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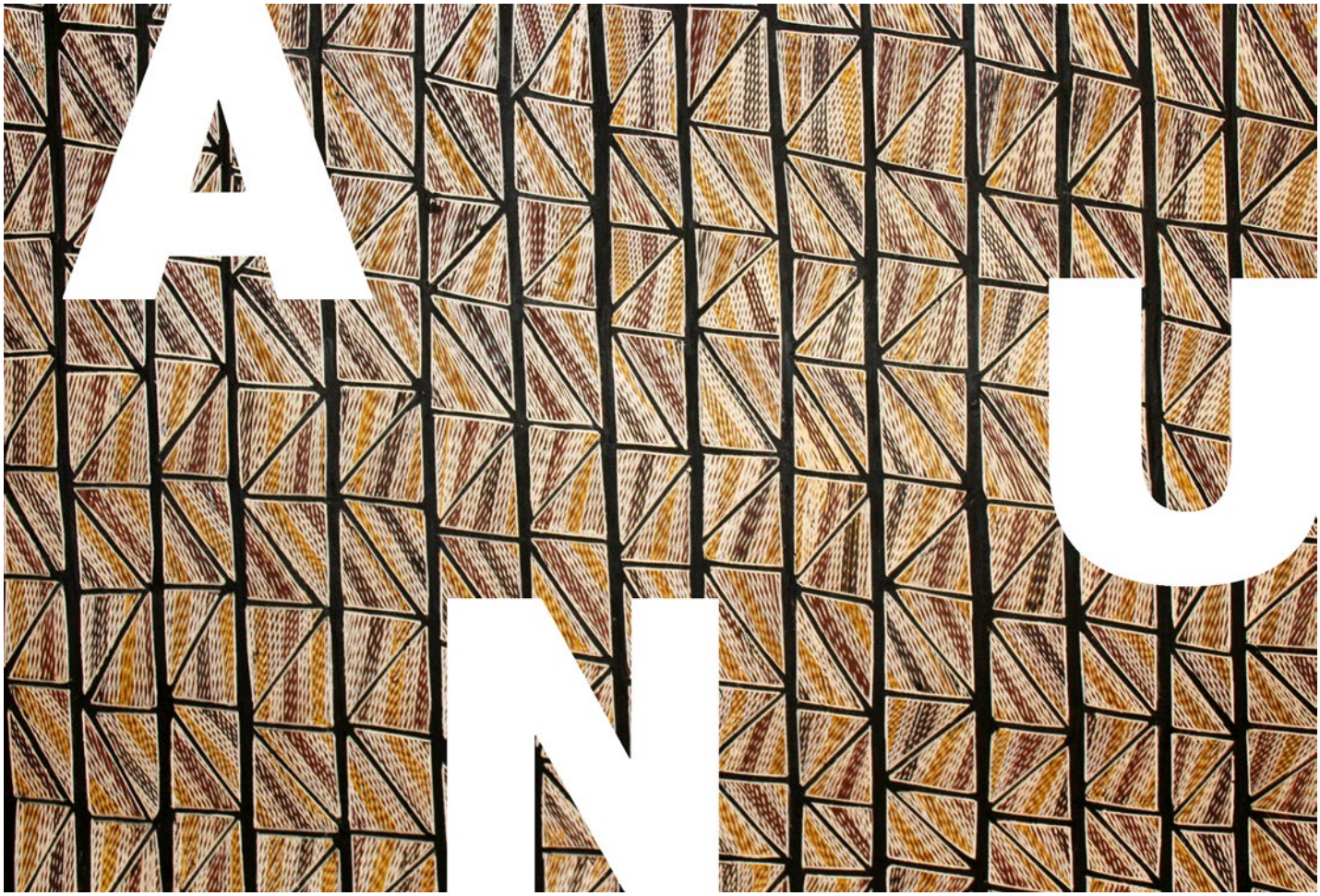

CHANGING ASSOCIATIONS OF SELECTED SOCIAL DETERMINANTS WITH ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH AND WELLBEING, 2002 TO 2012–13

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Centre for Aboriginal Economic Policy Research
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Changing associations of selected social determinants with Aboriginal and Torres Strait Islander health and wellbeing, 2002 to 2012–13

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Abstract

This report uses data from national health and social surveys of the Indigenous population, conducted between 2002 and 2012–13, to examine whether associations of some key social determinants with selected health and wellbeing outcomes changed over that time.

Consistently during the decade, employment status and housing tenure were significantly associated with a range of health and wellbeing outcomes for the Indigenous population.

As education levels have increased among the Indigenous population, the association of education with health and wellbeing has weakened. This suggests that at least some of the association of education with health and wellbeing is attributable to other characteristics of individuals or educational institutions not captured in our models, not just the outcome of the education process itself.

Improvements in some health and wellbeing outcomes in remote areas, despite declining employment over the decade, suggest that more detailed analysis is required to shed light on whether associations between the selected social determinants of health and wellbeing differ for Indigenous people living in remote and nonremote areas.

Keywords: Aboriginal and Torres Strait Islander, social determinants, health, wellbeing

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Acronyms

ABS	Australian Bureau of Statistics
ANU	The Australian National University
CAEPR	Centre for Aboriginal Economic Policy Research
CDEP	Community Development and Employment Projects
CSDH	Commission on Social Determinants of Health
NATSIHS	National Aboriginal and Torres Strait Islander Health Survey
NATSISS	National Aboriginal and Torres Strait Islander Social Survey
OECD	Organisation for Economic Co-operation and Development
WHO	World Health Organization

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1 Introduction

In 2005, the then Aboriginal and Torres Strait Islander Social Justice Commissioner, Professor Tom Calma, called on the governments of Australia to 'commit to achieving equality of health status and life expectation between Aboriginal and Torres Strait Islander and non-Indigenous people within 25 years' (Aboriginal and Torres Strait Islander Social Justice Commissioner 2005). In the same year, the Commission on Social Determinants of Health (CSDH) was set up by the World Health Organization (WHO) 'to marshal the evidence on what can be done to promote health equity and to foster a global movement to achieve it' (CSDH 2008:1). The CSDH's 2008 report *Closing the gap in a generation: health equity through action on the social determinants of health* highlights the influence on health of 'the circumstances in which people are born, grow, work, live and age', and argues that the structural drivers of these conditions of daily life are 'the inequitable distribution of power, money and resources' (CSDH 2008:26). The CSDH report presented evidence of a 'social gradient' in health, demonstrating that health outcomes improved with increasing socioeconomic status. At the time of finalising this paper, Sir Michael Marmot, who was the Chair of the CSDH, was delivering a 2016 Boyer Lecture titled *Fair Australia: social justice and the health gap* (Marmot 2016). While the impact of these lectures on policy in Australia remains to be seen, it is fair to say that they have focused renewed attention on the social determinants of health.

In Australia, the poorer health outcomes of the Indigenous population compared with the non-Indigenous population have been extensively documented:

- Average life expectancy at birth among Indigenous people born in 2010–12 is 10 years shorter (AIHW 2016).
- Child and infant mortality rates are higher, although the gaps have narrowed as a result of reductions in child, and particularly infant, mortality rates among the Indigenous population during the past decade (AIHW 2014:22).
- Deaths from circulatory disease and diabetes account for a large part of the gap in death rates between Indigenous and non-Indigenous Australians (AIHW 2014:295–339).

Two targets in the Australian Government's Closing the Gap initiative are health related: life expectancy and child mortality (COAG 2009). These targets signify the high priority that Australian governments attach to achieving improved health outcomes for Indigenous Australians.

The aim of this report is to examine whether there has been any change during the past decade in the associations of selected social determinants with health and wellbeing outcomes for Aboriginal and Torres Strait Islander people. Despite a growing body of literature on the social determinants of health for Indigenous Australians (summarised in Section 2), there are two key limitations of the existing research. First, the research tends to focus on one period only, with inconsistent measures in the past making it difficult to compare changes in health and wellbeing measures through time. Second, related to this, is that no multivariate analysis has been done to examine whether (and if so, how) the links between key social determinants and health have changed over time for the Indigenous population. Given the very dramatic change in the structure of the Indigenous population over the past 5–10 years (documented in CAEPR's Census Papers series[1]), it is possible that the links between social determinants and health are shifting through time in policy-relevant ways. This report presents the results of analysis that will help to fill this gap in the research.

The definition of health provided in the *National Aboriginal and Torres Strait Islander health plan 2013–2023* (drawn from the 1989 National Aboriginal Health Strategy) is a holistic one:

> 'Aboriginal health' means not just the physical wellbeing of an individual but refers to the social, emotional and cultural wellbeing of the whole Community in which each individual is able to achieve their full potential as a human being, thereby bringing about the total wellbeing of their Community. (DoHA 2013)

This definition extends beyond the biomedical model of health, with its focus on individual biology and behaviours, to encompass broader concepts of individual and community wellbeing. The above definition largely accords with WHO's 1948 definition of health:

> Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. (WHO 1948)

According to these broader perspectives, social and emotional wellbeing is as important as physical health. The definition in the *National Aboriginal and Torres Strait Islander health plan 2013–2023* differs in that it also refers to culture and emphasises the centrality of culture to the health of Aboriginal and Torres Strait Islander people, and the interrelationship between individual and community wellbeing.

Definitions and measures of health used in research vary depending on whether the purpose is to examine specific health conditions, emotional wellbeing or global measures of health. For our analysis, we selected a range of measures covering different perspectives on health, including the global measure of self-assessed health, certain specific physical health conditions with a high prevalence among the Indigenous population, and emotional wellbeing. We also included two health risk behaviours. In the CSDH framework, risk behaviours are conceptualised as intermediary factors between distal social determinants and health outcomes. Examining the link between social determinants and risk behaviours therefore has the potential to shed light on the relationship between social determinants and health outcomes.

Social determinants of health included in this study

It is recognised that 'the causes of Indigenous health are complex and multifactorial' and that 'there is considerable policy dispute about the importance of different factors and the relationship between them' (Anderson 2007:35). Such policy dispute is not surprising, given the range of different health outcomes likely to be of interest to policy makers and variation in the contributing factors associated with these different outcomes. Differences in analytical approaches, data sources, and measures and methods used also lead to diverse results among studies of the links between social determinants and health (Shepherd et al. 2012).

International work by WHO and the Organisation for Economic Co-operation and Development (OECD) during the past decade[2] supports the validity of using common health and wellbeing frameworks to understand the quality of life across diverse populations. The OECD argues that 'we are witnessing a convergence in our understanding of well-being with a common core set of well-being dimensions' (OECD 2013:1). Although all people may aspire to having a good quality of life or living a life that they value, and some core dimensions of health and wellbeing are similar across populations, the specifics of what matters for wellbeing are likely to differ according to different 'geographic, economic, social and cultural contexts' (OECD 2013:3).

These international frameworks, along with the National Aboriginal and Torres Strait Islander health plan (DoHA 2013), the 2005 social justice report (Aboriginal and Torres Strait Islander Social Justice Commissioner 2005), the work of the CSDH (2008) and other research (summarised in Section 2), informed our choice of social determinants for this study. We focused on a small set of key social determinants for which consistent measures were available over time: gender, age, location, education, employment, income and housing.

Our analyses focus on determinants of health in the Indigenous population. Comparisons of the health outcomes of the Indigenous and non-Indigenous populations are available in a range of other sources (ABS 2004, 2006, 2009, 2013; AHMAC 2015; AIHW 2016), as are analyses of the determinants of health disparities between the two populations (AIHW 2014).

The remainder of this paper is structured as follows:

- Section 2 summarises some of the literature relating to the social determinants of health for Indigenous Australians.
- Section 3 provides an overview of the data sources used in the analysis, and describes the measures and methods used.
- Section 4 summarises key trends in social determinants, and health and wellbeing measures.
- Section 5 presents the results of multivariate analyses examining the associations between the selected social determinants and health and wellbeing outcomes.
- Section 6 contains the discussion and conclusions.

2 What does the literature say?

This section summarises some key studies of the links between social determinants and health for the Aboriginal and Torres Strait Islander population. As observed in the literature, 'the relationship between social determinants and health is complex and multi-directional' (Osborne et al. 2013:60). It is difficult to establish, for example, the extent to which a link between employment and better health might be due to employment affecting health (perhaps because it provides an income and therefore greater material wellbeing, or opportunities for social participation) or health affecting employment (a person with chronic poor health is likely to find it difficult to gain or retain a job). In many cases, a particular social determinant may affect health in both positive and negative ways. For example, the social and material benefits of employment may be negated by exposure to discrimination in the workplace.

The relevant literature falls into two main categories. The first category comprises studies identifying the

social determinants that account for the gap in health outcomes between the Indigenous and non-Indigenous populations. The second category comprises studies that examine the social determinants of health in the Indigenous population. The first category focuses on socioeconomic determinants that can be analysed for both the Indigenous and non-Indigenous populations. In the second group, some studies also include Indigenous-specific variables, such as experience of racism or discrimination, and cultural attachment and participation.

Starting with the first category, analysis by the Australian Institute of Health and Welfare (AIHW), using data from the 2004–05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS), examined the relative contributions of social determinants and behavioural risk factors to the health gap between Indigenous and non-Indigenous Australians. Using a composite measure of health that combined information about self-assessed health, a morbidity score and emotional distress, the analysis found that social determinants – particularly household income, highest year of school completed and employment status – accounted for 31% of the gap, a much larger percentage than health risk factors at 11%. In all, the AIHW analysis found that social determinants and health risk factors accounted for 57% of the 'health gap'. The report notes that measuring access to health services is 'notoriously difficult', but that access to services is likely to account for a large percentage of the remaining gap (AIHW 2014:334–339). These results update similar findings based on 2001 data that attributed one-third to one-half of the gap in health outcomes to socioeconomic factors (Booth & Carroll 2005).

In the second category, a number of studies have examined associations between socioeconomic determinants and health outcomes in the Indigenous population. The authors of one review observed that weaker gradient effects in the relationship between social determinants and health for the Indigenous population may 'reflect low variability in the distributions of SES and health measures in indigenous populations' (Shepherd et al. 2012).

Some research has demonstrated links between higher levels of education and better health outcomes (Biddle 2006, Biddle & Cameron 2012). The results of these studies indicate that what is important is a certain minimum level of education, since health and wellbeing outcomes do not continue to improve with increasingly higher levels of education. In their assessment of the evidence on social gradients in Indigenous health in Australia, Shepherd et al. (2012) found a consistent association between higher education and better self-assessed health.

Some positive associations between employment and health and wellbeing outcomes among the Indigenous population overall are also evident (Biddle 2012, 2014). One study focusing on the determinants of very high psychological distress found a significant association with employment among Indigenous Australians living in nonremote areas and Indigenous females, but not males, living in remote areas (Cunningham & Paradies 2012). Shepherd et al. (2012) also found that employment status was commonly associated with better health outcomes among the Indigenous population. Hunter and Gray (2012) distinguished between employment as part of the Community Development Employment Projects (CDEP) scheme and non-CDEP employment. Their research found that CDEP participants had better social and economic outcomes than the unemployed, but worse than those in non-CDEP employment (the authors note that this may be due to selection effects, with individuals in the different types of employment having different characteristics). However, they also observed that the CDEP scheme appeared to provide support for maintaining Indigenous language and customary practice by providing economic opportunities enabling participants to live on or near their traditional country (Hunter & Gray 2012).

Evidence about the relationship between income and wellbeing among the Indigenous population appears more mixed (Cunningham & Paradies 2012, Shepherd et al. 2012, Biddle 2015). The relationship between income and wellbeing is contingent on location, with significant associations occurring only for those living in nonremote areas (Cunningham & Paradies 2012, Biddle 2015). Results also differed by gender, with household income appearing more relevant to wellbeing for Indigenous females living in nonremote areas; in contrast, for Indigenous males living in nonremote areas, there was also a strong association between personal income and wellbeing (Biddle 2015).

There was some evidence that home ownership was associated with better health and wellbeing (Shepherd et al. 2012), although one study showed a significant effect occurring in nonremote areas only (Cunningham & Paradies 2012).

Looking at the studies that include measures of cultural attachment, a couple of main themes emerge: strong attachment to culture is positively associated with a range of wellbeing outcomes, including socioeconomic outcomes (Dockery 2010, Biddle 2012), but not among

those living in nonremote areas who experience discrimination (Dockery 2011). Based on the findings of these studies, the authors caution that the way in which policies are pursued matters, and that there may be negative impacts on Indigenous wellbeing if employment and other policies are pursued at the expense of culture (Dockery 2011, Biddle 2012).

Finally, a number of authors reflect on what they consider to be surprising results regarding the overall better self-assessed health and emotional wellbeing of Indigenous people living in remote areas. Biddle (2014) discusses potential explanations for these results, including different interpretations of the survey questions, adaptation to circumstances and the different context for social comparison. Other potential explanations offered are greater participation in cultural activities (Walter & Mooney 2007, citing Hunter 2005; Biddle 2014) and 'living in an Indigenous majority environment' (Cunningham & Paradies 2012). Biddle (2012) cites a study by Rowley et al. (2008) that found 'lower than expected morbidity and mortality' in a remote Aboriginal outstation, with the authors identifying likely contributors to this result as a healthier lifestyle; connections to culture, family and land; and self-determination.

In summary, the literature confirms that education, employment, income and housing are significant determinants of health and wellbeing in the Indigenous population, and account for a large proportion of the gap in health outcomes between the Indigenous and non-Indigenous populations. However, the contribution of these determinants varies in different settings and in the context of other, sometimes countervailing, factors.

3 Data sources, measures and methods

3.1 Data sources

The data sources used in this analysis are the large-scale national health and social surveys of the Aboriginal and Torres Strait Islander population by the Australian Bureau of Statistics (ABS) during the past decade (2002 to 2012–13). These surveys are part of a program of statistical collections in relation to the Aboriginal and Torres Strait Islander population conducted by the ABS. The first National Aboriginal and Torres Strait Islander Social Survey (NATSISS) in 1994 had its origins in the Royal Commission into Aboriginal Deaths in Custody: the Commission found existing statistical information about the Indigenous population to be lacking (see, for example, Altman & Taylor 2002). In 2013, the ABS established the ABS Round Table on Aboriginal and Torres Strait Islander Statistics to provide advice and guidance on these statistical activities. The membership of this advisory group comprises Aboriginal and Torres Strait Islander people with 'extensive grassroots experience' working in the Indigenous community (ABS 2016a).

Our analysis draws on four surveys: NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13.[3]

Detailed information about the methodology of these surveys, and comparability with earlier surveys, is available on the ABS website (ABS 2016b). Table 1 provides information about the scope and sample size of each survey.

TABLE 1. Aboriginal and Torres Strait Islander social and health surveys, 2002 to 2012–13

Survey	Scope	Sample size
NATSISS 2002	Indigenous people 15 years and over, remote and nonremote	9 359
NATSIHS 2004–05	Indigenous people of all ages, remote and nonremote	10 439
NATSISS 2008	Indigenous people of all ages, remote and nonremote	13 307
NATSIHS 2012–13	Indigenous people of all ages, remote and nonremote	9 317

NATSIHS = National Aboriginal and Torres Strait Islander Health Survey; NATSISS = National Aboriginal and Torres Strait Islander Social Survey

3.2 Measures

We used a range of measures to examine health and wellbeing from various perspectives. First, we used self-assessed health, a global measure that has a well-established association with mortality and appears to have a basis in a person's physiological state, as well as being shaped by individual cognitive processes and cultural contexts – for example, people of different ages may have different ideas about what constitutes good health (Jylhä 2009). We also included measures of two specific health conditions identified as having a large and disproportionate impact on Aboriginal and Torres Strait Islander Australians: asthma, and heart or circulatory problems or diseases (AHMAC 2015:28–31). Measures of two key health risk factors – smoking and alcohol use – were also included. We also included measures of emotional wellbeing. These health and wellbeing measures have been collected in a reasonably

consistent way across some or all of the surveys (with the caveat that, inevitably, at least minor changes to survey methodologies have occurred over time).

Table 2 provides information about the health and wellbeing outcome measures and the social determinants used in our analysis.

For the explanatory variables, we selected a small set of key social determinants that are highlighted in the work of the CSDH and are shown by Australian research to account for a substantial proportion of health inequities between Indigenous and non-Indigenous Australians, and for which consistent measures were available over time: gender, age, location, education, employment, income and housing.

3.3 Method

We first looked at trends over time in each of the health and wellbeing outcomes and the social determinants examined. To better understand the relative contribution of each social determinant, multivariate models were then used to estimate the probability of an individual reporting each outcome of interest, drawing on data from surveys conducted from 2002 to 2012–13. The probabilities were estimated using maximum likelihood estimation of the probit model (Greene 2008). This approach enabled us to identify which of the selected set were the most significant determinants and then to examine whether the relative contribution of any of these determinants to the health and wellbeing outcomes had changed over time.

4 Changes over time in social determinants, and selected measures of health and wellbeing

4.1 Change over time in social determinants

Trends in the social determinants selected for inclusion in our analysis are summarised in Tables 3 and 4. More detailed tables in the Appendix (Tables A1 and A2) provide the percentage point change between surveys and the standard errors.

The most prominent change in the selected social determinants during the decade is the increase in the percentage of Indigenous adults who had completed Year 12 or attained an educational qualification at Certificate I–Advanced Diploma level, with significant increases occurring at different times for females and males, and in remote and nonremote areas.

Despite these increases in educational attainment, employment among men and in remote areas fell significantly (a significant increase in employment in nonremote areas between 2002 and 2004–05 was almost entirely offset by a significant decrease between 2008 and 2012–13). It should be noted that the type of employment has changed substantially, with a dramatic decline in the proportion of the population working in CDEP jobs as a result of changes in the CDEP scheme over this period, culminating in the end of the scheme in 2015 (Jordan 2016), and a partial but not complete increase in non-CDEP employment.

The percentage of Indigenous adults living in rental accommodation declined during the decade, although, of the separate groups analysed, the only statistically significant decrease between any two successive surveys was among females, between 2004–05 and 2008.

The percentage of Indigenous adults in remote areas who were living in a household with an equivalised income in the lowest quintile increased significantly, from 40% to 55%. At the same time, there was a small overall increase (but with no significant change between any two successive surveys) in the percentage of Indigenous adults (females and males, remote and nonremote areas) in the fourth (or second highest) quintile of equivalised household income, appearing to come from the lower second and third quintiles, but not the lowest quintile.

In relation to these determinants then, the overall picture for the Indigenous adult population is one of increasing rates of Year 12 completion and attainment of vocational qualifications; employment rates stagnating or falling; and, despite some evidence of increasing incomes among the general Indigenous adult population, Indigenous adults in remote areas increasingly overrepresented in households with incomes among the lowest in the country.

4.2 Change over time in selected measures of health and wellbeing

We then examined broad trends during the decade in the health and wellbeing measures selected (summarised in Tables 5 and 6), before looking at whether any of the associations between the social determinants and the health and wellbeing measures have changed over that time. Again, more detailed tables in the Appendix (Tables A3 and A4) provide the percentage point change between surveys and the standard errors.

Some of the health and wellbeing measures are relatively stable during the decade, with a significant change at

TABLE 2. Health and wellbeing measures, social determinants and demographics used

Measure	Variable	Categories	Survey data availability
Health and wellbeing measures	Self-assessed health	Good, very good, excellent Fair or poor	All
	Kessler psychological distress measure Kessler-5	High/very high distress Low/moderate distress	2004–05, 2008, 2012–13
	How often been a happy person (in last 4 weeks)	All or most of the time Some/a little/none of the time	2004–05, 2008, 2012–13
	How often felt so sad that nothing could cheer you up (in last 4 weeks)	Some/most/all the time A little/none of the time	2004–05, 2008, 2012–13
	Whether has current long-term health condition – asthma	Has asthma Does not have asthma	2004–05, 2012–13
	Whether has current long-term health condition – heart or circulatory problems/diseases	Has heart or circulatory problem/disease Does not have heart or circulatory problem/disease	2004–05, 2012–13
	Smoking	Current smoker Not a current smoker	All
	Alcohol use (2009 NHMRC lifetime risk guidelines)	Exceeded guidelines Did not exceed guidelines	2004–05, 2012–13
Social determinants of health	**Location**		
	Remoteness	Remote or very remote Major cities, inner regional or outer regional	All
	Education		
	Whether completed Year 12	Had completed Year 12 Had not completed Year 12	All
	Educational qualification	Bachelor degree or higher Certificate or diploma No nonschool qualification	All
	Employment		
	Labour force status	Employed Not employed	All
	Income		
	Equivalised gross weekly income of household	Lowest quintile Second quintile Third quintile Fourth quintile Highest quintile	All
	Housing		
	Tenure type	Owner (with or without a mortgage) Renter or other	All
Demographics	Gender	Male Female	All
	Age group	18–24 years 25–34 years 35–44 years 45–54 years 55 years and over	All

NHMRC = National Health and Medical Research Council

TABLE 3. Percentage of Indigenous population aged 18 years and over in selected social determinant categories, by gender, 2002 to 2012–13

Variable	2002	2004–05	2008	2012–13
Completed Year 12				
Males	18.3	22.1	22.1	**26.7**
Females	18.7	**23.0**	22.9	**27.1**
Bachelor degree and above				
Males	2.8	4.3	4.2	3.5
Females	4.5	5.3	6.2	7.9
Certificate I–Advanced Diploma				
Males	25.7	28.5	28.9	**37.7**
Females	23.2	**27.6**	27.8	**35.8**
Employed				
Males	57.8	**62.8**	63.8	**54.5**
Females	40.9	43.6	45.1	42.7
Renter/other[a]				
Males	70.9	73.7	69.9	67.1
Females	74.1	76.6	**71.6**	72.2
Equivalised household income – quintile 1 (lowest 20%)				
Males	38.9	37.2	**43.6**	**37.8**
Females	44.2	44.4	**54.2**	**47.1**
Equivalised household income – quintile 2				
Males	29.3	**24.6**	21.7	25.7
Females	27.4	26.4	**21.4**	24.9
Equivalised household income – quintile 3				
Males	14.7	**19.5**	16.5	15.4
Females	14.0	14.1	12.0	13.6
Equivalised household income – quintile 4				
Males	10.8	11.3	11.9	14.1
Females	7.8	10.4	8.9	10.3
Equivalised household income – quintile 5 (highest 20%)				
Males	6.3	7.3	6.4	7.0
Females	6.5	4.7	3.6	4.1

a 'Other' refers to tenure types apart from owning or buying. including life tenure scheme, participant of a rent/buy (shared equity) scheme and rent-free.
Note: Percentages that changed significantly compared with the previous survey are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

TABLE 4. Percentage of Indigenous population aged 18 years and over in selected social determinant categories, by remoteness, 2002 to 2012–13

Variable	2002	2004–05	2008	2012–13
Completed Year 12				
Nonremote	20.4	**26.0**	24.7	**28.7**
Remote	13.7	13.9	16.3	**20.7**
Bachelor degree and above				
Nonremote	4.5	6.0	6.2	6.6
Remote	1.6	2.0	2.7	2.9
Certificate I–Advanced Diploma				
Nonremote	27.7	30.8	31.9	**39.4**
Remote	15.6	**20.8**	18.0	**27.5**
Employed				
Nonremote	46.6	**52.6**	54.5	**49.6**
Remote	54.9	52.3	52.5	**44.4**
Renter/other[a]				
Nonremote	65.5	68.2	64.3	63.9
Remote	91.2	93.1	89.6	89.6
Equivalised household income – quintile 1 (lowest 20%)				
Nonremote	42.3	38.8	**46.2**	**39.5**
Remote	40.0	**47.4**	**58.2**	54.8
Equivalised household income – quintile 2				
Nonremote	25.2	23.3	21.4	**26.3**
Remote	37.4	31.9	**21.7**	21.1
Equivalised household income – quintile 3				
Nonremote	14.9	**18.8**	15.3	15.5
Remote	12.8	10.5	10.5	10.3
Equivalised household income – quintile 4				
Nonremote	10.3	12.4	11.5	13.0
Remote	6.1	6.4	6.5	8.7
Equivalised household income – quintile 5 (highest 20%)				
Nonremote	7.3	6.7	5.5	5.6
Remote	3.7	3.8	3.0	5.1

a 'Other' refers to tenure types apart from owning or buying. including life tenure scheme, participant of a rent/buy (shared equity) scheme and rent-free.
Note: Percentages that changed significantly compared with the previous survey are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab.

an earlier stage sometimes at least partially offset by later changes in the opposite direction. For example, self-assessed health for males remained fairly stable during the decade, with the percentage rating their self-assessed health as good to excellent increasing significantly between 2002 and 2004–05, then falling back to its original level by 2012–13 (and similarly for the measures of high to very high psychological distress and feeling extremely sad at least some of the time for males).

This analysis again highlights the significant declines in smoking among males and in nonremote areas, already widely reported. Despite these declines, the prevalence of smoking in remote areas did not change across the

decade. This would appear to be an area where policy attention could be focused, with the goal of reducing smoking-related health conditions among Indigenous people living in remote areas.

The other finding that emerges, which perhaps seems counterintuitive in the context of the relatively greater income poverty and poorer access to a range of services in remote areas, is increased percentages of Indigenous adults living in remote areas reporting higher levels of subjective health and wellbeing on a couple of different measures. The percentage with high or very high psychological distress in remote areas fell significantly between 2008 and 2012–13. This followed a significant increase from 2004–05 to 2008 in the percentage of Indigenous adults living in remote areas who reported that they felt happy all or most of the time.

Among Indigenous adults living in nonremote areas, on the other hand, there was a significant increase in the percentage with high or very high psychological distress between 2004–5 and 2008, along with a significant increase in the percentage who reported feeling extremely sad at least some of the time.

The question remains – how does the combination of change and stability in this set of selected social determinants affect the relative significance of any particular social determinant, and health and wellbeing outcomes? This question is policy relevant, as certain social determinants may assume greater or lesser significance in the context of the changing sociodemographic profile of the Indigenous population, requiring changing policy responses. This question is examined in the next section.

TABLE 5. Percentage of Indigenous population aged 18 years and over with selected health and wellbeing outcomes, by gender, 2002 to 2012–13

Variable	2002	2004–05	2008	2012–13
Self-assessed health good, very good or excellent				
Males	75.3	**78.6**	76.3	74.5
Females	74.4	73.9	75.0	72.6
Kessler-5 high or very high				
Males	–	21.5	**28.4**	**24.1**
Females	–	32.5	35.6	35.9
Happy all or most of the time				
Males	–	73.8	73.4	76.3
Females	–	71.2	71.4	70.4
Extremely sad at least some of the time				
Males	–	14.9	**19.3**	16.3
Females	–	26.0	24.5	25.5
Asthma				
Males	–	10.6	–	**13.5**
Females	–	21.6	–	24.9
Heart/circulatory problems or diseases				
Males	–	17.0	–	17.5
Females	–	23.4	–	21.2
Smoker				
Males	55.7	53.3	52.6	**47.4**
Females	51.5	51.0	47.4	44.3
Alcohol – risky lifetime use				
Males	–	30.8	–	29.4
Females	–	13.6	–	11.0

– = not available
Note: Percentages that changed significantly compared with the previous survey are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

5 Changes over time in the relative significance of social determinants to health and wellbeing outcomes – multivariate analysis

The multivariate analysis presented here examines the probability of an individual having a particular health or wellbeing outcome (the dependent variables) using a set of explanatory variables comprising demographics (gender and age) and selected social determinants of health (location, education, employment, income and housing tenure) (Table 7).

Using the probit model (Greene 2008), we can estimate the predicted probability of each outcome for an individual with selected characteristics compared with a reference person, or 'base case', defined by the omitted categories of the explanatory variables in the model. In our models, the base case is a male aged 18–24 years living in a nonremote area who had not completed Year 12, had not completed a post-school qualification, and who was living in a household with an equivalised household income in the middle quintile, in accommodation that was owned or being purchased.

Results are presented as marginal effects. The marginal effect is the difference in predicted probability of the outcome for an individual with the selected characteristic compared with the base case.

TABLE 6. Percentage of Indigenous population aged 18 years and over with selected health and wellbeing outcomes, by remoteness, 2002 to 2012–13

Variable	2002	2004–05	2008	2012–13
Self-assessed health good, very good or excellent				
Nonremote	73.5	74.6	74.1	72.3
Remote	78.3	79.9	80.1	77.7
Kessler-5 high or very high				
Nonremote	–	27.7	**32.9**	32.0
Remote	–	26.3	30.3	**23.9**
Happy all or most of the time				
Nonremote	–	70.9	69.7	71.2
Remote	–	76.1	**80.2**	80.5
Extremely sad at least some of the time				
Nonremote	–	19.0	**21.7**	20.9
Remote	–	25.8	23.0	21.4
Asthma				
Nonremote	–	18.8	–	21.4
Remote	–	10.5	–	12.3
Heart/circulatory problems or diseases				
Nonremote	–	19.3	–	17.4
Remote	–	23.4	–	26.1
Smoker				
Nonremote	52.3	51.0	48.2	**43.3**
Remote	56.8	54.9	54.6	54.5
Alcohol – risky lifetime use				
Nonremote	–	22.6	–	20.3
Remote	–	19.2	–	19.0

– = not available
Note: Percentages that changed significantly compared with the previous survey are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

5.1 Overview

Associations between most of the determinants and each of the health and wellbeing measures used have remained relatively consistent over time, after controlling for gender and age (Table 7).

Employment and housing tenure stand out as social determinants, that have significant associations consistently over time (with relatively large marginal effects) with a range of health and wellbeing outcomes. Also, consistently over time, higher levels of education are significantly associated with a lower probability of smoking.

However, the previous significant association between Year 12 completion and lower levels of psychological distress did not appear in the most recent data.

For the global measure of self-assessed health, and the specific physical health conditions of asthma and heart disease, there were few significant associations with the social determinants included in our analysis.

For the measures of emotional wellbeing, in addition to the significant determinants of employment and housing tenure, living in a remote area (compared with living in a nonremote area) was significantly associated with better self-assessed health and emotional wellbeing, consistently over time.

In the remainder of this section, we discuss each of these determinants in turn.

5.2 Employment

Employment is confirmed as having a significant positive association with most of the selected outcomes consistently across time, and with relatively large marginal effects.

5.3 Education

In comparison with employment, the association between education and health or wellbeing outcomes is less prominent. This is surprising, given that higher levels of education should provide benefits to the individual, above and beyond the economic or labour market returns (Biddle 2006).

While there was a significant positive association between completing Year 12 and better emotional wellbeing in the two earlier years for which data are available (2004–05 and 2008), by 2012–13 the association was no longer statistically significant. This coincides with the period in which Year 12 completion rates among Indigenous students have been increasing.

Those with higher levels of education were less likely to be smokers – this association was consistent over time, with large marginal effects.

5.4 Equivalised household income

Overall, the results indicate that being in the lowest quintile for equivalised household income was significantly associated with poorer emotional wellbeing (compared with being in the middle quintile), and being in the two highest income quintiles tended to have significant positive associations with emotional wellbeing (compared with those in the middle quintile).

TABLE 7. Marginal effects of explanatory variables on the probability of selected health and wellbeing outcomes

Variable	Self-assessed health good to excellent	High distress (Kessler-5)	Happy most or all the time	Extremely sad at least some of the time	Asthma	Heart or circulatory problem or disease	Current smoker	Alcohol use – high lifetime risk
Female								
2002	0.00	–	–	–	–	–	–0.08	–
2004–05	0.00	0.11	-0.02	0.09	0.11	0.02	–0.04	–0.19
2008	0.02	0.08	-0.01	0.07	–	–	–0.05	–
2012–13	0.00	0.08	–0.03	0.05	0.12	0.02	–0.06	–0.17
25–34 years								
2002	–0.08	–	–	–	–	–	0.05	–
2004–05	–0.06	0.00	0.02	0.00	–0.01	0.05	0.02	0.05
2008	–0.06	–0.01	0.00	0.00	–	–	0.04	–
2012–13	–0.09	0.02	–0.04	0.02	0.00	0.04	0.05	0.06
35–44 years								
2002	–0.20	–	–	–	–	–	0.03	–
2004–05	–0.15	0.02	–0.01	0.02	–0.01	0.12	0.02	0.03
2008	–0.18	0.02	–0.05	0.06	–	–	0.03	–
2012–13	–0.21	0.03	–0.09	0.05	0.01	0.11	0.02	0.09
45–54 years								
2002	–0.33	–	–	–	–	–	–0.04	–
2004–05	–0.30	0.01	0.00	0.02	0.02	0.25	–0.06	–0.01
2008	–0.31	0.01	–0.04	0.02	–	–	–0.06	–
2012–13	–0.35	0.05	–0.08	0.06	0.06	0.22	0.00	0.02
55 years and over								
2002	–0.39	–	–	–	–	–	–0.26	–
2004–05	–0.35	–0.09	0.10	–0.02	0.04	0.42	–0.30	–0.13
2008	–0.33	–0.09	0.05	–0.03	–	–	–0.26	–
2012–13	–0.38	–0.04	–0.01	0.02	0.03	0.36	–0.21	–0.03

TABLE 7 continued

Variable	Self-assessed health good to excellent	High distress (Kessler-5)	Happy most or all the time	Extremely sad at least some of the time	Asthma	Heart or circulatory problem or disease	Current smoker	Alcohol use – high lifetime risk
Remote								
2002	**0.02**	–	–	–	–	–	–0.02	–
2004–05	**0.04**	**–0.04**	**0.08**	0.01	**–0.05**	0.00	**–0.05**	–0.01
2008	**0.06**	**–0.04**	**0.12**	0.00	–	–	–0.02	–
2012–13	0.03	–0.08	**0.08**	**–0.02**	**–0.06**	**0.05**	**0.04**	0.02
Completed Year 12								
2002	0.02	–	–	–	–	–	**–0.09**	–
2004–05	0.01	**–0.04**	**0.04**	–0.03	–0.01	0.00	**–0.16**	**–0.08**
2008	0.03	**–0.06**	**0.05**	–0.06	–	–	**–0.18**	–
2012–13	0.02	–0.01	0.02	–0.02	–0.01	–0.01	**–0.16**	–0.02
Degree or higher								
2002	0.02	–	–	–	–	–	**–0.17**	–
2004–05	0.00	–0.02	–0.04	–0.04	–0.01	0.01	**–0.16**	–0.03
2008	0.00	0.02	–0.06	0.01	–	–	**–0.09**	–
2012–13	–0.02	0.00	–0.05	–0.01	**0.07**	0.01	**–0.12**	–0.04
Certificate–Advanced Diploma								
2002	0.00	–	–	–	–	–	–0.03	–
2004–05	0.00	–0.00	0.02	–0.01	**0.03**	0.00	**–0.06**	–0.02
2008	0.00	0.01	0.02	0.01	–	–	–0.02	–
2012–13	0.01	–0.01	0.00	–0.01	**0.02**	0.01	0.03	0.01
Employed								
2002	**0.07**	–	–	–	–	–	**–0.07**	–
2004–05	**0.06**	**–0.08**	**0.10**	**–0.04**	0.00	**–0.01**	–0.02	0.02
2008	**0.10**	**–0.10**	**0.11**	**–0.07**	–	–	**–0.07**	–
2012–13	**0.07**	**–0.08**	**0.06**	**–0.04**	**–0.03**	**–0.01**	**–0.04**	0.01
Lowest quintile								
2002	**–0.03**	–	–	–	–	–	**0.06**	–
2004–05	**–0.03**	0.04	–0.04	**0.05**	0.01	0.01	**0.11**	0.03
2008	–0.04	0.02	0.01	0.02	–	–	0.03	–
2012–13	–0.02	**0.07**	–0.03	**0.06**	0.01	0.00	**0.09**	–0.03

TABLE 7 continued

Variable	Self-assessed health good to excellent	High distress (Kessler-5)	Happy most or all the time	Extremely sad at least some of the time	Asthma	Heart or circulatory problem or disease	Current smoker	Alcohol use – high lifetime risk
Second quintile								
2002	**–0.04**	–	–	–	–	–	**0.05**	–
2004–05	–0.01	–0.01	0.00	0.02	0.00	0.01	**0.08**	0.02
2008	0.00	–0.02	0.01	–0.03	–	–	**–0.05**	–
2012–13	–0.01	0.03	–0.04	0.03	0.02	0.01	0.05	**–0.05**
Fourth quintile								
2002	–0.01	–	–	–	–	–	0.00	–
2004–05	0.00	–0.02	0.01	–0.03	0.00	0.00	–0.05	0.05
2008	0.02	**–0.08**	0.03	**–0.06**	–	–	–0.05	–
2012–13	0.01	–0.02	0.02	0.00	0.03	–0.01	–0.02	0.02
Highest quintile								
2002	0.01	–	–	–	–	–	–0.02	–
2004–05	0.00	**–0.07**	0.02	–0.03	0.03	0.01	–0.04	0.00
2008	0.03	–0.05	0.01	–0.03	–	–	–0.04	–
2012–13	**0.04**	**–0.06**	0.02	–0.03	0.00	**–0.02**	–0.05	0.03
Renter/other[a]								
2002	**–0.02**	–	–	–	–	–	**0.13**	–
2004–05	**–0.04**	**0.07**	**–0.05**	**0.06**	0.01	0.01	**0.12**	–0.03
2008	**–0.03**	**0.06**	**–0.04**	**0.05**	–	–	**0.16**	–
2012–13	**–0.03**	**0.09**	**–0.04**	**0.07**	–0.01	0.00	**0.16**	0.01

– = not available

a 'Other' refers to tenure types apart from owning or buying. including life tenure scheme, participant of a rent/buy (shared equity) scheme and rent-free.

Notes: The base case is a male aged 18–24 years living in a nonremote area who had not completed Year 12, had not completed a post-school qualification, and who was living in a household with an equivalised household income in the middle quintile, in accommodation that was owned or being purchased. Results in bold are statistically significant at $P < 0.05$.

Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

The association between equivalised household income and self-assessed health changed over time. Whereas earlier in the decade having a lower income was significantly associated with a lower probability of reporting good to excellent self-assessed health, by the end of the decade this association was no longer significant. At the same time, those in the highest income quintile were significantly more likely to report good to excellent self-assessed health in the most recent data, whereas previously there had been no significant association. This finding has potentially complex explanations, because the equivalised household income quintiles used here relate to the whole Australian population. The explanation could lie in absolute changes in income levels among the entire population (e.g. if the Australian population became wealthier on average, being in the lowest income quintile might cease to be a significant determinant of poor health), or in shifting relativities in the income distributions of the Indigenous and non-Indigenous populations.

Interestingly, in the most recent data, being in the second quintile was significantly associated with a lower probability of being a smoker or using alcohol at risky levels compared with those in the third (middle) quintile. In relation to smoking, this represents a reversal of a previously significant positive association of being in the second income quintile. In relation to alcohol use, this represents the emergence of a significant association with a reasonably large marginal effect. These results may point to changes in the profile of households in this income quintile. This is discussed in more detail in Section 6.

5.5 Home ownership

Housing tenure was also confirmed as being significantly associated with health, with those living in rental accommodation more likely to have poorer self-assessed health and emotional wellbeing, and more likely to be smokers.

5.6 Living in remote areas

Consistently during the decade, compared with those living in nonremote areas and controlling for the other observable characteristics in our model, Indigenous adults living in a remote area were:

- significantly more likely to report that their self-assessed health was good to excellent
- significantly less likely to have high to very high psychological distress
- significantly more likely to report that they had been happy most or all of the time
- in the most recent data – significantly less likely to report that they had been extremely sad at least some of the time.

Those living in remote areas were significantly less likely to have asthma but (in the most recent data) significantly more likely to have heart disease than their counterparts living in nonremote areas.

In 2004–05, Indigenous adults living in remote areas were significantly less likely to be smokers than their nonremote counterparts (controlling for other observable characteristics), but, by 2012–13, they were significantly more likely to be smokers than those living in nonremote areas.

6 Discussion and conclusion

The effects of social determinants on health and wellbeing can be assessed in many ways using quantitative analysis. Approaches may differ according to the measures of health and wellbeing and the set of social determinants selected, and more complex models might examine the extent to which factors such as health behaviours or access to health services explain the relationship between social determinants and health outcomes.

Our main objective in this report was to examine whether any of the associations between selected social determinants and health and wellbeing outcomes had changed during the decade 2002 to 2012–13. Drawing on large-scale national surveys of the Aboriginal and Torres Strait Islander population conducted during the past decade, we used an array of health and wellbeing measures, and a small set of explanatory variables (demographic and socioeconomic characteristics identified in previous research as important determinants of health, where these variables were measured consistently over time in the available data sources) in our analysis.

The findings presented in this report have a number of implications for policy and further research.

One clear finding is that reductions in smoking rates occurring among the Australian population, and also among Indigenous adults living in nonremote areas, are not occurring among Indigenous Australians living in remote areas. This finding suggests that future initiatives aimed at reducing smoking rates among the Indigenous population should focus on remote areas, especially

given that, in the most recent data, those living in remote areas were significantly more likely to have a heart or circulatory problem or disease.

Another finding is that housing tenure had a significant association with most of the health and wellbeing measures, consistently during the decade. Home ownership can have financial benefits as well as nonfinancial benefits, such as control and autonomy, that may be linked with improved health outcomes (see summary in Hulse & Burke 2009). Yet recent analysis showed that Indigenous Australians were less likely to transition into home ownership, and more likely to transition out of home ownership, than their non-Indigenous counterparts, after controlling for a number of other factors (Crawford & Biddle 2016).

Our results suggest that, as more of the Indigenous population participate in education and attain higher levels of education, the association of education with health and wellbeing outcomes is becoming less significant. This may be due to an effect similar to that observed in the broader Australian population, with the quality of tertiary education arguably declining at a time of increasing numbers and diversity of students (Bradley et al. 2008:xii). It may be that previously, when a small minority of Indigenous students was completing Year 12, these students had particular distinguishing characteristics enabling their educational participation and attainment (such as higher cognitive or noncognitive ability, a parental role model, or access to higher-quality education) that were also associated with better health outcomes. As Indigenous students from a greater diversity of circumstances complete Year 12 and participate in tertiary education, the salience of education as a determinant of health and wellbeing in its own right is diminishing.

Nevertheless, education is important for paid employment, which, as our results show, continues to have a strong positive association with better health and wellbeing outcomes for the Aboriginal and Torres Strait Islander population overall. At this stage, we have not examined this association using separate multivariate analyses for remote and nonremote populations. Given that a number of health and wellbeing indicators for those living in remote areas improved during the first decade of the 2000s despite an overall decline in employment, the relationship between employment and wellbeing in remote areas is less clear. It has previously been argued that there may be negative impacts on Indigenous wellbeing if employment and other policies are pursued without regard to the relationship between social determinants and health among Indigenous population groups living in different social and cultural contexts (Dockery 2010; Biddle 2012, 2014). Biddle has previously argued that encouraging migration from remote to nonremote areas for education and employment opportunities 'may have countervailing effects on health' (2012:75), and recent analysis using the Australian Census Longitudinal Dataset shows that employment outcomes among Indigenous people without work who migrated from remote to nonremote areas were, if anything, worse than employment outcomes among those who remained in remote areas (Biddle & Crawford 2015). Recent research examining the implementation of the Remote Jobs and Communities Program, now the Community Development Programme (CDP), shows that 'the punitive aspects' of the CDP appear to be putting at risk 'not only economic outcomes, but wider social and health outcomes' and calls into question the appropriateness of 'existing employment services' for Indigenous people, particularly in remote areas (Fowkes 2016).

As Jordan (2011) suggests in an informative discussion of work and Indigenous wellbeing:

> ... a more promising way forward, then, is to build on the emerging research … not only exploring ways in which some Indigenous cultures and mainstream work may collide, but also identifying the kinds of work – and work practices – that might better match diverse Indigenous attitudes and aspirations.

To reiterate the OECD's statement, the specifics of what matters for wellbeing are likely to differ according to different 'geographic, economic, social and cultural contexts' (OECD 2013:3). As Jordan (2011) points out, many activities considered highly productive by Indigenous people may not be considered in the same light by perspectives that give precedence to paid employment in the market economy.

At the same time, Indigenous Australians who aspire to paid employment in the market economy may encounter a range of barriers. Recent research has identified discrimination against Indigenous job applicants (Booth et al. 2012), and that Aboriginal and Torres Strait Islander employees in the Australian Public Service encounter difficulties, including racism, discrimination and lack of cultural awareness (among others) that motivate them to leave their employer (Biddle & Lahn 2016). There is still relatively little research into the links between experiences of racism or discrimination and health (Paradies 2006, Paradies et al. 2008), partly due to a lack of longitudinal data and analyses.

As noted in the literature review, previous studies have offered potential explanations for the finding that Indigenous people living in remote areas may have better outcomes (according to certain measures of health and wellbeing) than Indigenous people living in nonremote areas, despite lower levels of education, employment and income. Part of the explanation may be the extent to which people with very poor health are obliged to move from remote to nonremote areas to access the treatment or services they require. Further research on this issue would be useful. It could also be argued that these surprising findings stem from differences in the way in which Indigenous people living in remote and nonremote areas evaluate their health and wellbeing, language differences, or differences in the way in which the surveys are conducted in remote and nonremote areas. However, our findings relating to changes in time tend not to support these arguments. For example, our results show divergence over time in some outcome indicators of health and wellbeing for the remote and nonremote Indigenous populations, with some improvements in remote indicators despite decreasing employment and income. Assuming that factors such as different interpretations of health in remote and nonremote populations, language effects, or remote and nonremote differences in survey methodologies have remained fairly similar over time (if anything, it seems more likely that these differences would have diminished), it might be expected that worsening socioeconomic circumstances during the past decade among Indigenous populations in remote areas would be associated with poorer health and wellbeing outcomes, but this is not the case. Recent research by Yap and Yu (2016) in a remote Aboriginal community highlights the importance of connectedness to family, community, country and culture; health and wellbeing; and self-determination. The report also points to less vulnerability to interpersonal experience of racism or discrimination in that community. Dockery (2011) has suggested that experience of discrimination among Indigenous people living in nonremote areas offsets the beneficial effects of cultural attachment. In short, it is clear that the determinants of health and wellbeing for Indigenous people differ depending on the context.

Several of our findings could be explored in more detail. It would be useful to do a more detailed analysis of changes in household income during the decade among the Indigenous population, and to examine changes in the income disparity between Indigenous and non-Indigenous Australians, particularly in the context of the changing composition of households and mixed partnering. In the Indigenous population, more analysis of potentially increasing household income disparities between women and men, and those living in remote and nonremote areas, would be informative.

Our results indicate a shift towards higher incomes being associated with better health and wellbeing outcomes, rather than lower incomes being associated with poorer health and wellbeing outcomes. Such results may give some support for an 'emerging middle class', as documented by Marcia Langton in the 2012 Boyer Lectures (Langton 2012).

Finally, our analysis focused on a small set of key social determinants of health. A theme that recurs in literature about Indigenous health and wellbeing is the importance of people having control of their own lives, to pursue a life that has value to them (Marmot 2011, Carey 2013). Our analysis reaffirms that the relationship between social determinants and health and wellbeing is contingent on different geographical, social and demographic contexts.

In the absence of longitudinal information – that is, information obtained repeatedly from a group of people over time – it is more difficult to infer the direction of any causal influences, which are inevitably complex (see, for example, Anderson 2007). Cross-sectional or snapshot data – that is, data collected from a group of people at a single point in time of the type used in our analyses – can generally only be used to demonstrate associations between factors. However, using analyses of repeated cross-sections, we have been able to describe how the associations of some determinants of health may be changing, and these provide some insights into potential areas of policy focus.

Biddle (2012) made a renewed call, first raised by Biddle and Yap (2010), for longitudinal survey data, which would 'allow the development of a more robust evidence base to support Indigenous policy in Australia by allowing researchers to ask "what influences Indigenous health", rather than "what is associated with Indigenous health"' (p. 76). While the analysis presented in this report sheds light on how some social determinants of the health of Aboriginal and Torres Strait Islanders have – or have not – changed during the past decade, the need for longitudinal data to provide more robust insights into causal processes remains.

Appendix

TABLE A1. Percentage of Indigenous population aged 18 years and over in selected social determinant categories, and change over time, by gender, 2002 to 2012–13

	2002		2004–05		2008		2012–13	
Variable	%	SE	%	SE	%	SE	%	SE
Completed Year 12								
Males	18.3	1.3	22.1	1.5	22.1	1.3	26.7	1.5
Change	–	–	3.7	2.0	0.0	2.0	**4.6**	2.0
Females	18.7	1.1	23.0	1.4	22.9	1.1	27.1	1.2
Change	–	–	**4.3**	1.8	–0.1	1.8	**4.2**	1.6
Bachelor degree and above								
Males	2.8	0.6	4.3	0.8	4.2	0.6	3.5	0.5
Change	–	–	1.5	1.0	–0.1	1.0	–0.8	0.8
Females	4.5	0.7	5.3	0.7	6.2	0.6	7.9	0.7
Change	–	–	0.8	1.0	0.9	0.9	1.7	0.9
Certificate I–Advanced Diploma								
Males	25.7	1.5	28.5	1.4	28.9	1.4	37.7	1.6
Change	–	–	2.7	2.1	0.4	1.9	**8.9**	2.1
Females	23.2	1.2	27.6	1.3	27.8	1.2	35.8	1.3
Change	–	–	**4.4**	1.8	0.1	1.8	**8.0**	1.8
Employed								
Males	57.8	1.5	62.8	1.4	63.8	1.4	54.5	1.8
Change	–	–	**5.0**	2.1	1.1	2.0	**–9.3**	2.3
Females	40.9	1.5	43.6	1.6	45.1	1.4	42.7	1.5
Change	–	–	2.7	2.2	1.5	2.1	–2.4	2.0
Renter/other[a]								
Males	70.9	1.7	73.7	1.7	69.9	1.5	67.1	1.7
Change	–	–	2.8	2.4	–3.7	2.3	–2.8	2.3
Females	74.1	1.6	76.6	1.6	71.6	1.4	72.2	1.5
Change	–	–	2.5	2.2	**–5.0**	2.1	0.6	2.0
Equivalised household income – quintile 1 (lowest 20%)								
Males	38.9	1.9	37.2	1.7	43.6	1.9	37.8	2.0
Change	–	–	–1.7	2.6	**6.3**	2.6	**–5.8**	2.7
Females	44.2	1.6	44.4	1.7	54.2	1.7	47.1	1.7
Change	–	–	0.2	2.4	**9.8**	2.4	**–7.1**	2.4
Equivalised household income – quintile 3								
Males	14.7	1.3	19.5	1.6	16.5	1.3	15.4	1.2
Change	–	–	**4.8**	2.0	–3.0	2.1	–1.1	1.8
Females	14.0	1.3	14.1	1.3	12.0	1.1	13.6	1.0
Change	–	–	0.0	1.8	–2.1	1.7	1.7	1.5
Equivalised household income – quintile 4								
Males	10.8	1.2	11.3	1.2	11.9	1.0	14.1	1.2
Change	–	–	0.5	1.7	0.6	1.6	2.2	1.6
Females	7.8	0.8	10.4	1.1	8.9	0.9	10.3	0.9
Change	–	–	2.5	1.4	–1.5	1.5	1.4	1.3
Equivalised household income – quintile 5 (highest 20%)								
Males	6.3	0.9	7.3	1.1	6.4	1.0	7.0	0.9
Change	–	–	1.0	1.4	–1.0	1.5	0.7	1.4
Females	6.5	0.9	4.7	0.7	3.6	0.5	4.1	0.6
Change	–	–	–1.7	1.2	–1.2	0.9	0.5	0.7

– = not available; SE = standard error
a 'Other' refers to tenure types apart from owning or buying. including life tenure scheme, participant of a rent/buy (shared equity) scheme and rent-free.
Note: Changes from the previous survey that are significant are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

TABLE A2. Percentage of Indigenous population aged 18 years and over in selected social determinant categories, and change over time, by remoteness, 2002 to 2012–13

	2002		2004–05		2008		2012–13	
Variable	%	SE	%	SE	%	SE	%	SE
Completed Year 12								
Nonremote	20.4	1.3	26.0	1.5	24.7	1.1	28.7	1.1
Change	–	–	**5.6**	1.9	–1.3	1.8	**4.0**	1.6
Remote	13.7	1.2	13.9	1.5	16.3	1.2	20.7	1.4
Change	–	–	0.2	1.9	2.4	1.9	**4.4**	1.9
Bachelor degree and above								
Nonremote	4.5	0.6	6.0	0.7	6.2	0.6	6.6	0.5
Change	–	–	1.5	1.0	0.2	0.9	0.4	0.8
Remote	1.6	0.3	2.0	0.3	2.7	0.5	2.9	0.5
Change	–	–	0.3	0.5	0.8	0.6	0.2	0.7
Certificate I–Advanced Diploma								
Nonremote	27.7	1.4	30.8	1.3	31.9	1.2	39.4	1.2
Change	–	–	3.2	1.9	1.0	1.8	**7.6**	1.7
Remote	15.6	1.3	20.8	1.5	18.0	1.4	27.5	1.8
Change	–	–	**5.2**	2.0	–2.7	2.1	**9.4**	2.3
Employed								
Nonremote	46.6	1.5	52.6	1.6	54.5	1.5	49.6	1.6
Change	–	–	**6.0**	2.1	1.8	2.1	**–4.8**	2.1
Remote	54.9	2.0	52.3	1.9	52.5	1.6	44.4	2.4
Change	–	–	–2.6	2.7	0.2	2.5	**–8.1**	2.9
Renter/other[a]								
Nonremote	65.5	1.9	68.2	1.7	64.3	1.5	63.9	1.7
Change	–	–	2.7	2.6	–3.9	2.3	–0.4	2.3
Remote	91.2	1.3	93.1	1.4	89.6	1.2	89.6	1.4
Change	–	–	2.0	2.0	–3.5	1.9	0.0	1.8
Equivalised household income – quintile 1 (lowest 20%)								
Nonremote	42.3	1.7	38.8	1.7	46.2	1.8	39.5	1.7
Change	–	–	–3.5	2.4	**7.4**	2.4	**–6.8**	2.5
Remote	40.0	2.1	47.4	2.5	58.2	2.3	54.8	2.5
Change	–	–	**7.4**	3.3	**10.8**	3.4	–3.4	3.4
Equivalised household income – quintile 2								
Nonremote	25.2	1.4	23.3	1.3	21.4	1.1	26.3	1.4
Change	–	–	–2.0	1.9	–1.8	1.7	**4.9**	1.8
Remote	37.4	2.2	31.9	1.9	21.7	1.4	21.1	1.6
Change	–	–	–5.5	2.9	**–10.2**	2.4	–0.6	2.1
Equivalised household income – quintile 3								
Nonremote	14.9	1.4	18.8	1.4	15.3	1.2	15.5	1.0
Change	–	–	**3.9**	2.0	–3.5	1.8	0.3	1.6
Remote	12.8	1.2	10.5	1.2	10.5	1.4	10.3	1.3
Change	–	–	–2.3	1.7	0.0	1.8	–0.2	1.9
Equivalised household income – quintile 4								
Nonremote	10.3	1.0	12.4	1.2	11.5	0.9	13.0	1.1
Change	–	–	2.1	1.6	–0.9	1.5	1.5	1.4
Remote	6.1	0.8	6.4	1.6	6.5	0.9	8.7	1.0
Change	–	–	0.3	1.8	0.1	1.9	2.2	1.4
Equivalised household income – quintile 5 (highest 20%)								
Nonremote	7.3	1.0	6.7	0.9	5.5	0.7	5.6	0.7
Change	–	–	–0.6	1.3	–1.2	1.2	0.1	1.0
Remote	3.7	0.9	3.8	0.9	3.0	0.8	5.1	1.0
Change	–	–	0.1	1.3	–0.8	1.2	2.1	1.2

– = not available; SE = standard error
a 'Other' refers to tenure types apart from owning or buying. including life tenure scheme, participant of a rent/buy (shared equity) scheme and rent-free.
Note: Changes from the previous survey that are significant are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

TABLE A3. Percentage of Indigenous population aged 18 years and over with selected health and wellbeing outcomes, and change over time, by gender, 2002 to 2012–13

	2002		2004–05		2008		2012–13	
Variable	%	SE	%	SE	%	SE	%	SE
Self-assessed health good, very good or excellent								
Males	75.3	1.2	78.6	1.1	76.3	1.2	74.5	1.2
Change	–	–	**3.3**	1.6	–2.2	1.6	–1.8	1.7
Females	74.4	1.1	73.9	1.2	75.0	1.1	72.6	1.2
Change	–	–	–0.5	1.6	1.1	1.6	–2.5	1.7
Kessler-5 high or very high								
Males	–	–	21.5	1.4	28.4	1.2	24.1	1.4
Change	–	–	–	–	**6.9**	1.9	**–4.3**	1.9
Females	–	–	32.5	1.2	35.6	1.4	35.9	1.4
Change	–	–	–	–	3.1	1.9	0.4	2.0
Happy all or most of the time								
Males	–	–	73.8	1.5	73.4	1.3	76.3	1.3
Change	–	–	–	–	–0.3	2.0	2.8	1.9
Females	–	–	71.2	1.3	71.4	1.2	70.4	1.2
Change	–	–	–	–	0.2	1.7	–1.0	1.7
Extremely sad at least some of the time								
Males	–	–	14.9	1.2	19.3	1.1	16.3	1.2
Change	–	–	–	–	**4.4**	1.6	–3.0	1.6
Females	–	–	26.0	1.0	24.5	1.2	25.5	1.3
Change	–	–	–	–	–1.5	1.6	1.0	1.8
Asthma								
Males	–	–	10.6	1.0	–	–	13.5	1.1
Change	–	–	–	–	–	–	**2.9**	1.5
Females	–	–	21.6	1.1	–	–	24.9	1.2
Change	–	–	–	–	–	–	3.3	1.7
Heart/circulatory problems or diseases								
Males	–	–	17.0	1.0	–	–	17.5	1.2
Change	–	–	–	–	–	–	0.5	1.6
Females	–	–	23.4	1.3	–	–	21.2	1.0
Change	–	–	–	–	–	–	–2.2	1.6
Smoker								
Males	55.7	1.6	53.3	1.6	52.6	1.6	47.4	1.5
Change	–	–	–2.3	2.3	–0.7	2.3	**–5.2**	2.2
Females	51.5	1.5	51.0	1.5	47.4	1.3	44.3	1.3
Change	–	–	–0.5	2.1	–3.6	2.0	–3.1	1.9

TABLE A3 continued

	2002		2004–05		2008		2012–13	
Variable	%	SE	%	SE	%	SE	%	SE
Alcohol – risky lifetime use								
Males	–	–	30.8	1.5	–	–	29.4	1.4
Change	–	–	–	–	–	–	–1.4	2.1
Females	–	–	13.6	1.2	–	–	11.0	0.8
Change	–	–	–	–	–	–	–2.6	1.5

– = not available; SE = standard error
Note: Changes from the previous survey that are significant are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

TABLE A4. Percentage of Indigenous population aged 18 years and over with selected health and wellbeing outcomes, and change over time, by remoteness, 2002 to 2012–13

	2002		2004–05		2008		2012–13	
Variable	%	SE	%	SE	%	SE	%	SE
Self-assessed health good, very good or excellent								
Nonremote	73.5	1.1	74.6	1.2	74.1	1.0	72.3	1.1
Change	–	–	1.1	1.6	–0.5	1.6	–1.8	1.5
Remote	78.3	1.0	79.9	1.2	80.1	1.1	77.7	1.6
Change	–	–	1.6	1.6	0.2	1.6	–2.4	1.9
Kessler-5 high or very high								
Nonremote	–	–	27.7	1.3	32.9	1.1	32.0	1.2
Change	–	–	–	–	**5.1**	1.7	–0.8	1.7
Remote	–	–	26.3	1.6	30.3	1.7	23.9	1.6
Change	–	–	–	–	4.0	2.4	**–6.4**	2.4
Happy all or most of the time								
Nonremote	–	–	70.9	1.2	69.7	1.2	71.2	1.2
Change	–	–	–	–	–1.3	1.7	1.5	1.7
Remote	–	–	76.1	1.4	80.2	1.4	80.5	1.2
Change	–	–	–	–	**4.1**	2.0	0.3	1.8
Extremely sad at least some of the time								
Nonremote	–	–	19.0	1.0	21.7	1.0	20.9	1.0
Change	–	–	–	–	**2.8**	1.4	–0.9	1.4
Remote	–	–	25.8	1.6	23.0	1.5	21.4	1.3
Change	–	–	–	–	–2.8	2.3	–1.6	2.0
Asthma								
Nonremote	–	–	18.8	1.0	–	–	21.4	1.1
Change	–	–	–	–	–	–	2.6	1.5
Remote	–	–	10.5	0.9	–	–	12.3	1.1
Change	–	–	–	–	–	–	1.8	1.4
Heart/circulatory problems or diseases								
Nonremote	–	–	19.3	1.1	–	–	17.4	0.9
Change	–	–	–	–	–	–	–1.9	1.4
Remote	–	–	23.4	1.5	–	–	26.1	1.6
Change	–	–	–	–	–	–	2.7	2.2
Smoker								
Nonremote	52.3	1.6	51.0	1.5	48.2	1.2	43.3	1.3
Change	–	–	–1.2	2.1	–2.8	1.9	**–4.9**	1.8
Remote	56.8	1.5	54.9	1.8	54.6	1.7	54.5	1.9
Change	–	–	–1.9	2.3	–0.2	2.5	–0.1	2.6
Alcohol – risky lifetime use								
Nonremote	–	–	22.6	1.3	–	–	20.3	1.0
Change	–	–	–	–	–	–	–2.3	1.6
Remote	–	–	19.2	1.5	–	–	19.0	1.3
Change	–	–	–	–	–	–	–0.2	2.0

– = not available; SE = standard error
Note: Changes from the previous survey that are significant are in bold.
Source: Authors' calculations using Expanded Confidentialised Unit Record Files from NATSISS 2002 and 2008, and NATSIHS 2004–05 and 2012–13, accessed via the ABS Remote Access Data Lab

Notes

1. Available at http://caepr.anu.edu.au/publications/censuspapers.php
2. See the CDSH social determinants of health framework (CSDH 2008) and the OECD's framework for measuring wellbeing (OECD 2015).
3. Unit record data from the most recent NATSISS (2014–15) were not available when data were analysed for this paper.

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