Ethnic counts on mortality and census data 2001–06: New Zealand Census-Mortality Study update

Lavinia Tan, Tony Blakely, June Atkinson

Abstract

Aim To provide an update for the assessment of discrepancies in ethnicity counts in the 2001 census and mortality data for the 2004–2006 period.


Results Using a total definition of ethnicity, census and mortality counts agree reasonably well in 2004–06 and resemble comparisons in 2001–04, except at younger ages where counts for Pacific and Asian ethnicities are up to a third less for mortality data. Due to multiple ethnicities being more commonly recorded on census data, sole ethnicity counts are generally greater on mortality than census data, particularly for Māori ethnicity.

Conclusion Similar to 2001–2004, there is little bias in ethnic group counts between census and mortality data when using total ethnicity. Calculations of mortality rates by ethnicity using unlinked census and mortality data and a total definition of ethnicity should be unbiased. These results support ongoing use of the census definition of ethnicity on all health datasets.

The New Zealand Census-Mortality Study (NZCMS) has previously shown that Māori and Pacific deaths were significantly undercounted on mortality data relative to census data prior to 1995, and relatedly, non-Māori non-Pacific deaths overcounted on mortality data. In 1995, the ethnicity question on the death registration form was altered from the biological definition of race (blood more than half) to a more self-defined question resembling that on the 1996 census.

Thus, although historic mortality trends prior to 1995 required recalculation due to the considerable bias in ethnicity group counts, more recent NZCMS data has shown increasing agreement between census and 2001–04 mortality ethnic counts,1 at least for the concept of “total ethnicity”. This paper provides an update for the 2001 census linked to 2004–06 deaths, assessing any existing discrepancies between mortality and census data for ethnicity counts.

The main objectives of this paper are to examine any existing discrepancies in ethnicity counts for mortality (2004–06 and, by way of comparison, 2001–04) and 2001 census data, and how these differ depending on the ethnicity definition used. This paper provides an update for a series of publications focused on the numerator-denominator bias and changes in this bias over time.
Methods

The methodology used in this paper, using on linked census and mortality data, has been described previously in technical reports and papers.2–7 For the update 6 March 2004 to 5 March 2006 period, 79.8% of eligible mortality records were anonymously and probabilistically linked to census records. A subset of these records with highly probable links (HPL, 76.1% of 2004–06 eligible mortality records), where ethnicity had no effect on linkage probability, was used in analyses to assess any discrepancy in ethnicity counts on the mortality and census data.

The number of deaths in the HPL dataset was weighted up so that it was representative of all 2004–06 eligible mortality records.7 Weights were calculated based on variables that were predictors of HPL in logistic regression analyses: Age at census, sex, prioritised ethnicity, rurality, residential mobility of area unit, NZ deprivation index, Regional Health Authority, and cause of death. Cells within a stratum that met the numerical criterion of >3 linked records, were separated and assigned an independent weight, whereas the remaining cells were collapsed. The order of collapsing of strata variables to ensure sufficient cell sizes was based on the strength of their relationship with HPL.

Counts of ethnic groupings for census and mortality data were compared using weighted cross-classifications of the HPL dataset. Tabular count output is random rounded to a near multiple of three as per Statistics New Zealand protocol, but the census-mortality ratios were calculated on unrounded data.

Ethnicity definitions

Three ethnicity definitions were used to assess any discrepancies in ethnic counts between the census and mortality data:

- **Total ethnicity** was assigned as Māori if any ethnic group identified on the census or mortality record was Māori. The same was done for Pacific, Asian and “non-Māori non-Pacific non-Asian” (nonMPA) ethnicities. Individuals could be assigned multiple ethnicities and consequently the sum of counts across ethnic groups will be greater than actual number of decedents.

- **Prioritised ethnicity** was assigned as Māori if any of the three possible self-identified ethnicity responses was Māori. For non-Māori, an individual was assigned as Pacific if one of the self-identified ethnic groups was Pacific. For non-Māori non-Pacific, an individual was assigned as Asian if one of the self-identified ethnic groups was Asian. The remaining individuals were assigned as nonMPA (equivalent to sole nonMPA).

- **Sole ethnicity** was assigned as Māori if Māori was the only ethnic group self identified. Similarly, an individual was assigned as Pacific or Asian if it was the only self-identified ethnic group. All others were assigned as “Remainder”. This group also included some extra decedents that, for example, self-identified multiple ethnic groups.

Results

Table 1 shows the weighted ethnicity counts for census and death registration form data, as well as the census to mortality ratios for the 2001–2004 and 2004–2006 cohorts for all three ethnicity definitions. There is generally close agreement between the census and mortality data for both cohorts in both the 2001–04 and 2004–06 data. There does appear to be some overcounting of the Māori ethnicities in mortality data relative to census data when using the sole ethnicity definition. This is due to fewer mortality records being assigned multiple ethnicity groups relative to the census data, resulting in greater sole Māori counts on the mortality data.
Table 1. Census and death registration form (mortality) ethnicity totals and ratios in 2001–2004 (n = 82,404 deaths), 2004–2006 (n = 53,445 deaths) for total, prioritised and sole ethnicity definition

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Census</th>
<th>Mortality</th>
<th>Census to Mortality Ratio</th>
<th>2004–2006</th>
<th>Mortality</th>
<th>Census to Mortality Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>7,419</td>
<td>7,539</td>
<td>0.98</td>
<td>5,136</td>
<td>5,205</td>
<td>0.99</td>
</tr>
<tr>
<td>Māori</td>
<td>2,448</td>
<td>2,493</td>
<td>0.98</td>
<td>1,449</td>
<td>1,482</td>
<td>0.98</td>
</tr>
<tr>
<td>Pacific</td>
<td>1,236</td>
<td>1,215</td>
<td>1.02</td>
<td>804</td>
<td>816</td>
<td>0.99</td>
</tr>
<tr>
<td>Asian</td>
<td>73,089</td>
<td>72,051</td>
<td>1.01</td>
<td>47,262</td>
<td>46,530</td>
<td>1.02</td>
</tr>
<tr>
<td>NonMPA‡</td>
<td>71,442</td>
<td>71,274</td>
<td>1.00</td>
<td>46,143</td>
<td>46,020</td>
<td>1.00</td>
</tr>
<tr>
<td>Prioritised</td>
<td>7,419</td>
<td>7,539</td>
<td>0.98</td>
<td>5,136</td>
<td>5,205</td>
<td>0.99</td>
</tr>
<tr>
<td>Māori</td>
<td>2,373</td>
<td>2,439</td>
<td>0.97</td>
<td>1,386</td>
<td>1,449</td>
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<tr>
<td>Pacific</td>
<td>1,170</td>
<td>1,155</td>
<td>1.01</td>
<td>777</td>
<td>771</td>
<td>1.01</td>
</tr>
<tr>
<td>Asian</td>
<td>71,442</td>
<td>71,274</td>
<td>1.00</td>
<td>46,143</td>
<td>46,020</td>
<td>1.00</td>
</tr>
<tr>
<td>Sole</td>
<td>5,931</td>
<td>6,891</td>
<td>0.86</td>
<td>4,095</td>
<td>4,764</td>
<td>0.86</td>
</tr>
<tr>
<td>Māori</td>
<td>2,196</td>
<td>2,274</td>
<td>0.97</td>
<td>1,284</td>
<td>1,338</td>
<td>0.96</td>
</tr>
<tr>
<td>Pacific</td>
<td>1,098</td>
<td>1,086</td>
<td>1.01</td>
<td>744</td>
<td>735</td>
<td>1.01</td>
</tr>
<tr>
<td>Remainder#</td>
<td>73,179</td>
<td>72,153</td>
<td>1.01</td>
<td>47,322</td>
<td>46,602</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Counts have been weighted and random rounded to a multiple of three as per Statistics New Zealand protocol. Note that the sum of observations for Prioritised and Sole ethnicities is equal to the total number of records, but the sum of observations for Total ethnicity is larger than this.

† The 2001–04 counts and ratios are sourced from Tables 10–13 of Fawcett et al. (2008)

‡ The ‘total nMnPnA’ group was defined those people with one or more self-(undertaker-) defined ethnic groups, of which one was nMnPnA. The ‘prioritized nMnPnA’ is best thought of those remaining after all census respondents or decedents with any one of Māori, Pacific or Asian ethnicity have been ‘prioritised out’. This is equivalent to the ‘sole nMnPnA’ group.

# The ‘Remainder’ group in sole ethnicity includes any people who reported nMnPnA ethnic group (i.e. the ‘total nMnPnA’ group) plus some extra decedents or census respondents who were recorded as, say, both Māori and Pacific and therefore not eligible to be either ‘sole Māori’ or ‘sole Pacific’.

The counts for total ethnicity in 2001–04 and 2004–06, stratified by sex, age, regional health authority and NZ Deprivation Index are shown in Table 2. The counts for census and mortality data are largely congruent, and similar between the two cohorts. The notable exception is the undercounting of total ethnicity in the mortality data for younger age groups (<25 years) for all ethnic groups, but especially for Pacific and Asian ethnicities. This is because multiple ethnicities are much more commonly identified on the census data than mortality data. Also note that the 2004–06 cohort counts are fewer and consequently less stable than the counts for the 2001–04 cohort.
Table 2. Census and death registration form Total ethnicity counts and ratios by sex, age, RHA and NZ Deprivation in 2001–04 (n=82,404), 2004–06 (n=53,445)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Māori</td>
<td>4,095 4,140 0.99 2,793 2,841 0.98</td>
<td>1.00 22,932 22,560 1.02</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>1,365 1,371 1.00 798 810 0.99</td>
<td>1.00 651 669 0.97</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>681 642 1.06 459 459 1.00</td>
<td>1.00 348 357 0.97</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>36,042 35,499 1.02 22,932 22,560 1.02</td>
<td>1.00 24,333 23,970 1.02</td>
</tr>
<tr>
<td></td>
<td>Māori</td>
<td>3,324 3,396 0.98 2,343 2,364 0.99</td>
<td>1.00 1.40 912 1.12</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>1,086 1,122 0.97 651 669 0.97</td>
<td>1.00 1.19 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>552 573 0.97 348 357 0.97</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>37,047 36,552 1.01 24,333 23,970 1.02</td>
<td>1.00 24,333 23,970 1.02</td>
</tr>
<tr>
<td>Age</td>
<td>0–14 yrs</td>
<td>Māori 195 189 1.03 69 63 1.10</td>
<td>1.00 1.40 912 1.12</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>63 60 1.02 21 15 1.40</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>18 21 0.91 18 12 1.50</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>354 309 1.14 126 105 1.20</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>15–24 yrs</td>
<td>Māori 480 495 0.97 459 483 0.95</td>
<td>1.00 1.40 912 1.12</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>174 156 1.10 132 111 1.19</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>87 75 1.16 39 27 1.44</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>1,161 1,062 1.10 1,017 912 1.12</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>25–44 yrs</td>
<td>Māori 786 792 0.99 765 780 0.98</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>237 234 1.01 186 180 1.03</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>114 105 1.09 87 96 0.91</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>2,064 1,947 1.06 1,890 1,779 1.06</td>
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</tr>
<tr>
<td></td>
<td>45–64 yrs</td>
<td>Māori 2,589 2,637 0.98 1,443 1,458 0.99</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>732 726 1.01 363 375 0.97</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>282 261 1.09 171 168 1.02</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>9,348 9,048 1.03 5,157 4,989 1.03</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>65–74 yrs</td>
<td>Māori 1,863 1,896 0.98 1,251 1,257 1.00</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>558 579 0.97 339 345 0.98</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>282 285 0.98 192 201 0.96</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>12,852 12,648 1.02 7,512 7,383 1.02</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>75–84 yrs</td>
<td>Māori 1,098 1,089 1.01 840 852 0.99</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>480 522 0.92 294 321 0.92</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>297 297 1.00 189 198 0.95</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>23,937 23,775 1.01 15,765 15,636 1.01</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>85+ yrs</td>
<td>Māori 411 441 0.93 315 306 1.03</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>204 213 0.96 120 138 0.87</td>
<td>1.00 1.50 27 1.44</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>156 174 0.90 111 114 0.97</td>
<td>1.00 1.50 27 1.44</td>
</tr>
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<td>Variables</td>
<td>Ethnicity</td>
<td>Census</td>
<td>2001–2004 Death Registration Form</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------</td>
<td>--------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>RHA Northern</td>
<td>Māori</td>
<td>2,253</td>
<td>2,298</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>1,716</td>
<td>1,758</td>
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<tr>
<td></td>
<td>Asian</td>
<td>684</td>
<td>687</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>19,902</td>
<td>19,578</td>
</tr>
<tr>
<td>Midland</td>
<td>Māori</td>
<td>2,835</td>
<td>2,913</td>
</tr>
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<td></td>
<td>Pacific</td>
<td>174</td>
<td>177</td>
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<tr>
<td></td>
<td>Asian</td>
<td>129</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>14,850</td>
<td>14,454</td>
</tr>
<tr>
<td>Central</td>
<td>Māori</td>
<td>1,713</td>
<td>1,743</td>
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<tr>
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<td>Pacific</td>
<td>459</td>
<td>444</td>
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<tr>
<td></td>
<td>Asian</td>
<td>276</td>
<td>279</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>19,080</td>
<td>18,891</td>
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<td>Māori</td>
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<td>585</td>
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<tr>
<td></td>
<td>Pacific</td>
<td>99</td>
<td>114</td>
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<tr>
<td></td>
<td>Asian</td>
<td>144</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>19,257</td>
<td>19,125</td>
</tr>
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<td>NZ Deprivation</td>
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<td>Māori</td>
<td>312</td>
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<td></td>
<td>Pacific</td>
<td>84</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>273</td>
<td>267</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>11,781</td>
<td>11,709</td>
</tr>
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<td></td>
<td>5–6</td>
<td>Māori</td>
<td>597</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>159</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>237</td>
<td>234</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>14,565</td>
<td>11,460</td>
</tr>
<tr>
<td></td>
<td>7–8</td>
<td>Māori</td>
<td>1,062</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>273</td>
<td>294</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>231</td>
<td>228</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
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<td>16,659</td>
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<td>9–10</td>
<td>Māori</td>
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</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>486</td>
<td>477</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>282</td>
<td>282</td>
</tr>
<tr>
<td></td>
<td>NonMPA</td>
<td>17,451</td>
<td>17,163</td>
</tr>
</tbody>
</table>

All counts are weighted, and then random rounded to a multiple of three as per Statistics New Zealand protocol. Minimum cell size is 6.

Full cross-classifications of census and mortality 2004–2006 data for prioritised and sole ethnicity definitions are shown in Table 3 and 4. These show the specific mismatches in ethnicity counts between the census and mortality files. The majority
of misclassifications were between Māori and nonMPA groups. Using a sole definition of ethnicity, the number of Māori deaths according to mortality data exceeds census data (i.e. census-mortality ratio <1.0), due to multiple self-identified ethnicities being more common on census data, this causes sole Māori counts to be lower on census than mortality data.

Table 3. Census by mortality counts for prioritised ethnicity by sex, 2004–06

<table>
<thead>
<tr>
<th>Sex</th>
<th>Census Prioritised Ethnicity</th>
<th>Māori Deaths</th>
<th>Pacific Deaths</th>
<th>Asian Deaths</th>
<th>NonMPA Deaths</th>
<th>Total Census Deaths</th>
<th>Census to Mortality Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Māori</td>
<td>2,556</td>
<td>9</td>
<td>6</td>
<td>222</td>
<td>2,793</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>9</td>
<td>723</td>
<td>6</td>
<td>27</td>
<td>756</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>.</td>
<td>18</td>
<td>405</td>
<td>18</td>
<td>444</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>Non MPA</td>
<td>276</td>
<td>39</td>
<td>30</td>
<td>22,023</td>
<td>22,368</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,841</td>
<td>789</td>
<td>435</td>
<td>22,296</td>
<td>22,693</td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>Māori</td>
<td>2,133</td>
<td>6</td>
<td>6</td>
<td>204</td>
<td>2,343</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>12</td>
<td>594</td>
<td>6</td>
<td>21</td>
<td>630</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>.</td>
<td>15</td>
<td>312</td>
<td>9</td>
<td>336</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td>Non MPA</td>
<td>219</td>
<td>45</td>
<td>18</td>
<td>23,487</td>
<td>23,772</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,364</td>
<td>660</td>
<td>333</td>
<td>23,724</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All counts are weighted, and then random rounded to a multiple of three as per Statistics New Zealand protocol. Minimum cell size is 6.

Table 4. Census by mortality counts for sole ethnicity by sex, 2004–06

<table>
<thead>
<tr>
<th>Sex</th>
<th>Census Sole Ethnicity</th>
<th>Māori Deaths</th>
<th>Pacific Deaths</th>
<th>Asian Deaths</th>
<th>Remainder Deaths</th>
<th>Total Census Deaths</th>
<th>Census to Mortality Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Māori</td>
<td>2,394</td>
<td>6</td>
<td>6</td>
<td>390</td>
<td>2,268</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>9</td>
<td>693</td>
<td>6</td>
<td>60</td>
<td>714</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>.</td>
<td>6</td>
<td>396</td>
<td>42</td>
<td>417</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Non MPA</td>
<td>204</td>
<td>27</td>
<td>24</td>
<td>22,110</td>
<td>22,965</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,604</td>
<td>732</td>
<td>426</td>
<td>22,602</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>Māori</td>
<td>1,992</td>
<td>6</td>
<td>.</td>
<td>345</td>
<td>1,827</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>9</td>
<td>570</td>
<td>.</td>
<td>48</td>
<td>570</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>.</td>
<td>6</td>
<td>294</td>
<td>39</td>
<td>324</td>
<td>1.04</td>
</tr>
<tr>
<td></td>
<td>Remainder</td>
<td>159</td>
<td>33</td>
<td>12</td>
<td>23,568</td>
<td>24,357</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,160</td>
<td>609</td>
<td>312</td>
<td>24,003</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All counts are weighted, and then random rounded to a multiple of three as per Statistics New Zealand protocol. Minimum cell size is 6.

Discussion

Using a total definition of ethnicity, census and mortality counts agree reasonably well in 2004–06 and were similar to 2001–04, except at younger ages where mortality data counts for Pacific and Asian are up to a third (1–1.5) less for mortality data – although numbers are sparse and hence estimates unstable. Due to multiple ethnicities being more commonly recorded on census data, prioritised and sole comparisons differ; Māori sole counts are greater on mortality than census data.
The current analyses necessarily used only a subgroup of the total mortality records (the highly probable links, HPL) to estimate numerator denominator bias. By weighting up these HPL links to be representative of all mortality records, we are assuming that within strata of that weighting (i.e. sex by age by prioritised ethnicity (mortality data), rurality, residential mobility of area unit, NZ deprivation index, region, and cause of death) that the (dis)agreement of mortality and census data ethnicity is the same among the HPL dataset as the non-HPL dataset. Unfortunately, we cannot prove this assumption. However, we are reasonably confident that within all cross-classifications of these strata that we essentially adjust for any selection bias that may arise in using the subsidiary HPL data-set.

The use of a total definition of ethnicity appears to be the most accurate and consequently if this definition is used for the calculation of ethnic mortality rates, there should be little to no numerator-denominator bias. As with our last update, these results again provide support to the sector for ongoing attempts to ensure health data uses an ethnicity question as close in wording and layout to the census question as possible.

**Competing interests:** None known.

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Access to the data used in this study was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the authors, not Statistics New Zealand.

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**References:**


