Commentary: What explains widening geographic differences in life expectancy in New Zealand?

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The ongoing collection, analysis, and dissemination of routine health statistics is essential for monitoring the health of populations. While the main function of such routine data analysis is to provide surveillance for particular health conditions, it may also serve to generate and support hypotheses about the causes of changes in population health. In this issue, Pearce and Dorling analyse routine data to show that differences in life expectancy between New Zealand’s 21 health districts have widened from 1980 to 2000. More specifically, they show that life expectancy increased for all areas, but the areas that were least deprived in 2001 saw larger life expectancy gains since 1980 than did the most-deprived areas. Similar results have also been seen for the UK and Canada, but as the authors note, there has been less attention paid to investigating geographic inequalities in health than to socioeconomic or race–ethnic inequalities in health. So what might account for the widening gap in life expectancy observed among these areas in New Zealand?

One potential explanation is suggested by the method that Pearce and Dorling use for measuring health inequalities over this period. They use the slope index of inequality (SII) to measure absolute differences in life expectancy, which has the advantage, as they rightly note, of accounting for shifts in the population over time across regions. This is especially useful given the 20 year period of their analysis, during which New Zealand’s population increased by 20%, and has done so differentially by region, with faster population growth in the northern North Islands of Auckland, Bay of Plenty, Northland, and Waikato. However, monitoring health inequalities with an index like the SII also introduces an additional, but less well appreciated, dimension to measuring changes in inequality. The use of a population-weighted inequality measure creates the possibility of two potential routes to increasing inequality: widening differences in district life expectancies (i.e. changes in the health state), and differential rates of population growth among districts (i.e. changes in the proportion of people in different exposed groups). Given the near linear relationship between socioeconomic rank and life expectancy among health districts, even if regional life expectancies had stayed exactly the same, but over this time there was more rapid population growth among areas of higher and lower life expectancy, the SII would register an increase. Likewise, faster population growth among districts with average life expectancies might have kept geographic differentials from increasing even more than they did. Pearce and Dorling’s paper suggests at least some plausibility for the role of differential population growth, as in Figure 3 it appears that the absolute difference in life expectancy between the North and South Islands actually declined over this period. And while both life expectancy and population distributions were simultaneously changing in all districts during this period, it would be interesting to know how much of the observed increase in the SII was due to population shifts and how much was due to changes in district life expectancies.

Looking more closely at population change would be useful because one obvious mechanism consistent with the pattern of results Pearce and Dorling observe is population migration and/or immigration. In this case, it is possible that during the period of study individuals with worse health migrated to more-deprived areas, or that healthier individuals migrated to less-deprived areas. While there is less plausibility and evidence for the former, there is reasonable evidence to suggest that the latter makes a non-trivial contribution to geographic differences in health. In fact, the authors of a recent study documenting increases in geographic area mortality differences in England and Wales concluded that ‘Migration, rather than changes in the deprivation of the area that non-migrants live in, accounts for the large majority of these changes.’ [p. 2768 in Ref. (12)] Though Pearce and Dorling acknowledge that selective migration may have played a role in generating their findings, their main explanation for widening geographic differences in life expectancy is increasing economic inequality.

There is little doubt that economic inequality has increased precipitously in New Zealand since the mid-1980s, but the mechanism by which this change could be causally related to the observed changes in geographic health inequalities is unclear. Pearce and Dorling hypothesize that the effects of economic inequality operate either simultaneously or with very short lags to influence health inequality, noting that geographic inequalities fell after declines in economic inequality from 1981 to 1986. The plausibility of this assertion would be strengthened by looking at mortality among specific causes of death rather than life expectancy, which may change through multiple age-specific and cause-specific pathways. Other recent studies of health inequality trends in New Zealand have shown diverse patterns by age, gender, cause-of-death, and social group status, which diminish the case for a general effect of rising economic inequality. But even if economic inequality did operate simultaneously on mortality, the longer-term
trends show that economic inequality declined sharply in New Zealand from the end of The Second War to the mid-1980s, which would be inconsistent with the rise in health inequality Pearce and Dorling show from 1981 to 86. Additionally, a large multilevel study of economic inequality and mortality in New Zealand was unsupportive, and another recent simulation study suggested that redistributing income across New Zealand is not likely to achieve dramatic improvements in either overall health or health inequalities. Other recent examples also suggest that a contemporaneous, generalizable causal role for economic inequality on health is unlikely. Leclerc et al. showed that health inequalities remained stable while income inequality remained stable (or declined) in France; Regidor et al. found widening socioeconomic inequalities in health in Spain during a period of decreasing economic inequality, and in the UK health inequalities appear to be increasing as economic inequality is increasing. The diversity of these trends makes it difficult to hypothesize whether there is any universal association between economic inequality and health inequality.

One potential limitation of Pearce and Dorling’s paper is that their unit of analysis, the District Health Board (DHB), did not exist at the beginning of the study period. In calculating the SII they must, therefore, assume that the DHBs of 2001 were ranked similarly by deprivation in 1980, rather than ranking the areas by deprivation in each year. Pearce and Dorling attempt to assess the sensitivity of their results to this assumption by ranking areas based on either 1980–82 or 1999–2001 life expectancy rather than deprivation. But doing so does not generate the SII, which is meant to measure socioeconomic health inequalities, but estimates a one-dimensional measure of health inequality more akin to a Gini coefficient or other measure of total or ‘pure’ health inequality across geographic areas. Because, as Pearce and Dorling show, there is a strong cross-sectional correlation between deprivation and life expectancy among DHBs the trends are broadly similar, but if the correlation between deprivation rank and life expectancy was actually weaker in 1980, this could overestimate the extent to which the SII has increased. But given that Pearce and Dorling purport to measure geographic differentials, it is unclear why they would rank the DHBs by deprivation at all. Another strategy might have been to first measure trends in health inequalities among geographic areas and then to assess how much of this overall between-area inequality is associated with socioeconomic deprivation.

Finally, Pearce and Dorling attempt to strengthen their case by asserting that both geographic and socioeconomic inequalities in New Zealand are currently at ‘internationally high’ levels, the implication being that this is a result of New Zealand’s internationally high level of income inequality. As very few international studies of the magnitude of health inequalities have been conducted that include New Zealand, this assertion lacks solid evidence. Indeed, cross-country comparative studies of the extent of health inequalities are inherently hampered by the difficulty in obtaining comparable measures of social group designation—geographic, socioeconomic, or otherwise. And even when comparable measures of socioeconomic position permit a more fair comparison, the relative ranking of countries with respect to health inequality is likely to differ by other dimensions such as age, gender, or cause-of-death. For example, one recent study found that, compared with Denmark, Norway, and Finland, relative educational inequalities in working-age mortality in New Zealand tended to be larger among females but smaller among males, and the increase in inequalities over time were similar in all countries. Thus, the notion that health inequalities in New Zealand are high compared with what has been observed in the past may be true, but the question of how large such inequalities are compared with other rich countries warrants further investigation.

The paper by Pearce and Dorling makes timely and effective use of routinely collected health data to show that differences in life expectancy among New Zealand’s health districts have widened over the last two decades. And while their assertion that this is the result of widening economic inequalities in New Zealand is not, I believe, supported by their evidence, a strong argument can be presently be made that income inequality is far too high in New Zealand, regardless of its consequences for health.

References


