

## Does evidence influence policy? Resource allocation and the Indigenous Burden of Disease study

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### Abstract

**Objective.** The Indigenous Burden of Disease (IBoD) report is the most comprehensive assessment of Indigenous disease burden in Australia. The aim of the present study was to investigate the potential effect of the IBoD report on Australian Indigenous health policy, service expenditure and research funding. Findings have significance for understanding factors that may influence Indigenous health policy.

**Methods.** The potential effect of the IBoD report was considered by: (1) conducting a text search of pertinent documents published by the federal government, Council of Australian Governments and the National Health and Medical Research Council of Australia (NHMRC) and observing the quantity and quality of references to IBoD; (2) examining data on government Indigenous healthcare expenditure for trends consistent with the findings and policy implications of the IBoD report; and (3) examining NHMRC Indigenous grant allocation trends consistent with the findings and policy implications of the IBoD report.

**Results.** Of 110 government and NHMRC documents found, IBoD was cited in 27. Immediately after publication of the IBoD report, federal and state governments increased Indigenous health spending (relative to non-Indigenous), notably for community health and public health at the state level. Expenditure on Indigenous hospital separations for chronic diseases also increased. These changes are broadly consistent with the findings of the IBoD report on the significance of chronic disease and the need to address certain risk factors. However, there is no evidence that such changes had a causal connection with the IBoD study. After publication of the IBoD report, changes in NHMRC Indigenous research funding showed little consistency with the findings of the IBoD report.

**Conclusions.** The present study found only indirect and inconsistent correlational evidence of the potential influence of the IBoD report on Indigenous health expenditure and research funding. Further assessment of the potential influence of the IBoD report on Indigenous health policy will require more targeted research, including interviews with key informants involved in developing health policy.

**What is known about the topic?** There are currently no publications that consider the potential effect of the IBoD study on Indigenous health expenditure and research funding.

**What does this paper add?** This paper offers the first consideration of the potential effect of the IBoD report. It contains analyses of data from readily available sources, examining national expenditures on Indigenous health and NHMRC Indigenous research, before and after the publication of the IBoD report.

**What are the implications for practitioners?** The paper is relevant to analysts interested in drivers of Indigenous health policy. Although it finds correlations between the release of the IBoD report and some subsequent health spending decisions, other factors should be investigated to better understand the complexity of processes that drive government efforts to improve Indigenous health.

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## Introduction

The years 2007 and 2008 were significant for Australian Indigenous health policy. In 2007, Oxfam released the *Close the Gap: Solutions to the Indigenous Health Crisis Facing Australia* report<sup>1</sup> and the Council of Australian Governments (COAG) committed to eliminate differences in Indigenous and non-Indigenous life expectancy and infant mortality.<sup>2</sup> In 2008, the new federal government began its first parliament by making the *Apology to Australia's Indigenous Peoples*.<sup>3</sup> The Prime Minister then signed the *Statement of Intent*, committing to close the Indigenous and non-Indigenous health gap.<sup>4</sup> Later in 2008, COAG developed targets and timelines to achieve Indigenous health equality.<sup>5</sup>

Coinciding with these events was the 2007 publication of the *Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples 2003* (hereafter referred to as the IBoD report).<sup>6</sup> This report identified the extent and causes of Indigenous health problems and quantified the contribution of key risk factors. The report noted that Indigenous Australians suffered a burden of disease that was 2.4-fold<sup>7</sup> (2.4 for males and 2.5 for females)<sup>6</sup> greater than that of the total Australian population. In addition, the IBoD report showed that chronic illnesses were responsible for 70% of the health gap. The report outlined contributions to Indigenous burden of disease by 'broad cause': cardiovascular disease, mental disorder, chronic respiratory disease, diabetes, cancers and injury (here, intentional injury and unintentional injury are combined).<sup>6</sup> It also found 11 major significant risk factors behind the inequity in burden of disease: tobacco smoking, obesity, physical inactivity, high blood cholesterol, alcohol, high blood pressure, low fruit and vegetable intake, illicit drugs, intimate partner violence, child sexual abuse and unsafe sex. The IBoD report showed these risk factors were associated with 37.4% of Indigenous burden of disease.<sup>6</sup> Given their significant contribution to burden of disease, an implication of the IBoD report was that interventions targeting these factors could make significant improvements in Indigenous health.<sup>6</sup>

At its time of publication, the IBoD report was highly relevant to the direction of Indigenous health policy. Apart from offering unique and thorough national findings, the IBoD report offered a means for comparing the health of Indigenous and all Australians (including Indigenous), whose burden of disease was documented in a related report, namely *The Burden of Disease and Injury in Australia 2003*.<sup>8</sup> A common metric was used to measure burden of disease in both studies, namely disability-adjusted life years (DALYs). This metric combines years of life lost (i.e. mortality) with years of life lost due to disability (i.e. morbidity). The IBoD report was able to give informed and transparent quantifiable estimates of health gaps, assisting in the setting of priorities and targets. Botfield *et al.*<sup>9</sup> interviewed key informants (researchers, policy advisers and policy makers) in research on the commissioning of the IBoD report and found that some were waiting for data on Indigenous health.

However, it was unknown whether the IBoD report provided a useful input to future health policy development. When the IBoD report was commissioned there were concerns about the

report's inputs, particularly with the low quality of Indigenous health data and uncertainty about the methods used in burden of disease studies.<sup>9</sup> Although seen by policy makers as possibly useful in quantifying the health gap, the IBoD report was considered less useful in informing ways to remove it. Further, as claimed by one of Botfield *et al.*'s informants, policy is multifaceted and is determined not just by data but political, economic and cultural settings.<sup>9</sup>

Several authors have researched associations between health resource allocation and burden of disease. In a study of Ugandan health 'policy makers', Kapiriri *et al.*<sup>10</sup> found that results of national burden of disease research had been 'the basis for the national health policy and in defining the contents of the national essential healthcare package'. Aoun *et al.*<sup>11</sup> analysed associations between Australian National Health and Medical Research Council (NHMRC) allocations and the disease burden, finding associations to be significant. Stuckler *et al.*<sup>12</sup> compared World Health Organization (WHO) budget data with the burden of disease over the period 1994–95 to 2008–09 for the Western Pacific and Africa; the authors found a substantial bias towards funding of infectious disease in both areas that was appropriate to the burden of disease in Africa but not for the Western Pacific.

Researching the importance burden of disease for Ugandan health policy, Jeppsson *et al.*<sup>13</sup> found that burden of disease was not a dominant influence on health policy, which instead could be influenced by other considerations, such as threats from new diseases. Mitchell *et al.*<sup>14</sup> examined observed versus expected levels of NHMRC funding given results of *The Burden of Disease and Injury in Australia 2003* and found a higher-than-expected number of grants allocated to research on diabetes and cancer and fewer than expected for mental health research.

The aim of the present study was to investigate the potential influence of the IBoD report on Australian Indigenous health policy, service expenditure and research funding. Because the IBoD report is the only burden of disease analysis for Indigenous Australians, the findings will give insights into the significance of burden of disease research for Indigenous health policy. None of the analysis allows assessment of possible causal effects of the IBoD report. However, the identification of possible associations between changes in policy, expenditure and grant allocations since the publication of the IBoD report will provide guidance for subsequent research into drivers of Indigenous health policy.

## Methods

### *Stage 1: Text searches of Federal Government and COAG and NHMRC policy, advice and agreement documents*

To find documented information supporting a possible effect of the IBoD report on policy, we conducted a literature search of publicly available federal government and Council of Australian Government (COAG) documents, available since the publication of IBoD. Several of these documents were already known to us, whereas others were found through Google using terms 'Closing the Gap' and 'Indigenous health'. We also used these search terms on the Department of Health and Aging (DoHA), Australian Institute of Health and Welfare (AIHW), Australian Bureau of

Statistics (ABS), Australian Indigenous HealthInfoNet, COAG and NHMRC websites. Documents were read for citations of the IBoD report and uncited use of IBoD study findings.

Ideally, the present study would have gathered original qualitative data through semistructured interviews with key informants in the policy development field, such as government ministers and senior public servants. Botfeld *et al.*<sup>9</sup> have published qualitative findings on policy that led to the commissioning of the IBoD study, which have been incorporated into the present study. However, resources were not available to conduct our own interviews. The public documents collected for the present study remain valuable data sources. These documents offered insights to the potential use of the IBoD report in policy development. In addition, the results of the text search can be triangulated with expenditure and grant patterns since the publication of the IBoD report (Stage 2).

### *Stage 2: Reviews of Indigenous health expenditures and health research grants*

National health expenditure data on Indigenous and non-Indigenous government health expenditure were compared for Australian financial years immediately before and after the release of the IBoD report. Any changes consistent with IBoD study findings were noted. All expenditures were converted into 2010–11 Australian dollars using the AIHW price deflator<sup>15</sup> and are expressed in terms of dollars per person.

First, data on general government health expenditure for Indigenous and non-Indigenous Australians were examined for financial year periods before (2004–05, 2006–07) and after (2008–09, 2010–11) publication of the IBoD report. These data were reported by expenditure agency (i.e. federal/state government and non-government) and general area of expenditure (i.e. hospitals, public health, community health, medications and medical services).<sup>16–19</sup> Ratios between Indigenous and non-Indigenous expenditure were determined before and after the publication of the IBoD report to show possible associations between publication of the IBoD report and changes in hospital expenditures by services. The effect of the IBoD report may be implied in terms of extra community health and public health expenditure for Indigenous people to deal with major risk factors identified in the IBoD report, such as illicit drug taking, alcohol abuse, unsafe sex, tobacco and low fruit and vegetable consumption. However, no casual effects can be shown.

Second, hospital separation expenditures by disease were compared for Indigenous and non-Indigenous patients, before and after publication the IBoD report.<sup>20–22</sup> The data allowed examination of changes for the 2006–07 financial year (a pre-IBoD report period) with the 2008–09 and 2010–11 financial years (post-IBoD report). The AIHW provides hospital separations expenditures in terms of the 'IBoD's 'broad cause' disease categories (plus Communicable Disease).<sup>6</sup> The AIHW indicates that the data are an 'indication of access to health-care services and health service use'. Further, the AIHW indicates that the data 'enable monitoring of expenditure on the conditions for which Indigenous people access hospital services' and increases may indicate increased access to hospital care, particularly for conditions that contribute highest to the Indigenous burden of disease gap.<sup>6,22</sup>

Third, levels of NHMRC Indigenous grant funding were compared for five inclusive years after (2008–12) publication of the IBoD report in 2007 and five inclusive years before (2003–07). Data were drawn from a set of downloaded NHMRC datasets<sup>23</sup> detailing individual grants and annual payments from 2000–01 to 2014–15 as reported in the NHMRC grants system. Datasets are available for individual disease areas including the six major 'broad cause' disease categories (diabetes, cardiovascular, injury, chronic respiratory disease, cancer and mental illness) in the IBoD report.<sup>6</sup> Indigenous grants appear in a separate set, but most also appear in other datasets categorised by disease. Our analysis focused on Indigenous grants falling into the IBoD report's 'broad cause' categories.

All grants in the IBoD report's major cause categories were categorised as pre- (2003–07) or post-IBoD (2008–12) according to their application years. Grants were valued by their total amounts adjusted to 2010–11 Australian dollars. Indigenous grants were further identified by their membership of the IBoD report's 'broad cause' categories (diabetes, cardiovascular disease, injury, chronic respiratory disease, cancer and mental illness).<sup>6</sup> For each 'broad cause' disease category, comparisons were made of post- versus pre-IBoD report: a) Indigenous grant amounts; and b) Indigenous grant shares of total funding. Comparisons are expressed in terms of post-IBoD: pre-IBoD ratios. Throughout this article, ratios are expressed as single numbers. For example, a post-IBoD: pre-IBoD ratio in grant funding of 1.5:1 is expressed simply as 1.5.

## **Results**

### *Stage 1: Text searches of government policy, advice and agreement documents*

The text search found 110 relevant federal government and COAG documents released after publication of the IBoD report (Table 1); they were categorised into three groups, namely policy ( $n=26$ ),<sup>2,4,5,24–46</sup> expenditure ( $n=20$ )<sup>18,19,21,22,47–62</sup> and monitoring ( $n=64$ ).<sup>63–126</sup> The policy group contained statements of government policy and included significant COAG documents, such as the *National Indigenous Reform Agreement*<sup>25</sup> and the *National Partnership Agreement on Closing the Gap in Indigenous Health Outcomes*.<sup>5</sup> These also included the relevant federal, state and territory partnership agreements and plans<sup>26–41</sup> and NHMRC policy documents.<sup>42–45</sup> Expenditure documents reported expenditure on Indigenous health. These also included Department of Health and Ageing budget statements (DHABS) from 2008–09 to 2013–14,<sup>47–52</sup> a subsequent federal budget statement for Indigenous health presented by the Treasurer and Finance Minister (2014–15),<sup>59</sup> AIHW documents on Indigenous health expenditure<sup>18,19,21,22</sup> and biannual Productivity Commission *Indigenous Expenditure* reports.<sup>60–62</sup> Monitoring documents showed outcomes of services relevant to Indigenous health and states of health among Indigenous people. These documents included annual prime ministerial *Closing the Gap* reports,<sup>95–99</sup> and reports from: the ABS,<sup>63,64</sup> the Australian Health Ministers Advisory Council (AHMAC),<sup>65–68</sup> the AIHW,<sup>69–83,109,126</sup> COAG,<sup>84–86</sup> DoHA,<sup>94</sup> Department of Family, Community Services and Indigenous Affairs (FASCIA),<sup>87–93</sup> the NHMRC,<sup>100–108</sup> and the Productivity Commission.<sup>110–125</sup>

Of the 110 documents, only 27<sup>25–28,31,38,61–68,70,73–80,82,113,116,124</sup> had formal citations to the IBoD report. Only two were from the expenditure category.<sup>61,62</sup> Also, only six policy documents<sup>25–28,31,38</sup> contained citations of the IBoD report, the highest number being three in the National Indigenous Reform Agreement.<sup>25</sup> The monitoring group contained 19 documents with formal citations of the IBoD report.<sup>63–68,70,73–80,82,113,116,124</sup> Among these, most contained more than one citation to the IBoD report. The AHMAC's, *Aboriginal and Torres Strait Islander Health Performance Framework Report* had over 20 citations to IBoD in each of its four versions.<sup>65–68</sup>

It should be noted that nine documents contained findings of the IBoD report without formal citations.<sup>5,36,37,39,41,47,48,54,58</sup> For

example, the *National Partnership Agreement on Closing the Gap in Indigenous Health Outcomes* describes the health status of the Indigenous population with results from the IBoD study but without citations:

Indigenous Australians experience the worst health of any one identifiable cultural group in Australia, as evidenced in research which indicates: 2-fold rate of low birthweight in Indigenous babies; 12 per cent of the total burden of disease and injury from smoking etc.<sup>5–7</sup>

Consistent with the findings of the IBoD report, the *National Partnership Agreement* also prioritises the reduction of tobacco smoking among Indigenous Australians.<sup>5,6</sup> However, it should

**Table 1. Text search and literature review: documents found listed according to the number of citations of the Burden of Disease and Injury in Aboriginal and Torres Strait Islander Peoples 2003 (IBoD) report and subject text**

References: <sup>2,4,5,18,19,21,22,24–126</sup>

Documents found	Document categories			Total
	Expenditure	Monitoring	Policy	
With formal citations to IBoD				
1 citation	2	2	5	9
2–10 citations		12	1	13
> 10 citations		5		5
Total with formal citations	2	19	6	27
With only uncited IBoD references <sup>A</sup>	4		5	9
Without references to IBoD	14	45	15	74
Total documents	20	64	26	110
With subject text on: <sup>B</sup>				
Indigenous chronic disease	19	57	21	97
Indigenous smoking	12	51	18	81

<sup>A</sup>Documents with uncited IBoD findings.

<sup>B</sup>Documents may or may not have citations to the IBoD report.

**Table 2. Government Health Expenditure (Per Person) Indigenous/Non-Indigenous Pre-Post IBoD (\$2010–11)**

Sources: AIHW (2008, 2009, 2011, 2013)<sup>1–4</sup>

	Indigenous				Non-Indigenous				Indigenous:Non-Indigenous			
	Expenditure (\$) per Person				Expenditure (\$) per Person				Ratios			
	Pre-IBoD	Post-IBoD	Pre-IBoD	Post-IBoD	Pre-IBoD	Post-IBoD	Pre-IBoD	Post-IBoD	Pre-IBoD	Post-IBoD	Pre-IBoD	Post-IBoD
	2004–05	2006–07	2008–09	2010–11	2004–05	2006–07	2008–09	2010–11	2004–05	2006–07	2008–09	2010–11
Federal												
Hospitals	\$30	\$53	\$79	\$83	\$26	\$26	\$45	\$88	1.18	1.98	1.74	0.94
Medical Services	\$333	\$370	\$427	\$589	\$660	\$669	\$725	\$765	0.50	0.55	0.59	0.77
Pharmaceuticals/Medications	\$172	\$194	\$273	\$305	\$351	\$341	\$374	\$389	0.49	0.57	0.73	0.78
Community Health Services	\$516	\$563	\$618	\$781	\$8	\$8	\$14	\$26	63.29	74.37	43.99	30.61
Public Health	\$50	\$61	\$28	\$106	\$27	\$25	\$22	\$16	1.87	2.47	1.29	6.76
Other	\$294	\$310	\$304	\$287	\$428	\$461	\$286	\$275	0.69	0.67	1.06	1.05
Total	\$1395	\$1550	\$1730	\$2149	\$1500	\$1530	\$1466	\$1558	0.93	1.01	1.18	1.38
State												
Hospitals	\$2469	\$2950	\$3405	\$3659	\$1217	\$1386	\$1523	\$1667	2.03	2.13	2.24	2.20
Community Health Services	\$669	\$719	\$940	\$1241	\$171	\$188	\$211	\$209	3.91	3.82	4.46	5.94
Public Health	\$162	\$168	\$222	\$221	\$54	\$60	\$76	\$67	3.02	2.82	2.92	3.30
Other	\$363	\$321	\$351	\$339	\$142	\$151	\$169	\$186	2.56	2.13	2.08	1.82
Total	\$3663	\$4159	\$4918	\$5460	\$1584	\$1785	\$1979	\$2129	2.31	2.33	2.49	2.56
Non-Govt	\$432	\$450	\$368	\$386	\$1595	\$1612	\$1596	\$1750	0.27	0.28	0.23	0.22
TOTAL	\$5490	\$6159	\$7016	\$7995	\$4679	\$4927	\$5040	\$5437	1.17	1.25	1.39	1.47

be noted that in addition to the IBoD report, other published research had identified tobacco smoking as a major health risk factor among Indigenous Australians.<sup>127</sup>

Consistent with the IBoD report, 97 publications noted chronic disease as a problem among Indigenous Australians.<sup>2,5, 18,19,21,22,24-37,39-42,46-58,60-81,83,85-97,99-104,109-126</sup> Of these, 34 contained cited or uncited references from the IBoD report.<sup>5,25-28,31,32,36,37,39,41,47,48,58,61-68,70,73-80,113,116,124</sup> Also consistent with IBoD report, 81 documents noted the problem of Indigenous tobacco smoking.<sup>5,19,24-34,36-39,41,46,49-55,57,58, 61-81,83-86,88,91,93-97,99-101,109-126</sup>

Of these, 33 had cited or uncited references from IBoD.<sup>5,25-28,31,36-39,41,54,58,61-68,70, 73-80,113,116,124</sup> Hence, it is possible that the findings of the IBoD report were becoming common points of discussion within policy, but, as pointed out, the significance of smoking among Indigenous Australians had also been highlighted by other research.<sup>127</sup>

Sixteen documents noted the finding of the IBoD study that burden of disease is two and a half-times greater for Indigenous Australians, compared with the Australian disease burden (seven with citations<sup>25,26,62-64,113,116</sup> and nine without<sup>36-39,41,47,48,54,58</sup>).

Our search found other information that possibly drew on information contained in the IBoD report. Of the DHABS, the 2009-10 statement was the first to identify and address risk factors of chronic disease among Indigenous people, some of which were included in the IBoD report, such as smoking, inadequate nutrition and exercise, access to Pharmaceutical Benefits Scheme (PBS) medications and primary care, as well as access to 'culturally appropriate social and emotional well-being services, (and) mental health services'.<sup>51</sup> Subsequently, the 2010-11 DHABS noted funding of a 'mothers and babies' program and a mobile outreach service to provide counselling and forensic examinations for child sexual abuse.<sup>50</sup> These programs may have been instigated due to various factors, but they are also consistent with the findings of the IBoD study. Also consistent with the IBoD study, the 2012-13 DHABS commits the federal government to address this burden through a range of activities 'focusing on prevention, detection and management of chronic disease and follow-up care'.<sup>48</sup>

Generally, the relationship between NHMRC publications and the IBoD report is unclear. For example, there are no citations of the IBoD report in any of the NHMRC's post-2007 annual reports<sup>102-105,107,108</sup> or NHMRC strategic plans and 'road maps' on supporting Indigenous Health.<sup>42,43,45,101,106,128</sup> However, there is an oblique reference to the IBoD report in the 2008-09 NHMRC Annual Report: 'NHMRC has invested in priority areas such as Indigenous health, diseases imposing the greatest burden into the future, chronic disease and health research frontiers'.<sup>102</sup> A similar statement is made with regard to the 2009 round of the International Collaborative Indigenous Health Research Partnership program that focused on: 'reducing the burden of disease and inequalities in health caused by chronic disease in Indigenous people'.<sup>128</sup> It should be noted that the NHMRC also makes grant data available in burden of disease categories.<sup>129</sup>

The NHMRC describes its approach to 'Closing the Gap' in Indigenous/non-Indigenous health in the document Road Map II.<sup>42</sup> Rather than setting objectives in terms of burden of disease, the NHMRC confronts the health gap with a series of

**Table 3. Broad Cause Disease Groups by a) Disability Adjusted Life Years (Indigenous vs Australia 2003) and b) Hospital Separation Expenditures (Indigenous vs Non-Indigenous) (Pre and Post IBoD Publication) (\$ per person – 2010-11 Australian Dollars)<sup>15</sup>**

Data are from Vos *et al.*<sup>8</sup> and Australian Institute of Health and Welfare (AIHW) publications.<sup>20-22</sup> Note, for 2008-09, the previous period is 2006-07.<sup>20</sup> The IBoD disability-adjusted life years (DALY) data are split between Indigenous and All Australia; the AIHW data are split between Indigenous and non-Indigenous

	Indigenous		Australia		Ratio Indigenous: total Australia		DALY (per 1000)				Post-IBoD expenditure					
	2008-09		2010-11		2008-09		2010-11		2008-09		2010-11		2008-09		2010-11	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	% Change on previous	% Change on previous	Indigenous	Non-Indigenous	% Change on previous	% Change on previous	Indigenous	Non-Indigenous	% Change on previous	% Change on previous		
Communicable disease	24.8	6.7	6.7	3.7	637	13.5	\$222	\$691	14.3	8.4	\$299	35.0				
Non-communicable diseases (total)	151.0	68.0	68.0	2.2	\$1586	18.1	\$1003	\$1801	5.6	13.6	\$1396	39.1				
Selected non-communicable																
Malignant neoplasms	16.4	9.8	9.8	1.7	\$85	14.6	\$134	\$86	4.6	0.9	\$175	30.4				
Diabetes	17.9	3.5	3.5	5.1	\$99	25.2	\$25	\$61	4.8	-38.5	\$18	-25.6				
Mental and behavioural disorders	31.3	19.6	19.6	1.6	\$265	15.7	\$90	\$336	-2.0	26.7	\$126	39.6				
Cardiovascular disease	35.3	7.6	7.6	4.6	\$202	12.4	\$187	\$230	8.3	14.0	\$262	40.0				
Chronic respiratory diseases	18.1	7.1	7.1	2.5	\$115	37.3	\$59	\$124	14.1	8.3	\$79	34.8				
Injuries	26.1	8.6	8.6	3.0	\$305	15.4	\$165	\$348	9.2	14.1	\$230	39.4				
Total	201.9	83.3	83.3	2.4	\$2788	16.6	\$1600	\$3160	7.8	13.3	\$2219	38.6				

action objectives, such as: ‘promoting knowledge transfer’ between community health providers and service agencies, identifying ‘health infrastructure requirements’ of Indigenous people, ‘promoting understanding of the gap’ and ‘maintaining an evidence base on the geographical distribution of disease relative to health care access’.<sup>42</sup>

### Stage 2: Reviews of Indigenous health expenditures and health research grants

Table 2 reports per-person healthcare expenditure for Indigenous and non-Indigenous populations in 2010–11 Australian dollars.<sup>16–19</sup> It shows comparisons of Indigenous and non-Indigenous health expenditure before (2004–05 to 2006–07) and after (2008–09 to 2010–11) publication of the IBoD report.

Table 2 shows that the ratio of total non-Indigenous to Indigenous expenditure increased across each successive period, even during the pre-IBoD period. However, the biggest increase in the Indigenous share of health funding occurred at the start of the post-IBoD period (2008–09) when the total Indigenous: non-Indigenous expenditure ratio increased from 1.25 to 1.39. This increase is broadly consistent with the finding of the IBoD report of the need to address a large Indigenous–non-Indigenous health gap. Trends in the ratios between Indigenous and non-Indigenous community and public health expenditure may indicate efforts to confront certain risk factors identified by the IBoD report as responsible for health gap e.g. smoking, alcohol and unsafe sex. Between 2006–07 and 2008–09 the Indigenous: non-Indigenous ratios of federal expenditure for community health (74.37 to 43.99) and public health (2.47 to 1.29) actually declined. However for state expenditure on community and public health, there were respective increases in ratios (3.82 to 4.46; 2.82 to 2.92) which continued upward in 2010–11 (community health: 5.94; public health: 3.30). There was also a 2010–11 increase in the ratio for public health expenditure at the federal level (from 1.29 to 6.76). These changes represent general

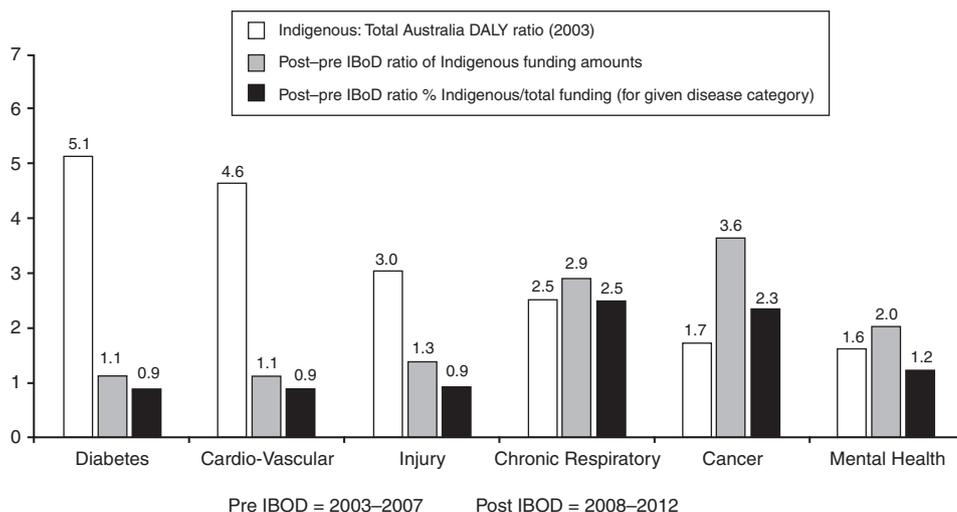
increases in the ratio of Indigenous: non-Indigenous expenditure for community and public health between 2006–07 and 2010–11. However, these figures are too general to indicate specific correlations with the IBoD report.

Table 3 shows: (1) Indigenous: total Australian DALY ratios for main causes (diseases) of Indigenous burden of disease<sup>6</sup> (as identified in the IBoD report); and (2) hospital separation expenditures for Indigenous and non-Indigenous Australians in the post-IBoD period,<sup>20–22</sup> with percentage changes on previous reports. DALY ratios are highest for diabetes (5.1), cardiovascular disease (4.6) and communicable diseases (3.7).

Comparing changes between funding for Indigenous and non-Indigenous health for the periods 2006–07 to 2008–09, higher increases occurred for Indigenous expenditure across all the main cause groups (e.g. diabetes 25.2% v. 4.8%; chronic respiratory disease 37.3% v. 14.1%), implying an increase in Indigenous access to hospital services in these disease areas. Subsequently, the reverse generally occurred in 2010–11, with Indigenous expenditure having lower percentage increases (or greater percentage decreases) compared with non-Indigenous expenditure for all broad groups.<sup>20–22</sup>

Figure 1 gives an overview of the values of NHMRC Indigenous grants awarded by major cause areas before (2003–2007) and after (2008–2012)<sup>23</sup> publication of the IBoD report.<sup>6</sup> For each major cause there are sets of three columns: (1) Indigenous: Total Australia DALY ratio;<sup>6,8</sup> (2) post-IBoD: pre-IBoD Indigenous funding (in \$2010–11) ratio; and (3) post-IBoD: pre-IBoD Indigenous share of funding for the major cause area.

Generally, these results are not consistent with the findings of the IBoD study. Although diabetes had the highest Indigenous: total Australia DALY ratio (5.1), its post–pre funding ratio shows only a small change (1.1). Further the portion of total diabetes funding going to Indigenous grants declined (post–pre funding ratio of 0.9). Disease groups with the second and third highest Indigenous: Total Australia DALY ratios, namely cardiovascular disease and injury, had very similar results for funding.



**Fig. 1.** Broad Cause Disease Groups by a) Disability Adjusted Life Years (Indigenous: Australia 2003) and b) NHMRC Grant Funding Ratios, Post-Pre IBoD Publication. Sources: Vos *et al.*,<sup>6</sup> Begg *et al.*<sup>8</sup> and NHMRC.<sup>23</sup> Allocations based on grant application years. Grant ratios calculated in 2010–11 Australian Dollars.<sup>15</sup>

However, chronic respiratory disease and mental health had more favourable post–pre funding ratios of 2.9 and 2.0, respectively. Indigenous grants more doubled their share of total chronic respiratory funding. Although cancer had the second lowest DALY ratio (1.7) among the major burden groups, it had the highest increase in funding with a post–pre ratio of 3.6. Further, Indigenous grant share of total cancer grants more than doubled (post–pre ratio of 2.3).

The findings of the IBoD study and the above observations do not suggest a correlation between publication of the IBoD report and subsequent changes in NHMRC funding. We note that the text search found almost no references to the IBoD report in NHMRC documents.

## Discussion

The aim of the present study was to investigate the potential influence of the IBoD report on Australian Indigenous health policy, service expenditure and research funding. Federal Government, COAG and NHMRC documents were reviewed for references to the IBoD report. Our review of government documents found that some aspects of articulated policy were consistent with findings of the IBoD study, such as confronting Indigenous chronic diseases, smoking and child sexual abuse. In addition, our review of government health expenditures showed some increases in ratios of Indigenous to non-Indigenous health expenditure immediately after the release of the IBoD report. However, there is no definite correlational evidence between the IBoD report and subsequent policy directions.

We also analysed NHMRC grant funding for Indigenous and non-Indigenous health, before and after publication of the IBoD report.<sup>23</sup> Consistent with the inequalities found by the IBoD report, there were increases in Indigenous research funding after 2007 in significant health areas of chronic respiratory disease, cancer and mental health. However, there were no significant increases in Indigenous funding to research the highly important areas of diabetes, cardiovascular disease and injury. Research funding for cancer received the most generous increase.<sup>6,23</sup>

The lack of strong correlational evidence between the IBoD report and the direction of Indigenous health policy is not unexpected because the publication of the IBoD report coincided with major events that would also have facilitated increased Indigenous health expenditure, including the National Apology to Indigenous Australians, formalisation of COAG efforts to ‘close the gap’ in Indigenous–non-Indigenous health and public concerns over Indigenous life expectancy, infant mortality and petrol sniffing. It is difficult on the basis of available evidence to isolate the relationship of the IBoD report with policy direction and expenditure given the general movement to improve Indigenous health and social status.

An important limitation of the present study is the lack of data. Tracking resource expenditure in Australia is difficult given that healthcare financing is a complex arrangement with responsibility divided between federal and state governments. There is a lack of appropriate data to accurately conduct such an analysis by disease focus. A comprehensive study of the effect of the IBoD report should include a review of internal government and

public service documents, as well as interviews with health ministers, senior health bureaucrats and significant figures outside of government. Such data will give insights into the application and relevance of burden of disease evidence to Indigenous health policy.

## Conclusion

The findings show that health authorities have been aware of the IBoD report and used its findings in policy documents to recognise the health gap between Indigenous and non-Indigenous Australians. We found a lack of correlational evidence of the relationship between the IBoD report and the direction of Indigenous health policy, expenditure and grant funding. However, there were some patterns of resource allocation that were consistent with the findings of the IBoD report. Ascertaining the potential influence of the IBoD report on Indigenous health policy will require more data, including access to internal government documents and interviews with key health decision makers and more sophisticated analysis.

## Competing interests

None declared.

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