Comparing Indigenous health status across regions: a numerical example of uncertainty

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Abstract

Objective: To illustrate how regional variation in data quality could explain some or all of the apparent regional differences in the health status of Indigenous Australians.

Methods: A series of simple hypothetical numerical examples is provided, with varying assumptions regarding the accuracy of identification of Indigenous deaths.

Results: The apparent difference in Indigenous mortality in remote compared with urban areas is of a magnitude that could be explained by relatively modest regional differences in data quality.

Conclusion and implications: Determinations of relative health status within the Indigenous population must take into account the impact of variability in data quality.

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In April 2002, I was asked to provide expert advice to the Commonwealth's Office for Aboriginal and Torres Strait Islander Health (OATSIH). The question I was asked to address was whether the quality of administrative data collections is sufficient to enable differentiation of the health status of Indigenous people in urban, rural and remote areas. In response, I provided a numerical example (shown in this paper) illustrating the ease with which relatively small differences in data quality can result in potentially important differences in interpretation.

The request for assistance was not part of an academic exercise or the result of idle curiosity. Rather, it came in the wake of the Commonwealth Grants Commission (CGC) Inquiry into Indigenous Funding, which reported to the Commonwealth Government in 2001.[1] The CGC had been asked by the Federal Government in late 1999 to undertake an inquiry into the distribution of funding for programs that provided services to Indigenous Australians in the areas of health, housing, infrastructure, education, training and employment services. The terms of reference for the inquiry made it clear that the aim was to develop and apply "a method to determine the needs of groups of indigenous Australians *relative to one another*"[1] (p. xii, emphasis added). In other words, the inquiry was established to look at the distribution of existing funding (how the 'pie' is divided), rather than to assess the appropriateness of the levels of current expenditure (the size of the pie that would be needed to address Indigenous disadvantage). To their credit, the authors of the CGC report explicitly recognised that re-allocation of existing funds might not be warranted because of the negative consequences this could have for the Indigenous population as a whole.[1]

Whether the Government was asking the right question is an appropriate topic for debate, but it is not the issue to be considered here. The question I was asked to address is whether it is feasible to make evidence-based statements about relative need within the Indigenous population based on differences in health status. Although the focus here is on health, the principles apply to other areas of social concern.

The importance of data quality in measuring regional health differences

The main sources of regional health data used in the CGC report[1] related to mortality and hospital separations. The quality of Indigenous identification in these data collections has been the subject of investigation in recent years.[2-5] The existing evidence indicates that there is considerable variation across the country, but the potential impact of this variation is not always appreciated.

The CGC report states that, for the period for which data were analysed, reliable identification of Indigenous deaths was available only in the Northern Territory, Western Australia and South Australia.[1] This statement was based on assessments published by the Australian Bureau of Statistics (ABS), which in recent years has added Queensland to the group of

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jurisdictions considered to have adequate data quality.[2] However, using the ABS's own figures, it is debatable whether identification is sufficiently 'reliable' even in those four jurisdictions. For example, in 1998, the ratio of registered to expected deaths was 0.88 in the Northern Territory, 0.74 in Western Australia, 0.64 in South Australia and 0.63 in Queensland.[2] That is, assuming the number of expected deaths was reasonably accurate, then 'reliable' identification actually meant misclassifying (and therefore missing) between 12% and 37% of Indigenous deaths. The ratios were even lower for 1999.[6] This leaves considerable room for error, as is demonstrated below.

The process used by the ABS to estimate 'expected' deaths has been scrutinised and questions have been raised about the precision of the resulting estimates.[3] Even if we assume the ABS figures are correct, however, we would still not have any information about the degree of variation in data quality *by region* within jurisdictions. This knowledge is critical to the interpretation of mortality figures by region or by category of remoteness.

Estimates of the proportion of Indigenous deaths that are correctly classified as Indigenous (hereafter referred to as 'completeness') at the State/Territory level are essentially a population-weighted average for various regions within that jurisdiction (e.g. capital city, other urban areas, rural areas and remote areas). The same State-wide figure could result from consistent completeness across all areas, or from higher completeness in some areas and lower completeness in others. If it is the former, then looking at regional variation in death rates might be a reasonable way of establishing a relative ranking by region within the Indigenous population. (The adequacy of comparisons with the non-Indigenous population would still depend on the absolute level of completeness.) If it is the latter – for example, if completeness of recording of Indigenous deaths was highest in remote areas and lowest in urban areas (a not unreasonable proposition) – then we would not be able to distinguish between regional variation in *death rates* and regional variation in *data quality*.

A numerical example

Table 1 provides a hypothetical example of what can happen to apparent death rates and rate ratios if data quality varies by region, even if the underlying (or 'true') rates are exactly the same. Suppose a jurisdiction had 45,000 Indigenous people, with 15,000 each in urban, rural and remote areas. (For the sake of simplicity, the age distribution in the three areas has been assumed to be identical.) Suppose also that the crude death rates were exactly the same in the three areas, at 6.7 deaths per 1,000 population (100 deaths per year) in each of these areas. This scenario is presented in column A of Table 1.

Now, suppose that only 90% of Indigenous deaths were recorded as such, and that this was consistent across regions (see Table 1, column B). In this case, the apparent death rate is lower than the true death rate, but it remains consistent across regions (as it is in truth).

If the proportion of Indigenous deaths correctly recorded varies by region, however, then the apparent death rates will also differ from one another. Two scenarios are presented in Table 1, in columns C and D. In the first scenario (column C), the regional differences are not particularly dramatic. Completeness averages 90%, with a range of 80% to 100%. In this case, the apparent rate ratio for remote compared with urban areas is 1.25; that is, Indigenous people in the remote regions appear to have a death rate that is 25% higher than Indigenous people in urban areas, even though the true rates are the same.

In the second scenario (column D), the average level of completeness has been reduced to 80% (which is still higher than that found in most jurisdictions), and the disparity by region has been increased, with completeness ranging from 65% to 95%. The remote:urban rate ratio in this scenario is 1.46, which indicates an almost 50% higher apparent death rate in remote areas than in urban areas, even though there is no difference in truth.

By comparison, the CGC report presented age-standardised death rates by area of residence for Indigenous males and females

Table 1: Hypothetical example of true and apparent regional variation in death rates.

	A. 100% completeness[a]: 'Truth'			B. 90% completeness[a], consistent across regions			C. 90% completeness[a] overall, variable across regions			D. 80% completeness[a] overall, variable across regions		
	Urban	Rural	Remote	Urban	Rural	Remote	Urban	Rural	Remote	Urban	Rural	Remote
Deaths recorded	100	100	100	90	90	90	80	90	100	65	80	95
Popn	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Apparent death rate[b]	6.7	6.7	6.7	6.0	6.0	6.0	5.3	6.0	6.7	4.3	5.3	6.3
Rate ratio[c]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.13	1.25	1.0	1.23	1.46

Notes:
(a) Completeness refers to the proportion of Indigenous deaths that are correctly classified as Indigenous. It is assumed that all non-Indigenous deaths are correctly identified.
(b) Crude rate per 1,000 population.
(c) With urban as the reference area.

for 1994-98, based on data provided by the Australian Institute of Health and Welfare (AIHW) for Western Australia, South Australia and the Northern Territory.[1] The rate ratio for very remote areas compared with highly accessible areas was 1.53 for Indigenous males and for 1.48 for Indigenous females. These figures are quite similar to the apparent rate ratio presented in column D of the table, which occurred *even though there was no difference in truth* and even though the levels of completeness of recording of Indigenous deaths were higher than is usually the case in Australia. The raises the question: How much of the difference seen in the rates presented in the CGC report is real, and how much is due to differences in data quality?

A similar argument could be made for hospital separation data. In a variety of studies cited elsewhere,[5] the accuracy of recording of Indigenous status among hospital patients ranged from less than 50% to 100%. As with mortality data, this leaves considerable room for error. In one study of 11 hospitals in five jurisdictions, patients were more likely to be correctly identified as Indigenous in hospitals where a larger proportion of the catchment population was Indigenous.[4] This suggests that the accuracy of identification may be better for patients from remote areas. As with deaths, *apparent* regional differences in Indigenous hospital separations may result at least in part from regional differences in data quality.

Discussion

Governments need to make decisions about how funds are to be allocated; that is one of their major functions. Sometimes decisions have to be made when there is insufficient evidence available, while at other times the evidence base is more than adequate. It is important to be clear about which times are which. We fall into a trap when what is taken to be 'evidence' is not what it appears to be.

It may well be true that the health status of Indigenous Australians is worse in remote than in urban areas. However, it is highly likely that there are differences in the completeness of recording of Indigenous deaths (and hospital separations) by region. In the absence of good information about the variability of completeness of recording of Indigenous status, the apparent rate ratios based on deaths (or hospital separations) identified as Indigenous do not allow us to differentiate between regional differences in health status and regional differences in data quality. If we are to make reasonable and useful statements about relative need within the Indigenous population, then we *must* be able to distinguish between the two. Unfortunately, we are not there yet.

References

1. Commonwealth Grants Commission. *Report on Indigenous Funding, 2001. Volume 1.* Canberra: Commonwealth Grants Commission; 2001.
2. Australian Bureau of Statistics and Australian Institute of Health and Welfare. *The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples, 2001.* Canberra: Australian Bureau of Statistics; 2001.
3. Cunningham J, Paradies Y. *Mortality of Aboriginal and Torres Strait Islander Australians.* Canberra: Australian Bureau of Statistics; 2000.
4. Aboriginal and Torres Strait Islander Health and Welfare Information Unit. *Assessing the Quality of Identification of Aboriginal and Torres Strait Islander People in Hospital Data.* Canberra: Australian Health Ministers' Advisory Council, Australian Institute of Health and Welfare and Australian Bureau of Statistics; 1999.
5. Cunningham J, Beneforti M. *Hospital Statistics, Aboriginal and Torres Strait Islander Australians, 1997-98.* Canberra: Australian Bureau of Statistics; 2000.
6. Australian Bureau of Statistics. *Deaths, Australia, 1999.* Canberra: Australian Bureau of Statistics; 2000.