psychiatric service records, including principal, secondary and provisional diagnoses, using ICD 9, ICD 10AM or DSMIV. Nevertheless, many individuals have no diagnostic information or “no diagnosis” recorded. There is a requirement that some diagnostic information is entered after a person...
has been in contact with services for 30 days, with the result that many of those with no diagnostic information are those with short term contact with services.

In order to identify a single primary diagnosis for each individual to allow comparisons of mortality between diagnostic groups, a prioritisation process was used. The prioritised order of diagnoses was:

1. Schizophrenia, schizoaffective disorder and other non-organic psychoses;
2. Bipolar affective disorder and other affective psychosis;
3. Organic disorders and dementia (excluded from the current study);
4. Depression and other mood disorders;
5. Anxiety and stress disorders;
6. Substance use disorders;
7. Mental retardation (excluded);
8. Other mental health diagnoses (includes personality disorders, eating disorders, etc); and
9. “No diagnosis” or “diagnosis deferred” recorded.

Principal diagnosis was used if available, otherwise provisional diagnosis information was used.

Mental health service type and extent: Those with any inpatient service use recorded in the 9-year study period were categorised as having received inpatient care. The number of calendar years in the time period in which contact with mental health services was recorded (not necessarily continuous) was categorised into three levels: 1 year, 2 to 4 years, and 5 or more years.

Cause of death—Underlying cause of death is recorded using ICD10, based on information from death certificates and coroners reports. Cause of death was grouped into categories based on the underlying cause of death—natural causes of death (all deaths not from external causes), split into cardiovascular causes (ICD10 I chapter), cancer (ICD10 C chapter), psychiatric causes (ICD10 F chapter, includes deaths attributed to dementia, eating disorders and other psychiatric conditions) and other natural causes; and external causes of death, split into self-inflicted and other external (accident and assault and undetermined intent).

Analysis

A descriptive analysis of those using adult mental health services between 2002 and 2010 was performed to provide context for the study.

Standardised mortality ratios (SMRs) were calculated by dividing the observed mortality in those using psychiatric services by the mortality that would be expected if those using psychiatric services had the same patterns of mortality as the total New Zealand population.

The national mortality data for 2005 to 2007 (the mid-point of the study), by cause and 5-year age groups, were used for the comparison. Deaths in those under 20 were excluded from the SMR calculations as their small numbers could lead to unstable results. Only deaths prior to age 65 were included in the calculations, for the purposes of comparison to the New Zealand population. As a sensitivity analysis, the overall SMR was estimated both with and without the exclusion of those with service use only in the 3 months prior to death.

SMRs were calculated for all those using adult mental health services, and then separately for (a) those with a diagnosis of schizophrenia and other non-organic psychoses or bipolar disorder (psychotic disorders) and (b) those with substance use disorders. SMRs for other diagnoses were not calculated because of the large amount of missing diagnostic information.

To examine cause of death, SMRs were also calculated for natural and external causes of death, and for deaths from cancer and cardiovascular disease as the two most common causes of death other than suicide. Standardised mortality ratios for Māori and non-Māori mental health service users, compared to all Māori and non-Māori in the New Zealand population, were also examined separately.

All analysis was performed using SAS software (version 9).

Ethical approval for this study was granted by the New Zealand Multi-region Ethics Committee (reference number MEC/12/05/046).
Results

393,444 people who had had contact with services between 2002 and 2010 were identified from the Ministry of Health PRIMHD data set. After exclusions, 266,093 people were eligible for the study and were included in the final data set.

Figure 1 shows the numbers at each step.

Figure 1. Cohort selection process

Table 1 shows the demographic and service use characteristics and the prioritised psychiatric diagnosis of the study population. Both men and women were relatively young, with 70% under the age of 45.

The majority was of European ethnicity, and 20% were identified as Māori. Those using psychiatric services commonly lived in relatively deprived areas with around 30% living in the most deprived quintile. Approximately half of those using psychiatric services had no diagnostic information available, and this was related to the length of service use (30% of those with service contact only in 1 year had diagnostic information available, while 92% of those with 5 or more years of service use and 87% of people who had been inpatients had a diagnosis).
One-fifth of those using psychiatric services had inpatient stays during the study period. Nearly half of those seen by psychiatric services had contact with services in only one calendar year over the 9-year study period.

### Table 1. Cohort characteristics: adults using mental health services in New Zealand between 2002 and 2010

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Women</th>
<th>%</th>
<th>Men</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total with MHS use 2002–2010*</td>
<td>128450</td>
<td>48.3</td>
<td>137637</td>
<td>51.7</td>
</tr>
<tr>
<td>Age (at 1/1/06)#</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–29</td>
<td>37835</td>
<td>29.5</td>
<td>43199</td>
<td>31.4</td>
</tr>
<tr>
<td>30–44</td>
<td>49858</td>
<td>38.8</td>
<td>51885</td>
<td>37.7</td>
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<tr>
<td>45–64</td>
<td>32394</td>
<td>25.2</td>
<td>32721</td>
<td>23.8</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>86840</td>
<td>67.6</td>
<td>84456</td>
<td>61.4</td>
</tr>
<tr>
<td>Māori</td>
<td>25855</td>
<td>20.1</td>
<td>31009</td>
<td>22.5</td>
</tr>
<tr>
<td>Pacific</td>
<td>5222</td>
<td>4.1</td>
<td>8992</td>
<td>6.5</td>
</tr>
<tr>
<td>Asian</td>
<td>5780</td>
<td>4.5</td>
<td>4186</td>
<td>3.0</td>
</tr>
<tr>
<td>other and unknown</td>
<td>4753</td>
<td>3.7</td>
<td>8994</td>
<td>6.5</td>
</tr>
<tr>
<td>NZDep Score (quintile)^</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (least deprived)</td>
<td>16502</td>
<td>12.1</td>
<td>13935</td>
<td>9.7</td>
</tr>
<tr>
<td>2</td>
<td>19272</td>
<td>14.2</td>
<td>18445</td>
<td>12.9</td>
</tr>
<tr>
<td>3</td>
<td>25119</td>
<td>18.5</td>
<td>25337</td>
<td>17.7</td>
</tr>
<tr>
<td>4</td>
<td>32897</td>
<td>24.2</td>
<td>36320</td>
<td>25.3</td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>34228</td>
<td>25.2</td>
<td>43038</td>
<td>30.0</td>
</tr>
<tr>
<td>Prioritised diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia, other psychoses</td>
<td>8973</td>
<td>7.0</td>
<td>14075</td>
<td>10.2</td>
</tr>
<tr>
<td>Bipolar affective disorder</td>
<td>5881</td>
<td>4.6</td>
<td>4042</td>
<td>2.9</td>
</tr>
<tr>
<td>Depression and other mood</td>
<td>26443</td>
<td>20.6</td>
<td>15621</td>
<td>11.4</td>
</tr>
<tr>
<td>Anxiety and stress disorders</td>
<td>12546</td>
<td>9.8</td>
<td>8734</td>
<td>6.4</td>
</tr>
<tr>
<td>Substance use</td>
<td>4484</td>
<td>3.5</td>
<td>3415</td>
<td>2.5</td>
</tr>
<tr>
<td>Other mental health diagnoses</td>
<td>9631</td>
<td>7.5</td>
<td>21747</td>
<td>15.8</td>
</tr>
<tr>
<td>“no diagnosis” or “diagnosis deferred”</td>
<td>38295</td>
<td>29.8</td>
<td>47078</td>
<td>34.2</td>
</tr>
<tr>
<td>No diagnostic information</td>
<td>22197</td>
<td>17.3</td>
<td>22925</td>
<td>16.7</td>
</tr>
<tr>
<td>Service type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any inpatient service use</td>
<td>24025</td>
<td>18.7</td>
<td>25683</td>
<td>18.7</td>
</tr>
<tr>
<td>Years of service use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>62056</td>
<td>48.3</td>
<td>66950</td>
<td>48.6</td>
</tr>
<tr>
<td>2–4 years</td>
<td>47418</td>
<td>36.9</td>
<td>49528</td>
<td>36.0</td>
</tr>
<tr>
<td>5+ years</td>
<td>18976</td>
<td>14.8</td>
<td>21159</td>
<td>15.4</td>
</tr>
</tbody>
</table>

* 6 were of unknown sex and are not included in this table.
# 5.7% were under 18 years of age at the midpoint and 1.1% were over 65 years.
^ 994 had missing NZDep information.
Table 2. Standardised mortality ratios (SMRs) by cause of death for adults (aged 18–64) using mental health services in New Zealand 2002–2010 compared to the New Zealand population

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Women (n)</th>
<th>SMR</th>
<th>95% CI</th>
<th>Men (n)</th>
<th>SMR</th>
<th>95% CI</th>
<th>Combined SMR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All natural causes</td>
<td>2092</td>
<td>1.89</td>
<td>1.81–1.97</td>
<td>2611</td>
<td>1.78</td>
<td>1.72–1.85</td>
<td>1.83</td>
<td>1.78–1.88</td>
</tr>
<tr>
<td>Cancer</td>
<td>805</td>
<td>1.26</td>
<td>1.18–1.35</td>
<td>759</td>
<td>1.29</td>
<td>1.20–1.38</td>
<td>1.27</td>
<td>1.21–1.34</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>399</td>
<td>1.95</td>
<td>1.76–2.15</td>
<td>816</td>
<td>1.59</td>
<td>1.48–1.70</td>
<td>1.69</td>
<td>1.60–1.79</td>
</tr>
<tr>
<td>Mental health</td>
<td>56</td>
<td>9.58</td>
<td>7.37–12.45</td>
<td>81</td>
<td>5.13</td>
<td>4.12–6.38</td>
<td>6.33</td>
<td>5.35–7.48</td>
</tr>
<tr>
<td>Other natural causes</td>
<td>832</td>
<td>0.75</td>
<td>0.70–0.80</td>
<td>955</td>
<td>0.65</td>
<td>0.61–0.69</td>
<td>0.69</td>
<td>0.66–0.73</td>
</tr>
<tr>
<td>All external causes</td>
<td>832</td>
<td>4.27</td>
<td>3.99–4.57</td>
<td>1864</td>
<td>2.78</td>
<td>2.65–2.91</td>
<td>3.11</td>
<td>3.00–3.23</td>
</tr>
<tr>
<td>Other external causes</td>
<td>343</td>
<td>3.04</td>
<td>2.74–3.38</td>
<td>789</td>
<td>2.00</td>
<td>1.86–2.14</td>
<td>2.23</td>
<td>2.10–2.36</td>
</tr>
<tr>
<td>All causes</td>
<td>2924</td>
<td>2.23</td>
<td>2.15–2.32</td>
<td>4475</td>
<td>2.08</td>
<td>2.02–2.14</td>
<td>2.14</td>
<td>2.09–2.19</td>
</tr>
</tbody>
</table>

Table 2 shows numbers of deaths and standardised mortality ratios by cause of death. Over 7000 adults who had used mental health services died before the age of 65 during the study period.

The majority of deaths for both women and men were due to natural causes (71% and 58% respectively), with cancer and cardiovascular disease accounting for most deaths in this category. Suicide accounted for 15% of deaths in women and 22% of deaths in men, and other external causes (mainly accidents) were also common.

Overall those using mental health services had an SMR of 2.14, more than twice the risk of death compared to the general population. This difference was greatest for intentional self-harm and other external causes (SMR=4.4 and 2.2 respectively), but was also substantial for all natural causes combined (SMR=1.83), and for both cancer (SMR=1.27) and cardiovascular disease (SMR=1.69).

When those with psychiatric service use only in the last 3 months of their life were not excluded, the overall SMR was slightly higher at 2.26 (95% CI 2.21–2.31: sensitivity analysis not displayed in Table 2).

Table 3. Standardised mortality ratios (SMRs) by diagnosis and setting for adults using Mental Health Services in New Zealand 2002–2010 compared to the New Zealand population

<table>
<thead>
<tr>
<th>Diagnosis/Setting</th>
<th>Female (n)</th>
<th>SMR</th>
<th>95% CI</th>
<th>Male (n)</th>
<th>SMR</th>
<th>95% CI</th>
<th>Combined SMR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotic disorders</td>
<td>630</td>
<td>3.00</td>
<td>2.78–3.25</td>
<td>938</td>
<td>2.94</td>
<td>2.76–3.14</td>
<td>2.97</td>
<td>2.82–3.12</td>
</tr>
<tr>
<td>Substance use</td>
<td>308</td>
<td>3.48</td>
<td>3.12–3.90</td>
<td>733</td>
<td>2.32</td>
<td>2.16–2.50</td>
<td>2.58</td>
<td>2.43–2.74</td>
</tr>
<tr>
<td>Any inpatient care</td>
<td>1081</td>
<td>3.84</td>
<td>3.62–4.07</td>
<td>1569</td>
<td>3.52</td>
<td>3.35–3.70</td>
<td>3.64</td>
<td>3.51–3.79</td>
</tr>
<tr>
<td>Outpatient care only</td>
<td>1843</td>
<td>1.79</td>
<td>1.71–1.88</td>
<td>2906</td>
<td>1.70</td>
<td>1.64–1.77</td>
<td>1.74</td>
<td>1.69–1.79</td>
</tr>
</tbody>
</table>

Table 3 shows standardised mortality ratios by psychiatric diagnosis and psychiatric service setting. Both men and women with psychotic disorders had mortality rates three times that of the general population (combined SMR=2.97). Women with a...
principle diagnosis of substance use had an even higher mortality rate relative to the population as a whole (SMR=3.48).

Men and women who had accessed any inpatient care over the 9-year study period had much higher mortality relative to the whole population than that observed for those who had only accessed outpatient care (combined SMRs=3.64 and 1.74 respectively).

Māori mental health service users had a mortality rate one third greater than that of the whole Māori population assuming the same age structure [combined SMR 1.36 (95% CI 1.30–1.43)], while non-Māori service users had an SMR of 2.39 compared to the non-Māori New Zealand population (95% CI 2.33–2.45).

The difference between Māori using mental health services and the whole Māori population was more marked for women than men [SMR 1.50 (1.38–1.62) vs. 1.29 (1.21–1.37) respectively].

Discussion

This study is the first to examine the mortality of those using mental health services in New Zealand, and demonstrates that those with mental illness are experiencing premature mortality here just as they are in other countries. Men and women using mental health services in New Zealand have more than twice the risk of death when compared to the New Zealand population after adjusting for age. Men and women with psychotic disorders have even higher mortality, three times that of the whole population.

While suicide and accidents were important contributors to the high death rates, both men and women using mental health services also had a significantly raised risk of death from natural causes such as cancer and cardiovascular disease. Māori using mental health services also have higher mortality compared to the Māori population as a whole, but the magnitude of the difference was less for Māori than for non-Māori.

A large body of international literature points to multiple reasons for the high mortality of those using mental health services.\textsuperscript{11,12} The patterns of mortality found are important for understanding possible causes. For example the elevated risk of death from cardiovascular disease for those using mental health services in New Zealand is likely to be caused, at least in part, by the use of antipsychotic medications, which have adverse metabolic and cardiac effects.\textsuperscript{13} A recent international review found that monitoring of the side effects of psychiatric drugs tends to be inadequate.\textsuperscript{14}

In addition, smoking rates remain high amongst those using mental health services,\textsuperscript{15} in part because mental health services have in the past facilitated smoking.\textsuperscript{16} Smoking is likely to impact both on rates of cardiovascular disease and cancer. There is also evidence from other countries that those who use mental health services are less likely to receive appropriate treatment for their cardiac disease,\textsuperscript{17} and this may also be contributing to unequal outcomes in New Zealand.

The metabolic effects of antipsychotic medications are also likely to be a cause of the higher mortality seen in people with psychotic disorders. The effect of discrimination may also help explain the higher mortality of people with psychotic disorders.
Experience of discrimination by health service providers has been reported by people using mental health services internationally including in New Zealand, and discrimination is thought to be related to a lack of adequate preventative care or treatment for physical health problems for people with mental illness.

Moreover discrimination in wider society can lead to difficulties securing long-term employment and housing, which in turn impact on health. While such discrimination can occur against anyone with mental illness, there is some evidence that discrimination is more commonly experienced by people with psychotic disorders compared to other mental illness diagnoses.

The high mortality of those with substance use diagnoses is likely to be related to the impacts of the substances themselves, in particular alcohol. Alcohol is the most commonly used recreational drug in New Zealand and has a major impact on health and mortality.

Social deprivation will also be contributing to the reported mortality gap. Mental illness is both caused by social disadvantage, and also a cause of such disadvantage through social selection. We found that those using mental health services were more likely to live in more deprived areas, and thus social circumstances will be driving some of the increased mortality risk for this group.

Māori in New Zealand have higher rates of morbidity and premature mortality when compared to non-Māori. It might be expected that Māori using mental health services would bear a double burden of disadvantage—experiencing both the disadvantage of ethnicity and of mental health status. However these findings show that the additional burden of mortality experienced by those using mental health services compared to those of the same ethnicity in the New Zealand population was not greater for Māori than for non-Māori. Similarly, Piatt found that African Americans (who also have a higher base line mortality) with severe mental illness did not have increased premature mortality compared with white decedents with severe mental illness.

Our findings are consistent with other studies of mortality in people using mental health services, which have almost universally found excess mortality across all psychiatric diagnoses, settings and ages, and both natural and unnatural causes of death. However as far as we are aware, this is the first study to look at the impact of excluding those whose psychiatric service use is likely to be secondary to a terminal illness. People who are referred to consultant liaison psychiatry by medical or hospice services have a very high mortality rate, and so their inclusion can bias the results of this type of study.

In a recent Australian study, a high and increasing risk of death from cancer was found in those with diagnoses of stress and adjustment disorders. It is likely that this finding reflects stress and adjustment disorders secondary to cancer rather than the reverse. Because we were not able to specifically identify those accessing consultant liaison services or accessing care because of a physical illness, contact with psychiatric services only in the last 3 months of life (excluding those who died from external or psychiatric causes) was used as a way of identifying those likely to be in this group. It is notable that removing this group from the analysis reduced the SMR estimate slightly but the large gap remains.
A particular strength of this study is that it used routine national data about all people using public mental health services, as well as some NGO services, in New Zealand over a 9-year period. It is likely that virtually all deaths in this group are recorded in the national mortality data, as reporting is mandatory and the emigration rate for this group is likely to be low. However using routine data has limitations in terms of data completeness.

No psychiatric diagnosis information was available for half of those included in the study, which limited the examination of the mortality of people with specific diagnoses. However most of those with no diagnostic information had brief contact with services, and it is likely that people who did have the primary diagnoses examined (psychotic disorders or substance use) would have more prolonged contact with services and have diagnostic information recorded.

There are also no outpatient mental health service use data prior to 2001, and so the use of psychiatric services in earlier periods could not be examined. Information on psychiatric service use for those aged 65 and older is not universally included in the national mental health service use collection. The age of those included in a study of this type will impact on the results, as deaths from unnatural causes typically occur earlier in life while deaths from medical causes occur later in life.²

There are two sources of bias that may result in this study in fact underestimating the differences in mortality between those using mental health services and those who are not. First, it was not possible to exclude those who have used mental health services from the comparison population. This means we are not comparing those who have used mental health services with those who are not, but with a group that includes people with the high mortality related to mental illness. Second, the study examines a cross section of people using mental health services (a prevalent cohort), and because those who access mental health services have the highest risk of death, particularly from suicide, in the first year after diagnosis,²⁶ it is likely that the mortality for those using mental health services is underestimated with this method. However using a prevalent cohort enables inclusion of those who have long-term experience of psychiatric illness and therefore may be more likely to suffer the chronic physical effects of medication use, substance use and socioeconomic deprivation.

There have been numerous calls to action on the physical health and mortality of people with mental illness internationally (for example²⁷), and as well as in New Zealand,²⁸,²⁹ and many health services are working to address this inequality.³⁰

Primary care providers have a particularly important role as they treat the majority of those with mental illness, including those who also have contact with secondary services. However more evidence about the causes of the mortality gap and the effectiveness of interventions, including interventions in primary care, is needed. In particular more research to illuminate the causes of unequal outcomes for natural causes of death including cancer and cardiovascular disease is needed to inform appropriate action. Moreover, very little research has examined this issue from the perspective of those using mental health services.

As we have shown, adults using mental health services in New Zealand experience at least twice the mortality rate of the total population, information not previously available.
The present study provides a baseline for ongoing monitoring of the physical health of people with mental illness, and will inform the policy and research needed to address these highlighted inequalities.

**Competing interests:** Nil.

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