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Indigenous Population Projections, 2006–31: Planning For Growth

N. Biddle and J. Taylor

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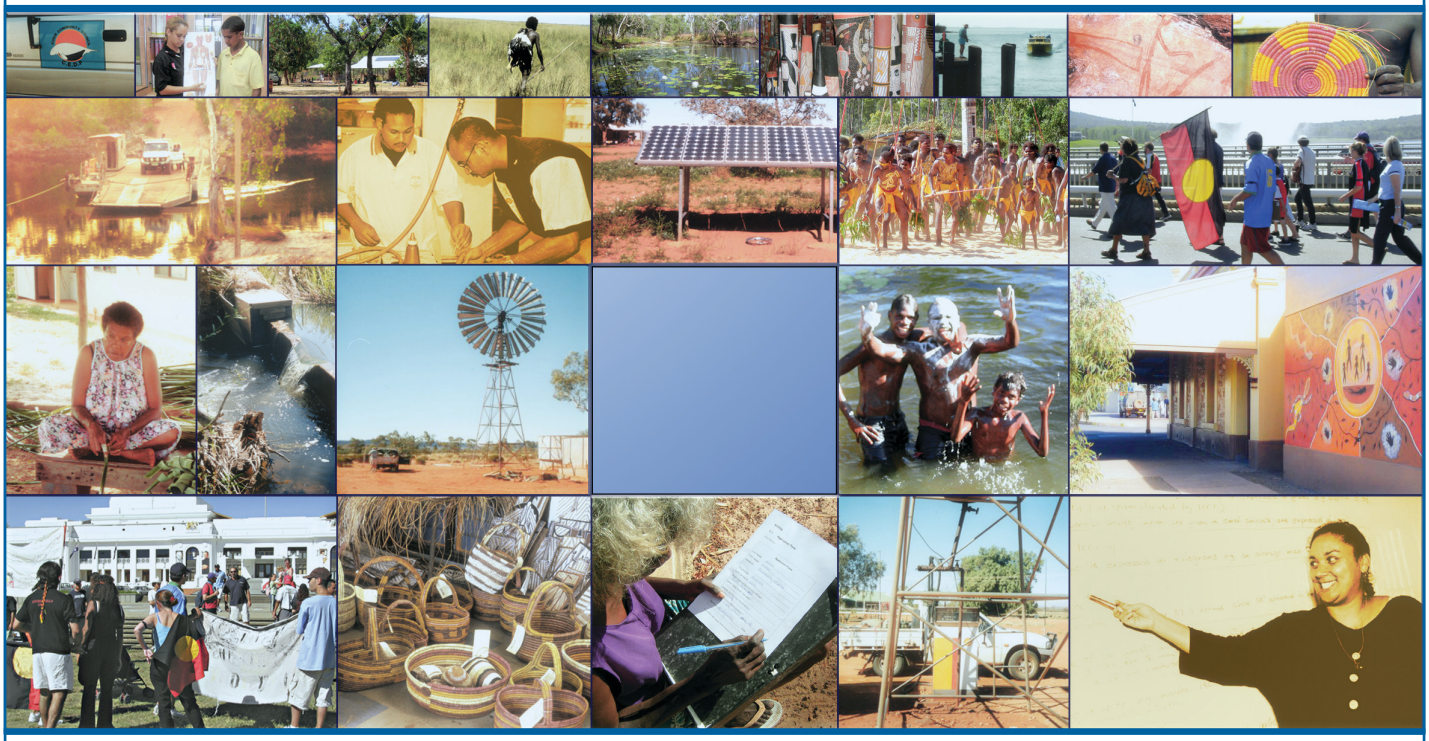

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Ministerial Council for Aboriginal
and Torres Strait Islander Affairs

THE AUSTRALIAN NATIONAL UNIVERSITY

Indigenous population projections, 2006–31: Planning for growth

N. Biddle and J. Taylor

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ABSTRACT

Policy development in Indigenous affairs often proceeds with dated estimates of population and with little understanding of the likely impact of changing demographic parameters on future Indigenous population size and composition. To the extent that policy itself can influence demographic outcomes, this represents a significant deficiency in current planning methodology. To stimulate a dialogue around such issues, this paper models the national and regional population impacts of a continuation of existing mortality and fertility regimes compared to a situation where these converge. The effects of inter-regional migration are also considered. The scenarios presented are heuristic only and reflect the logic of sustaining into the future recently observed demographic trends, compared to following through on the idea of convergence in sociodemographic outcomes over timescales that are commensurate with stated policy ambitions. As such, they are designed to sketch out the effects on the size and composition of Indigenous population of no change in current conditions compared to maximum change. What they show is that while the overall size of the Indigenous population is conservatively projected to be around 830,000 by 2031, regardless of which assumptions are adopted, any movement towards convergence in demographic outcomes, as implied by current Closing the Gap policies, produces a population that is much older and more urban in profile.

Keywords: Population projections, 2006 Census, Closing the Gap.

CAEPR INDIGENOUS POPULATION PROJECT

This project has its genesis in a CAEPR report commissioned by the Ministerial Council for Aboriginal and Torres Strait Islander Affairs (MCATSIA) in 2005. The aim of the paper (published as CAEPR Discussion Paper No. 283) was to synthesise findings from a wide variety of regional and community-based demographic studies. What emerged was the identification of demographic 'hot spots'—particular Indigenous population dynamics in particular regions that give rise to issues of public policy concern. These trends spatially align with specific categories of place that transcend State and Territory boundaries. The 'hot spots' coalesce around several structural settings including city suburbs, regional towns, town camps, remote Indigenous towns, and outstations, as opposed to the more formal regionalised or jurisdictional spatial configurations that have tended to guide and inform Indigenous policy development.

Recognising that the structural circumstances facing Indigenous populations are locationally dispersed in this way, MCATSIA has established an enhanced research capacity at CAEPR to further explore the dynamics and regional geography of Indigenous population and socioeconomic change.

This research activity commenced in late 2007 and is constructed around four discrete yet overlapping projects:

- a detailed regional analysis of relative and absolute change in Indigenous social indicators
- an assessment of social and spatial mobility among Indigenous metropolitan populations
- case-study analyses of multiple disadvantage in select city neighbourhoods and regional centres
- the development of conceptual and methodological approaches to the measurement of temporary short-term mobility.

Working Papers related to these projects are co-badged with MCATSIA and released as part of the CAEPR Working Paper Series. It should be noted that the views expressed in these publications are those of the researcher/s and do not necessarily represent the views of MCATSIA as a whole, or the views of individual jurisdictions.

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A number of organisations and individuals provided helpful feedback on an early draft of this work, including officers of the Standing Committee for Aboriginal and Torres Strait Islander Affairs (SCATSIA) and the Productivity Commission. In addition we would like to thank Professor Martin Bell from the University of Queensland and Dr Jeromey Temple from The Australian National University for constructive comments on earlier drafts of the paper and associated methodology. Finally and most importantly, we would like to thank Gillian Cosgrove who gave editorial assistance and prepared the final document as well as Mandy Yap and Hilary Bek for detailed proofing.

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EXECUTIVE SUMMARY

1. Being proactive in service delivery requires a measure of future requirements for infrastructure and services, something only rarely achieved for Indigenous populations. Given current Closing the Gap policy settings, the need for projections of the Indigenous population is now more clearly defined, since not only will the attempts by government to establish convergence in socioeconomic outcomes have an impact on demographic futures, the resulting population trends themselves will impact on setting targets for change.

2. In this paper, three projection series are constructed, each of which generates outcomes for Australia as a whole, for Indigenous Regions (of which there were 37 in 2006), and for the standard five-category Remoteness Classification. Series A assumes no change in existing Indigenous demographic parameters and it sets net inter-regional migration to zero. Series B maintains zero net migration, but models the effect of a variation in fertility and survival parameters towards convergence with the rest of the population. Series C introduces the redistributing effect of inter-regional migration.

3. Assuming constant survival/fertility rates between 2006 and 2031 and no internal migration, the Indigenous population is projected to grow from just over 517,000 to almost 848,000, representing an annualised rate of 2.00 per cent. This represents a decline in the rate of growth from previous census periods. The non-Indigenous population is projected to grow at a slower rate over 2006–31 resulting in an increase in the Indigenous share of the total population from 2.5 to 3.2 per cent.

4. The fastest rate of growth in this series is projected to occur amongst those aged 55 years and over. The number of Indigenous Australians in this age group is projected to almost treble from 40,025 in 2006 to 117,532 in 2031. A high relative growth rate is also evident among those of prime working age with a more than 50 per cent increase in the Indigenous share of the population in this age group.

5. On the basis of natural increase alone, the Indigenous Region that is projected to have the fastest rate of growth is Brisbane. With an annual growth rate of 2.60 per cent, the Indigenous population will almost double in size from around 46,000 in 2006 to almost 88,000 by 2031. Overall, the lowest Indigenous growth rates are projected for regions in 'remote' and 'very remote' Australia, reflecting lower survival rates and a relative lack of contribution to Indigenous population increase from non-Indigenous mothers.

6. Incorporating linear convergence of Indigenous survival and fertility rates to the (current) non-Indigenous rates by 2031 appears to have little impact on overall projected growth. However, it does lead to a relatively slow rate of growth amongst infants and school-age population, with correspondingly higher rates of growth among those of prime working age and at the older ages of 55 years and over. The Closing the Gap approach will need to be cognisant of a slowing down of the expansion in younger age groups and a corresponding ageing of the Indigenous population.

7. There is much greater diversity in regional population projections after incorporating historic migration rates. This enhances an overall shift in Indigenous population distribution in favour of major cities and regional areas. Notable increases in growth are evident in Brisbane, Melbourne, Perth, Adelaide, Darwin, Cairns, Townsville, Rockhampton, Darwin and Alice Springs. At the other extreme, three regions stand out as a consequence of projected decline in Indigenous population—Bourke, the Torres Strait and Tennant Creek. These latter regions also display the greatest decline in the non-Indigenous population.

8. Differential growth rates are also projected by remoteness category, with remote and very remote areas experiencing much lower Indigenous growth when migration is factored in, while non-Indigenous growth in these areas turns negative. Indeed, this latter non-Indigenous negative growth emerges across a number of regions and this noticeably raises Indigenous population shares, mostly in remote areas such as Derby, Alice Springs, Cape York, Katherine, Tennant Creek and Bourke.

INTRODUCTION AND OVERVIEW

Planning processes in Indigenous affairs all too often rely on dated demographic information, leading to a degree of uncertainty in assessing the adequacy of policy responses to shortfalls in social and economic infrastructure. As such, policy development is typically reactive to needs as they become evident (for example, in terms of post-facto responses to housing shortages), as opposed to being proactive in seeking to anticipate and plan for expected requirements. However, in order to be proactive a measure of future requirements for infrastructure and services is needed, and this is something that is only rarely achieved for Indigenous populations. This is not the case for mainstream communities throughout Australia, where approaches to settlement planning are far more prospective. For example, State and local government planning authorities routinely develop future scenarios and often seek budgetary allocations on the basis of anticipated needs. A key element in this proactive planning is the production of small-area population projections or forecasts. While the Australian Bureau of Statistics (ABS) provides official projections of the total population for 20-year periods down to the Statistical Local Area (SLA) level, State and Territory planning departments also produce regional and local area projections of total population, often down to the local government area level (Bell 1992).

ABS: Australian Bureau of Statistics

SLA: Statistical Local Area

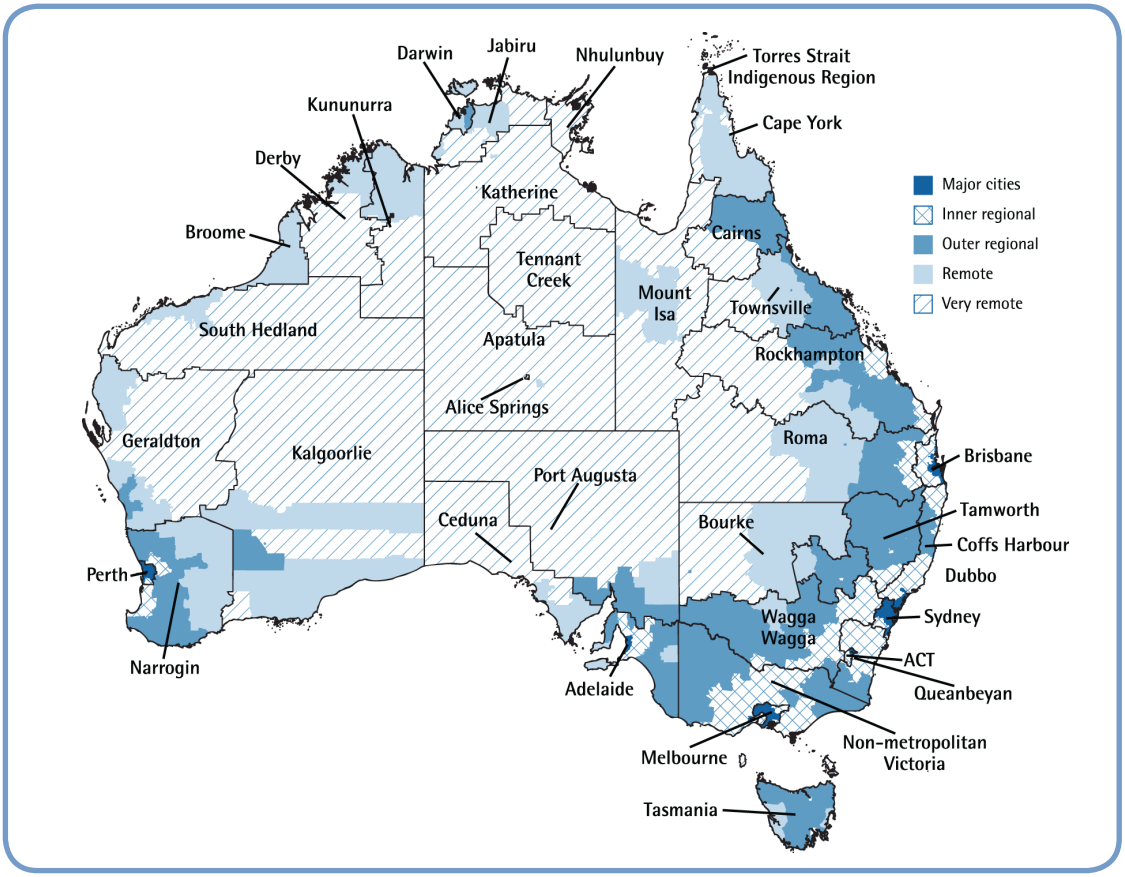
The first projections of Indigenous population were prepared for the Royal Commission into Aboriginal Deaths in Custody in 1990 (Gray & Tesfaghiorghis 1991) and subsequent efforts have been summarised by Wilson (2009) to date. Official ABS projections have only ever been produced at the national and State or Territory level, and only for 10-year periods (ABS 1998, 2004). However, there have been attempts by others to project for more detailed geographies, such as the recent projections for regions of New South Wales (Khalidi 2008) and for customised regions including the Australian desert (Brown, Taylor & Bell 2008) and Cape York Peninsula (Taylor & Bell 2002), as well as for longer time frames out to 2051 (Productivity Commission 2005). Policy-wise, projections have been successfully deployed in the development of Indigenous employment policy (Taylor & Hunter 1998), in regional needs assessment for service delivery (Taylor 2004), and in driving home the fiscal opportunity-cost message that business as usual in Indigenous affairs is not a rational option due to the weight of population momentum (Taylor 2006).

Given current Closing the Gap policy settings, the need for projections of the Indigenous population is now more clearly defined, since not only will the attempts by government to establish convergence in socioeconomic outcomes have an impact on demographic futures, the resulting population trends themselves will impact on the setting of targets for change. While there has clearly been a good deal of projection activity, and while Indigenous projections form part of ABS standard output, much of this remains limited in spatial detail and continues to refer to relatively short time frames. Importantly, as well, there tends to be a three-year period of processing vital demographic information following each census such that currently, in 2009, the most recently available ABS projections (and only up to 2009) are based on 2001 population estimates. In the meantime, while policy decisions proceed on the basis of dated information, Council of Australian Governments (COAG) processes are focused more on regionalised or place-based initiatives, and have time frames and targets that are long-term and inter-generational in scope.

COAG: Council of Australian Governments

In recognition of this growing gap between policy requirements and available information, this paper develops Indigenous projections as a timely response to policy need. It also provides these on a regional basis and in a manner that models the potential population impacts of moving towards convergence in socioeconomic status as envisaged by the Closing the Gap agenda. To this end, three projection series are constructed, each of which generates outcomes for Australia as a whole, for Indigenous Regions (of which there were 37 in 2006) and for the standard five-category Remoteness Classification shown in Fig. 1.

Fig. 1. 2006 Indigenous Regions and SLA-based Remoteness Classification



The first series (Series A) projects the population to 2031. It assumes no change in existing Indigenous demographic parameters and it sets net inter-regional migration to zero. This focuses attention on the effects of variable age structure and regional differences in natural increase under current conditions. The second series (Series B) also projects to 2031 and maintains zero net migration, but it models the effect of a variation in fertility and survival parameters towards convergence with the rest of the population by 2031. While this is done primarily to test the potential outcome of current policy settings, it also reflects established long-term trends in Indigenous demography towards lower fertility rates (Taylor 2003; Kinfu & Taylor 2005) and higher survival rates (Wilson, Condon & Barnes 2007) as well as observed positive interactions with change in related social and economic determinants, such as employment, education and income (Gray 1990) that government policy is also attempting to influence. The final series (Series C) introduces the redistribution effect of inter-regional migration over a shorter time frame (to 2016). It also develops parallel non-Indigenous projections in order to establish estimates of change in regional Indigenous population shares. It should be noted that these are complementary projection series to those proposed by the ABS (2009a), which will use alternative assumptions on fertility, survival and migration.

PROJECTION METHODS

There are no formally accepted rules or procedures for demographic projection. Rather, there exists a large body of professional literature which is concerned with the computation of future populations and which collectively contains a set of guidelines that is accepted as representing good projection practice. Among these guidelines is the principle supported by empirical evidence that the accuracy of projections diminishes with time (Bell 1992; Smith & Sincich 1991). It is also well established that projections for large populations are more reliable than those for small populations (Keyfitz 1981). As we have seen, partly for such reasons, official projections of Indigenous population in Australia have to date only ever been produced for large geographic areas (States and Territories) and never at the regional level. Also, they have only ever been prepared for much shorter time periods (10 years) compared to the much longer periods often applied to the general population. While such observations do not invalidate the present exercise, they do provide an indication of its innovative nature.[1]

Several methods are available for population projection, ranging from simple mathematical methods using historic growth rates and assuming that these will continue into the future, to the complex microsimulation methods that apply maximum amounts of information to interactions with age structure (Wilson & Rees 2005). Those most appropriate for Indigenous projection are cohort-component methods, since these examine interactions with age structure but require relatively basic data inputs, all of which are readily available for the Indigenous population. In practice, their suitability depends on the quality of information that feeds into the standard demographic balancing equation:

$$\begin{aligned}(pop_{t+\Delta} = \; & pop_t + births_{t,t+\Delta} - deaths_{t,t+\Delta} + (immigration_{t,t+\Delta} - emigration_{t,t+\Delta}) \\ & + (immigration_{t,t+\Delta} - outmigration_{t,t+\Delta}) + \mathcal{E}_{t+\Delta}\end{aligned} \tag{1}$$

At the national level, the Indigenous population at a particular future time period (t+Δ) is equal to the population at a previous point in time (t), plus births to Indigenous mothers and births to non-Indigenous mothers and Indigenous fathers that occurred over the period, minus Indigenous deaths, plus international net migration. For regional population change, net internal migration should also be added. These components of population change are examined separately and rates for these are applied to cohorts of a base population as appropriate, resulting in a set of projections for a set time period. This process is iterative across age groups over the projection period.

Equation (1) includes an error term ($\mathcal{E}_{t+\Delta}$). This represents the amount needed to make intercensal increase in a population balance after accounting for births, deaths and migration. For the most part this 'error of closure', as the American demographer Passel (1996) has described it, is usually small, but in Indigenous populations that are socially constructed, evidence from around the world has shown this to often be very substantial. For example, this error of closure for the Indigenous Australia population accounted for fully 50 per cent of population change between 1991 and 1996, and 31 per cent between 1996 and 2001 (Taylor 2003: 24), while for the most recent intercensal period of 2001–06 error of closure was small (ABS 2009b) (as it was in the 1986–91 period). With such variation, there is no sense in which over time the Indigenous population can be confidently described as clearly defined for statistical purposes, especially at the regional level (Taylor & Biddle 2008). There are no satisfactory ways of dealing with this issue. In the past, the ABS has applied estimates of closure error observed in prior intercensal periods to produce a high series projection alongside a low series with no such estimate. Here we follow the latter, more conservative, assumption.

ASFRs: age-specific fertility rates

ERP: Estimated Resident Population

Table 1. Summary of assumptions for Series A projection to 2031

Component	Assumptions
Fertility and projected births ($births_{t,t+1}$)	Two birth categories are estimated: births of Indigenous children to Indigenous mothers and births of Indigenous children to non-Indigenous mothers. For the first category, 2006 State & Territory age-specific fertility rates (ASFRs) are calculated using a yearly average of the 2005–07 births divided by the 2006 ERP (ABS 2007b) which are then applied to Indigenous Regions and SLAs as appropriate and held constant for the projection period. After excluding births to Indigenous mothers, the average of the remainder of the Indigenous births over the period are divided first by the Indigenous male ERP and then the non-Indigenous female estimated resident population (ERP). The average of the two is used as the second category of births.
Mortality and projected deaths ($deaths_{t,t+1}$)	Age-specific survival rates are derived from the most recent experimental Indigenous life tables (ABS 2009b) and held constant. 2006 State & Territory age-specific rates are applied to Indigenous Regions and SLAs as appropriate.
Net overseas migration ($immigration_{t,t+1} - emigration_{t,t+1}$)	Net overseas migration is set to zero.
Net internal migration ($immigration_{t,t+1} - outmigration_{t,t+1}$)	Net inter-regional migration is set to zero.
Error of closure ($\varepsilon_{t+\Delta}$)	No allowance is made for population change via shifts in Indigenous identification. This is a conservative assumption and similar to that adopted by the ABS low series Indigenous projections.

Table 2. Summary of assumptions for Series B projection to 2031

Component	Assumptions
Fertility and projected births ($births_{t,t+1}$)	Two birth categories are estimated. For births of Indigenous children to Indigenous mothers, ASFRs are calculated as per Series A and applied to Indigenous Regions and SLAs as appropriate for the 2006–11 period. Non-Indigenous ASFRs are used for the 2026–31 period, with convergence between the two occurring in a linear fashion for the intervening intercensal periods. Births of Indigenous children to non-Indigenous mothers are calculated as per Series A.
Mortality and projected deaths ($deaths_{t,t+1}$)	Indigenous age-specific survival rates are derived from the most recent 2006 experimental Indigenous life tables (ABS 2009b) and used for the 2006–11 period. Age-specific survival rates based on the non-Indigenous population are used for the 2026–31 period. Convergence between the two is assumed to occur in a linear fashion for the intervening intercensal period.[a]
Net overseas migration ($immigration_{t,t+1} - emigration_{t,t+1}$)	Net overseas migration is set to zero.
Net internal migration ($immigration_{t,t+1} - outmigration_{t,t+1}$)	Net inter-regional migration is set to zero.
Error of closure ($\varepsilon_{t+\Delta}$)	No allowance is made for population change via shifts in Indigenous identification. This is a conservative assumption and similar to that adopted by the ABS low series Indigenous projections.

Note: **a.** We also used a similar convergence methodology to Cuxson et al. (2008) and found no qualitative differences. To maintain consistency with the convergence methods used for the fertility rates in this paper (which could not be adapted to the Cuxson et al. (2008) methodology due to the presence of zero fertility amongst certain age groups), we therefore used the linear convergence for the survival rates.

Table 3. Summary of assumptions for Series C projection to 2016

Component	Assumptions
Fertility and projected births ($births_{t,t+1}$)	Indigenous births to Indigenous and non-Indigenous women are derived as per Series A. Non-Indigenous births to non-Indigenous women are derived by applying 2006 State & Territory total ASFRs to non-Indigenous women of child-bearing age in Indigenous Regions and SLAs as appropriate.
Mortality and projected deaths ($deaths_{t,t+1}$)	Indigenous survival rates are derived as per Series A. Non-Indigenous survival is based on 2006 rates for the total population and held constant. These State and Territory survival rates are applied to Indigenous Regions and SLAs as appropriate.
Net overseas migration ($immigration_{t,t+1} - emigration_{t,t+1}$)	Net overseas migration for the Indigenous population is assumed to be zero. For the non-Indigenous population, State & Territory specific projections from ABS (2008c) are used and allocated to each Indigenous Region or SLA according to 2006 Census counts of recent migrants.
Net internal migration ($immigration_{t,t+1} - outmigration_{t,t+1}$)	Net inter-regional migration rates are derived from the 2006 Census for Indigenous and non-Indigenous populations and held constant to 2016.
Error of closure ($\varepsilon_{t+\Delta}$)	No allowance is made for population change via shifts in Indigenous identification. This is a conservative assumption and similar to that adopted by the ABS low series Indigenous projections.

We apply a cohort component method to develop three projection series based on varying sets of assumptions regarding the components of Indigenous and non-Indigenous population change as outlined in Tables 1–3. The Series A projection to 2031 assumes zero net inter-regional migration and focuses on the impact of existing fertility and mortality rates and their interaction with age structure (Table 1). The Series B projection (Table 2) also assumes zero net inter-regional migration but varies Indigenous fertility and survival rates to points of convergence with current non-Indigenous rates by 2031. The Series C projection replicates Series A through to 2016 and considers the effect of adding net inter-regional migration based on census rates observed over the 2001–06 intercensal period and holding these constant to 2016.

BASE POPULATIONS

Indigenous and non-Indigenous ERPs produced by the ABS following the 2006 Census provide the base populations for the projections. At the national and Indigenous Region level (Table 4) these are straightforward enough—they are available for Indigenous and non-Indigenous males and females and by five-year age group, although some concerns over accuracy have been expressed (Wilson & Barnes 2007). Establishing estimates for the Remoteness Classification is more problematic because the classification is based on census Collection Districts (CDs) for which estimated age data and census migration data are not available. Consequently, it is necessary to establish an appropriate level at which these data can be introduced into the analysis and the level selected here for this purpose is the SLA. We allocate SLAs to a remoteness category on a population-weighted basis using 2006 usual resident counts of census CDs within each SLA. The base population by remoteness category then becomes the summation of ERPs for these constituent SLAs,[2] and this produces the particular remoteness geography outlined in Fig. 1 and in the associated population estimates in Table 4.

CD: Collection District

Table 4. ERP by Indigenous Region or Remoteness Classification[a]—Indigenous and non-Indigenous males and females, 2006

	Indigenous ERP		Non-Indigenous ERP		Indigenous share (%)	
Region/remoteness	Males	Female	Male	Female	Male	Female
Queanbeyan	4,868	4,669	159,098	159,676	2.97	2.84
Bourke	4,229	4,213	18,951	17,632	18.24	19.29
Coffs Harbour	21,879	21,942	677,023	698,476	3.13	3.05
Sydney	23,193	23,693	2,080,998	2,127,708	1.10	1.10
Tamworth	8,060	8,172	96,919	96,582	7.68	7.80
Wagga Wagga	9,085	8,723	226,318	223,729	3.86	3.75
Dubbo	5,025	5,147	40,064	40,401	11.14	11.30
Melbourne	7,979	7,951	1,841,126	1,886,579	0.43	0.42
Non-Met. Victoria	8,602	8,985	677,361	687,957	1.25	1.29
Brisbane	23,009	23,270	1,315,314	1,344,112	1.72	1.70
Cairns	10,667	10,964	97,864	94,760	9.83	10.37
Mt Isa	4,097	4,265	12,469	10,254	24.73	29.38
Cape York	3,807	3,919	3,313	2,574	53.47	60.36
Rockhampton	8,729	8,532	208,492	201,766	4.02	4.06
Roma	6,791	7,062	155,343	155,966	4.19	4.33
Torres Strait	3,928	3,934	774	627	83.54	86.25
Townsville	10,922	10,989	175,772	166,623	5.85	6.19
Adelaide	9,202	9,482	703,933	727,059	1.29	1.29
Ceduna	1,082	1,166	16,983	15,729	5.99	6.90
Port Augusta	3,506	3,617	39,347	36,782	8.18	8.95
Perth	12,657	12,656	745,726	747,709	1.67	1.66
Broome	2,435	2,315	5,021	4,404	32.66	34.45
Kununurra	2,566	2,641	2,721	2,145	48.53	55.18
Narrogin	5,102	4,921	172,636	165,260	2.87	2.89
South Hedland	3,946	3,518	21,933	16,906	15.25	17.22
Derby	2,566	2,618	1,423	1,073	64.33	70.93
Kalgoorlie	3,159	3,072	26,850	22,990	10.53	11.79
Geraldton	3,344	3,450	26,960	24,658	11.03	12.27
Tasmania	9,204	9,211	232,352	239,184	3.81	3.71
Alice Springs	2,615	3,022	10,602	10,648	19.79	22.11
Jabiru	5,304	5,356	1,701	1,181	75.72	81.93
Katherine	4,903	5,033	4,583	4,119	51.69	54.99
Apatula	5,205	5,328	1,362	1,191	79.26	81.73
Nhulunbuy	4,849	5,063	3,299	2,555	59.51	66.46
Tennant Creek	2,008	1,994	1,163	988	63.32	66.87
Darwin	6,630	6,695	55,091	48,139	10.74	12.21
Australian Capital Territory (ACT)	2,147	2,135	163,156	166,681	1.30	1.26
Major cities	80,599	83,620	6,840,915	7,147,157	1.16	1.16
Inner regional	54,158	54,835	1,910,765	1,974,884	2.76	2.70
Outer regional	54,959	57,267	901,441	887,360	5.75	6.06
Remote	24,145	25,226	120,241	109,649	16.72	18.70
Very remote	35,846	36,819	40,192	32,933	47.14	52.79
Australia (total)[b]	**257,309**	**259,734**	**10,025,124**	**10,155,713**	**2.50**	**2.49**

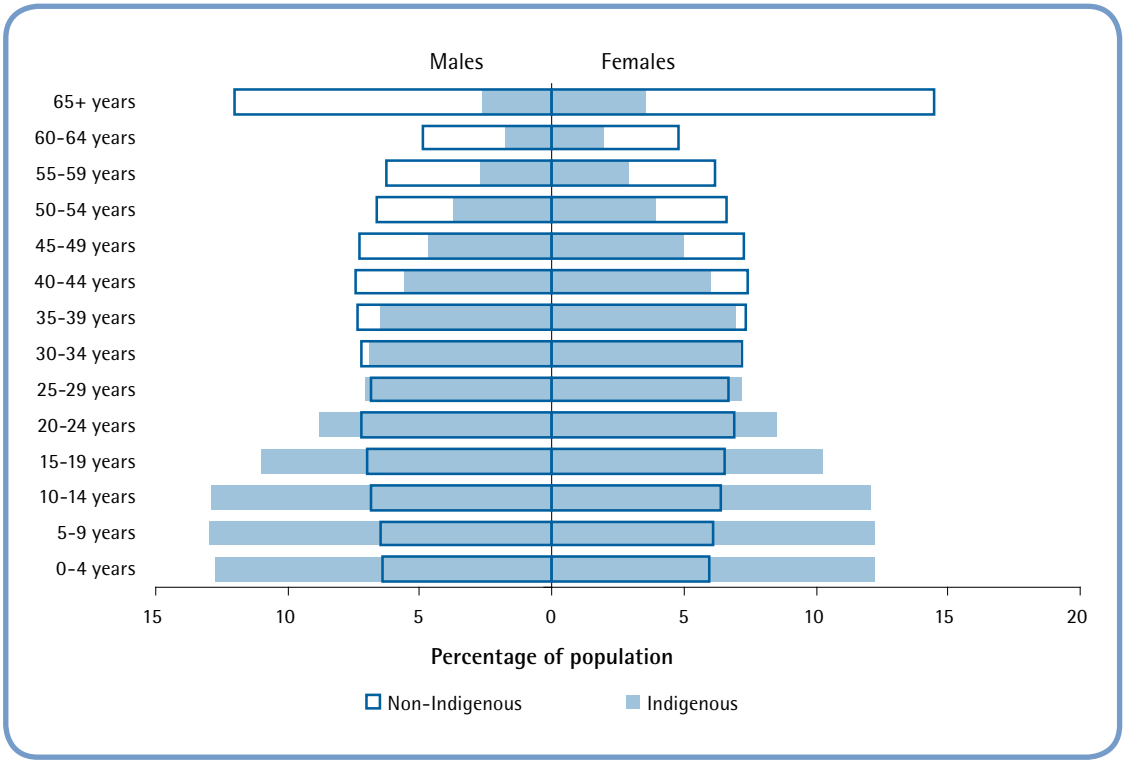
Note: a. These remoteness figures are slightly different to those presented in ABS (2008a) as they are constructed using SLAs rather than census CDs.

b. Australia (total) projections were calculated using national fertility/survival rates and do not necessarily equal a summation of the individual regions.

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

ACT:
Australian Capital Territory

Fig. 2. Age distribution of Indigenous and non-Indigenous Australians, 2006



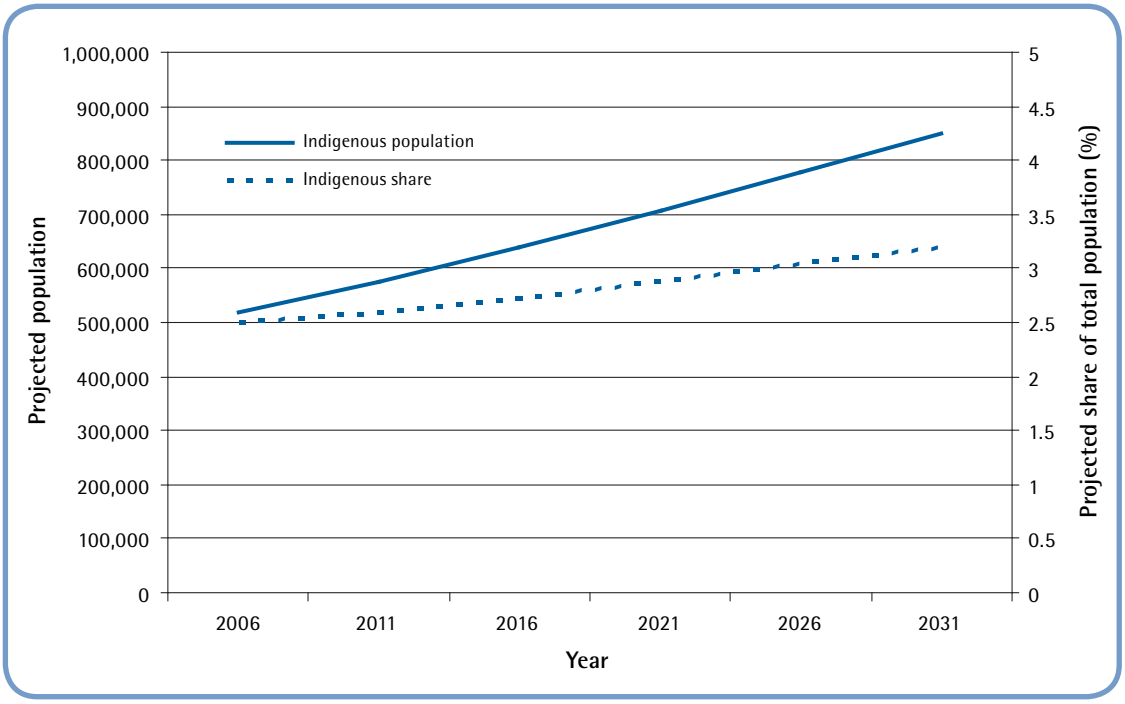
Source: ABS 2008b.

Before proceeding to the projection results it is worth recalling that age structure has an important bearing on projected growth, and that social policy is typically directed at particular age groups. Fig. 2 shows the clear contrast that exists in age structure between Indigenous and non-Indigenous populations, a contrast that is more or less replicated across all of the regions in Table 4. The main point of interest is the much younger age profile of the Indigenous population. This younger profile highlights the potential for substantially higher population momentum, with 48.2 per cent of the population under the age of 20 years, compared to 25.8 per cent of non-Indigenous Australians.[3]

PROJECTION SERIES A (2006–31)

Between 2006 and 2031 the Indigenous population is projected to grow from just over 517,000 to almost 848,000 (Fig. 3). This growth is reasonably steady over the period and it represents an annualised rate of 2.00 per cent. By way of comparison, between 2001 and 2006, the Indigenous population was estimated to have grown from 458,500 at an implied annual growth rate of 2.43 per cent (ABS 2008a). Clearly, the model projects a decline in the rate of growth. Over the same period to 2031, the non-Indigenous population is projected to increase from around 20,179,000 to around 25,621,000. This represents a lower growth rate compared to the Indigenous population, resulting in an increase in the Indigenous share of total population from 2.5 per cent to 3.2 per cent (Fig. 3). An interesting point to note from Fig. 3 is that a continuation of the growth trend shown would result in one million Indigenous Australians by 2040.

Fig. 3. Projected Indigenous population and Indigenous share of total population, 2006–31



Source: Authors' calculations using the ABS Census of Population and Housing 2006.

Table 5. Indigenous population and Indigenous share of the total population by age group, 2006 and 2031

Year	Aged 0–4	Aged 5–14	Aged 15–24	Aged 25–54	Aged 55 +
Indigenous population					
2006 (estimate)	64,424	129,819	99,719	183,036	40,025
2031 (projection)	95,552	175,196	144,876	314,759	117,532
2006 to 2031 annual change	1.59	1.21	1.51	2.19	4.40
Indigenous share of the total population					
2006 (estimate)	4.92	2.31	1.77	2.08	0.81
2031 (projection)	6.60	2.87	2.37	3.18	1.31

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

As mentioned, an important consideration for policy development is the shift over time in the size and composition of population by age group. While the selection of relevant age groups is dictated somewhat by the availability of ERP data at five-year intervals only, it is possible to approximate those that are of most interest for social policy. Thus, the infant years leading up to compulsory schooling are identifiable as 0–4 years, but for the years of compulsory schooling we are forced to use 5–14 years. Thereafter, we can identify the transition years from school or post-school study to work as ages 15–24 years, while the prime working age group is identified here as ages 25–54. In Australian labour force statistics the population in scope for economic activity is typically all adults aged 15 years and above in line with international standards that impose a lower, but not an upper, age limit. However, given the evidence for premature ageing in the Indigenous population in the context of high levels of adult mortality and morbidity (Divarakan-Brown 1985; Earle & Earle 1999), a separate 'aged' category is identified here that includes all those over the age of 55 years. Table 5 shows the Indigenous population estimate for 2006, population projections to 2031, and implied annualised growth rates to 2031 for each of these age groups.

All five age groups are projected to have reasonably high annualised growth rates for the Indigenous population between 2006 and 2031. However, the fastest rate of growth is projected to occur amongst those aged 55 years and over, albeit from a low base. The number of Indigenous Australians in this age group is projected to almost treble from 40,025 in 2006 to 117,532 in 2031.

To provide an indication of Indigenous growth in these age groups relative to the total population, Table 5 also includes the Indigenous share of population in each age group in 2006 as well as the projected share in 2031. In all five age groups, the Indigenous share of total population is set to rise. Among those of infant age, the Indigenous share of population will increase by over one-third to reach 6.6 per cent of the total. While broadly similar levels of increase are projected for the school-age and young adult groups, the highest relative growth is evident among those of prime working age and those of retirement age with a more than 50 per cent increase in the Indigenous share of the population for these two groups.

REGIONAL PROJECTIONS

Table 6 shows population estimates and projections for Indigenous Australians in 2006, 2016 and 2031 for each Indigenous Region and the five-category Remoteness Classification. These are presented alongside corresponding annualised growth rates shown in percentage terms between 2006 and 2016 as well as between 2006 and 2031.[4]

On the basis of natural increase alone, the fastest rate of growth is projected in Brisbane. With an annual growth rate of 2.60 per cent, the Indigenous population there will almost double in size from 46,279 in 2006 to reach 87,981 by 2031. At this level, Brisbane would have a population that is 8 per cent higher than the second most populous region (Sydney), and it would contain over 10 per cent of the total Indigenous population. Along with other high-growth regions in Queensland such as Rockhampton, Roma and Townsville, this also means that growth generally in Queensland would be relatively high.

Other metropolitan regions also indicate high growth rates over the period, reflecting an augmentation of Indigenous population numbers due to higher rates of intermarriage in such areas (Heard, Birrell & Khoo 2009). The region with the lowest projected growth rate is Bourke at 1.54 per cent per annum and overall, the lowest relative Indigenous growth rates are projected for regions in remote and very remote Australia. This reflects a combination of relatively lower survival rates and a relative lack of contribution to Indigenous population increase from births to non-Indigenous mothers.

Further insight is added by considering projected growth rates for each of the age groups presented earlier. We can see from Table 7 that the national level finding of highest growth among those 55 years and over is consistent across all regions, although six regions (Brisbane, Ceduna, Perth, Jabiru, Nhulunbuy and the ACT) stand out as having particularly high rates above 5 per cent per annum. At the other end

Table 6. Population estimates and projections for Indigenous Australians by Indigenous Region or Remoteness Classification[a]—2006, 2016, 2031 and annualised percentage change

	Estimates	Projections		Annualised projected change	
Region/remoteness	2006	2016	2031	2006–16	2006–31
Queanbeyan	9,537	11,320	14,671	1.73	1.74
Bourke	8,442	9,852	12,366	1.56	1.54
Coffs Harbour	43,821	52,694	68,945	1.86	1.83
Sydney	46,886	59,966	81,532	2.49	2.24
Tamworth	16,232	19,218	24,815	1.70	1.71
Wagga Wagga	17,808	21,345	27,901	1.83	1.81
Dubbo	10,172	12,061	15,650	1.72	1.74
Melbourne	15,930	20,449	27,929	2.53	2.27
Non-Met. Victoria	17,587	21,379	28,689	1.97	1.98
Brisbane	46,279	61,347	87,981	2.86	2.60
Cairns	21,631	26,493	35,302	2.05	1.98
Mt Isa	8,362	10,122	13,384	1.93	1.90
Cape York	7,726	9,311	11,924	1.88	1.75
Rockhampton	17,261	21,452	29,591	2.20	2.18
Roma	13,853	17,298	24,119	2.25	2.24
Torres Strait	7,862	9,405	12,280	1.81	1.80
Townsville	21,911	27,442	37,196	2.28	2.14
Adelaide	18,684	23,617	32,130	2.37	2.19
Ceduna	2,248	2,755	3,561	2.06	1.86
Port Augusta	7,123	8,560	10,856	1.85	1.70
Perth	25,313	32,999	46,171	2.69	2.43
Broome	4,750	5,756	7,348	1.94	1.76
Kununurra	5,207	6,344	8,288	1.99	1.88
Narrogin	10,023	12,396	17,023	2.15	2.14
South Hedland	7,464	8,947	11,298	1.83	1.67
Derby	5,184	6,297	8,192	1.96	1.85
Kalgoorlie	6,231	7,644	9,928	2.06	1.88
Geraldton	6,794	8,226	10,875	1.93	1.90
Tasmania	18,415	22,115	28,157	1.85	1.71
Alice Springs	5,637	6,813	8,630	1.91	1.72
Jabiru	10,660	12,884	16,358	1.91	1.73
Katherine	9,936	11,917	15,200	1.83	1.71
Apatula	10,533	12,589	15,565	1.80	1.57
Nhulunbuy	9,912	11,938	14,817	1.88	1.62
Tennant Creek	4,002	4,762	5,890	1.75	1.56
Darwin	13,325	16,419	21,659	2.11	1.96
ACT	4,282	5,498	7,420	2.53	2.22
Major cities	164,220	210,915	291,100	2.53	2.32
Inner regional	108,993	132,814	177,903	2.00	1.98
Outer regional	112,226	135,782	179,100	1.92	1.89
Remote	49,370	58,793	75,907	1.76	1.74
Very remote	72,665	85,917	108,907	1.69	1.63
Australia (total)[b]	**517,023**	**638,072**	**847,915**	**2.13**	**2.00**

Note: a. These remoteness figures are slightly different to those presented in ABS (2008a) as they are constructed using SLAs rather than census CDs.

b. Australia (total) projections were calculated using national fertility/survival rates and do not necessarily equal a summation of the individual regions.

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

Table 7. Annualised growth in the Indigenous population by age groups and Indigenous Region or Remoteness Classification, 2006–31

Region/remoteness	Aged 0-4	Aged 5-14	Aged 15-24	Aged 25-54	Aged 55+
Queanbeyan	0.89	0.53	1.12	2.34	3.88
Bourke	0.47	0.43	0.73	1.96	4.09
Coffs Harbour	1.06	0.66	0.93	2.50	4.32
Sydney	2.17	1.70	1.97	2.07	4.42
Tamworth	0.64	0.40	0.82	2.55	4.03
Wagga Wagga	0.95	0.58	0.85	2.61	4.20
Dubbo	0.62	0.26	0.76	2.86	3.92
Melbourne	2.40	1.96	2.03	1.86	4.54
Non-Met. Victoria	1.40	0.92	1.24	2.73	3.63
Brisbane	2.60	2.08	2.32	2.49	5.21
Cairns	1.54	1.13	1.61	2.06	4.58
Mt Isa	0.94	1.14	1.64	2.04	4.44
Cape York	1.07	1.35	1.45	1.41	4.52
Rockhampton	1.86	1.19	1.75	2.56	4.48
Roma	1.53	1.25	1.90	2.81	4.46
Torres Strait	0.75	1.02	1.29	2.32	3.50
Townsville	1.78	1.26	1.59	2.37	4.91
Adelaide	2.15	1.56	1.75	2.36	4.15
Ceduna	1.82	0.98	1.34	1.80	5.21
Port Augusta	1.42	1.23	1.20	1.58	3.95
Perth	2.63	2.07	2.14	2.10	5.23
Broome	1.85	1.26	1.23	1.52	4.52
Kununurra	1.61	1.21	1.34	2.14	3.62
Narrogin	1.94	1.16	2.04	2.40	4.26
South Hedland	1.84	1.08	1.29	1.34	4.25
Derby	1.53	1.34	1.34	2.04	3.36
Kalgoorlie	1.67	1.28	1.54	1.85	4.02
Geraldton	1.98	1.06	1.87	1.94	3.52
Tasmania	0.87	0.59	0.59	2.42	4.18
Alice Springs	1.31	1.48	1.73	1.39	3.57
Jabiru	0.90	0.98	1.04	1.95	5.10
Katherine	0.89	1.08	0.98	2.05	4.27
Apatula	1.21	1.13	0.81	1.61	4.02
Nhulunbuy	1.28	1.05	1.04	1.40	5.21
Tennant Creek	1.17	0.91	0.84	1.59	4.35
Darwin	1.98	1.28	2.00	1.68	4.49
ACT	1.99	1.46	1.62	2.08	6.52
Major cities	2.30	1.77	2.05	2.18	4.58
Inner regional	1.42	0.89	1.28	2.61	4.13
Outer regional	1.48	0.90	1.49	2.19	4.00
Remote	1.35	0.94	1.34	1.87	4.01
Very remote	1.29	0.94	1.14	1.74	4.04
Australia (total)[a]	**1.59**	**1.21**	**1.51**	**2.19**	**4.40**

Note: a. Australia (total) projections were calculated using national fertility/survival rates and do not necessarily equal a summation of the individual regions.

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

of the age spectrum, the five largest metropolitan regions have growth rates for the infant age group that are relatively high (above 2% per annum) and major city regions generally display high growth for this group.

As for school and young adult ages, growth here also tends to peak in city regions, especially in Brisbane and Perth. By contrast, growth in the working-age population is most prominent (above 2.5% per annum) in inner regional areas such as Coffs Harbour, Tamworth, Wagga Wagga, Dubbo, non-metropolitan Victoria, Rockhampton and Roma. For more detailed consideration, actual population figures related to these growth rates are provided in a spreadsheet available on the CAEPR website at <**http://www.anu.edu.au/caepr/Publications/WP/2009WP56.php**>.

PROJECTION SERIES B (2006–31)

Current Indigenous affairs policy is constructed around a discourse of Closing the Gap and it involves the adoption by COAG of a number of explicit targets for reducing disparities between Indigenous and non-Indigenous Australians.[5] While much of this agenda has the potential to impact on demographic outcomes, the centrepiece is a commitment to eliminate the gap between the life expectancy of the two populations within a generation (by roughly 2031).

While there has been debate surrounding the ability of governments to achieve these aims and the steps that would be required to do so (Altman 2009; Hoy 2009), there has been less discussion regarding the implications for the size and composition of the Indigenous population if they were to be achieved. Obviously, a reduction in the life expectancy gap would, by definition, lead to fewer Indigenous deaths over a given period. On the other hand, improvements in education and employment would likely serve to reduce the fertility rate of Indigenous women in line with connections observed between female labour force participation, income and urban/rural residence (Gray 1990). Thus, there are likely to be competing implications for Indigenous population growth if COAG targets are met.

In order to test these implications, the Series B projections incorporate linear convergence of Indigenous survival and fertility rates to the (current) non-Indigenous rates by 2031. Interestingly, this appears to have little impact on overall projected growth compared to the Series A projections. Between 2006 and 2031, the rate of Indigenous population growth from the Series B projection is 1.91 per cent per annum, which is only slightly lower than the 2.00 per cent per annum derived from Series A. Accordingly, the eventual projected population in 2031 of around 829,000 is only slightly less than the Series A projected population of around 848,000, meaning that reductions in deaths are counterbalanced by reductions in births.

The impact of COAG target-setting is therefore more likely to be felt in terms of the age composition of the Indigenous population, as demonstrated by Table 8. The first two rows in this table show projected annualised growth rates for selected age groups using the constant survival and fertility rates from Series A and then the converged rates from Series B. The final three rows show the change in projected Indigenous share of total population in each age group for Series A and B projections.

It is clear that the biggest difference between the two series is the relatively slow rate of growth amongst infants and school-age population in Series B, with correspondingly higher rates of growth among those of prime working age and at the older ages of 55 years and over. This is further highlighted by Fig. 4, which shows the percentage of the Indigenous male and Indigenous female population by five-year age group in 2006 alongside the population in 2031 for the Series B projection.

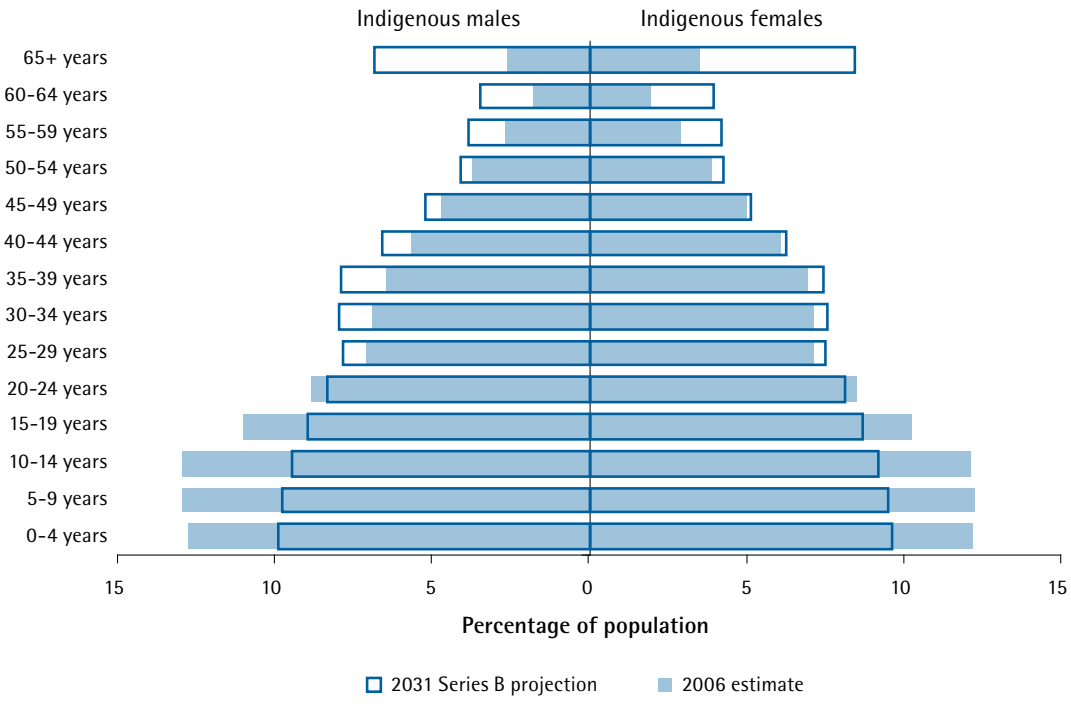
The simple message is that Closing the Gap must take into account a slowing down of the recent expansion in younger age groups and a corresponding ageing of the Indigenous population.

Table 8. Projected annualised Indigenous growth rates and Indigenous share by age group and series—Australia, 2006–31

Year	Aged 0–4	Aged 5–14	Aged 15–24	Aged 25–54	Aged 55+
Projected annualised growth rates (2006–31)					
Series A (Constant survival/fertility)	1.59	1.21	1.51	2.19	4.40
Series B (Closing the Gap)	0.91	0.76	1.41	2.29	4.74
Projected Indigenous share					
Base population—2006	4.92	2.31	1.77	2.08	0.81
Series A—2031 (Constant survival/fertility)	6.60	2.87	2.37	3.18	1.31
Series B—2031 (Closing the Gap)	5.63	2.58	2.32	3.25	1.41

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

Fig. 4. Age distribution of the Indigenous population—Series B projections, 2006 and 2031



Source: Authors' calculations using the ABS Census of Population and Housing 2006.

PROJECTION SERIES C (2006–16)

In the Series A and B projections inter-regional migration was assumed to be zero. However, internal migration is a persistent and key component of Indigenous population redistribution at the regional level (Taylor & Bell 1996; Taylor & Biddle 2008). In order to reflect this, the Series C projection introduces observed age-specific Indigenous and non-Indigenous net migration rates for each region using 5-year data from the 2006 Census. These are applied to both the 2006–11 and 2011–16 periods. This provides a more realistic basis for computing changes in the Indigenous share of regional populations.

For remoteness categories, a separate net migration rate is calculated for each five-year age group based on data from the 2001 and 2006 Censuses. This is not possible for each Indigenous Region, as it is computationally intensive and very quickly produces sample size constraints. For this reason, rates of migration are calculated for four age groups only at this level of geography (0–14; 15–29; 30–54; and 55 plus). These age groups are chosen to reflect life cycle patterns of migration outlined in Biddle and Hunter (2006).

Table 9 shows the effect on implied annual population growth rates of applying these migration rates to the base case deployed in the Series A projections. Estimates are to 2016 only, given the difficulty of extending historic migration rates in the absence of an adequate model of Indigenous migration. Three regions stand out as a consequence of their projected decline in Indigenous population—Bourke, the Torres Strait and Tennant Creek. Along with Derby, these regions also display the greatest decline in non-Indigenous population. By implication, the majority of regions show positive growth in Indigenous population with seven of these projected to experience relatively high growth at over 3 per cent per annum—Melbourne, Brisbane, Townsville, Perth, Alice Springs, Darwin and the ACT (Adelaide is not far behind).

This impact of migration on select major city growth (Sydney experiences reduced growth due to migration) is consistent with previous findings on Indigenous spatial redistribution (Taylor & Bell 1996, 1999). It is also reflected in the differential growth rates indicated by remoteness category, with remote and very remote areas experiencing much lower Indigenous growth under the Series C projections, while non-Indigenous growth in these areas turns negative. Indeed, this latter non-Indigenous negative growth emerges across a number of regions. It noticeably raises Indigenous population shares in a number of regions, mostly in remote areas, such as Derby, Alice Springs, Cape York, Katherine, Tennant Creek, and Bourke. The most prominent example is the Alice Springs region, where Indigenous population growth based on historic migration rates is projected to be close to double that in the 'no-migration' series, and because non-Indigenous net migration is negative, the Indigenous share of regional population is projected to rise from 21.0 to 28.5 per cent by 2016. Katherine provides another example of increased population share, but in a situation where Indigenous growth is reduced by migration.

Because of the quite different migration rates of the Indigenous and non-Indigenous population by age, changes in the Indigenous share of population are not consistent across different age groups. This is highlighted in Table 10 through the estimated share of the population who identified as being Indigenous in 2006, as well as the projected Indigenous share of the population in 2016 for five social policy age groups after taking into account births, deaths and internal migration.

Table 9. Projected annualised growth rates for Indigenous and non-Indigenous Australians and projected Indigenous share by Indigenous Region and Remoteness Classification using historic migration, 2006–16

	Annualised population growth rates (2006–16)				Indigenous share of population (%)		
	Indigenous		Non-Indigenous				
Region/remoteness	Migration	No migration	Migration	No migration	2006	2011	2016
Queanbeyan	1.45	1.73	0.62	0.06	2.9	3.0	3.1
Bourke	-0.33	1.56	-2.00	0.09	18.7	20.0	21.5
Coffs Harbour	2.32	1.86	0.60	0.22	3.1	3.3	3.6
Sydney	1.69	2.49	1.05	1.65	1.1	1.1	1.2
Tamworth	1.35	1.70	-0.19	0.27	7.7	8.3	8.9
Wagga Wagga	1.43	1.83	-0.03	0.32	3.8	4.1	4.4
Dubbo	1.18	1.72	-0.94	0.17	11.2	12.3	13.5
Melbourne	3.03	2.53	1.52	1.57	0.4	0.5	0.5
Non-Met. Victoria	2.27	1.97	0.41	0.32	1.3	1.4	1.5
Brisbane	3.82	2.86	2.37	1.47	1.7	1.8	2.0
Cairns	2.59	2.05	1.42	1.02	10.1	10.6	11.2
Mt Isa	0.24	1.93	-0.90	1.46	26.9	28.0	29.2
Cape York	1.65	1.88	0.36	0.85	56.8	58.2	59.9
Rockhampton	2.84	2.20	1.22	0.55	4.0	4.3	4.7
Roma	1.95	2.25	0.79	0.58	4.3	4.5	4.8
Torres Strait	-0.55	1.81	-4.17	0.96	84.9	86.9	89.0
Townsville	3.40	2.28	1.65	0.97	6.0	6.5	7.1
Adelaide	2.99	2.37	0.88	0.96	1.3	1.4	1.6
Ceduna	2.09	2.06	-0.30	0.20	6.4	7.2	8.0
Port Augusta	1.44	1.85	-0.65	0.34	8.6	9.4	10.3
Perth	3.71	2.69	1.99	1.88	1.7	1.8	2.0
Broome	0.30	1.94	0.58	1.46	33.5	33.0	32.9
Kununurra	0.43	1.99	0.05	1.48	51.7	52.1	52.6
Narrogin	1.83	2.15	0.96	0.62	2.9	3.0	3.1
South Hedland	1.98	1.83	0.61	2.05	16.1	17.0	18.0
Derby	1.22	1.96	-2.04	1.55	67.5	70.9	74.2
Kalgoorlie	1.75	2.06	0.21	1.77	11.1	11.9	12.7
Geraldton	1.49	1.93	-0.27	0.65	11.6	12.5	13.6
Tasmania	1.73	1.85	0.65	0.52	3.8	3.9	4.2
Alice Springs	3.60	1.91	-0.52	1.68	21.0	24.5	28.5
Jabiru	1.47	1.91	-0.25	1.05	78.7	80.0	81.4
Katherine	1.53	1.83	-1.56	0.92	53.3	57.1	60.9
Apatula	0.91	1.80	0.03	1.86	80.5	81.0	81.8
Nhulunbuy	1.69	1.88	0.60	1.31	62.9	64.0	65.3
Tennant Creek	-0.10	1.75	-2.66	0.95	65.0	67.9	70.7
Darwin	3.26	2.11	0.66	1.18	11.4	12.7	14.3
ACT	3.20	2.53	1.19	1.05	1.3	1.4	1.6
Major cities	2.97	2.53	1.46	1.51	1.2	1.2	1.3
Inner regional	2.14	2.00	0.72	0.36	2.7	2.9	3.1
Outer regional	2.05	1.92	0.36	0.50	5.9	6.4	6.9
Remote	0.92	1.76	-0.65	0.94	17.7	18.7	20.1
Very remote	0.85	1.69	-0.76	1.03	49.8	51.6	53.9

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

Table 10. Projected Indigenous share of population by age group and Indigenous Region or Remoteness Classification using historic migration, 2006–16

	Aged 0–4		Aged 5–14		Aged 15–24		Aged 25–54		Aged 55+	
Region/remoteness	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016
Queanbeyan	6.4	7.6	3.0	2.5	2.0	2.8	2.6	3.2	0.9	1.2
Bourke	33.1	37.0	17.3	16.8	12.6	17.5	17.0	22.8	6.6	8.8
Coffs Harbour	6.5	8.0	3.1	2.9	2.3	3.3	2.7	3.6	0.9	1.2
Sydney	2.0	2.5	1.0	1.0	0.8	0.9	0.9	1.0	0.4	0.5
Tamworth	15.1	17.0	7.4	6.7	5.1	7.5	6.7	8.8	2.5	3.4
Wagga Wagga	7.3	9.0	3.6	3.3	2.6	3.7	3.3	4.3	1.2	1.6
Dubbo	20.7	25.4	11.2	9.8	7.4	11.5	9.3	13.4	3.6	5.3
Melbourne	0.8	1.1	0.4	0.4	0.3	0.4	0.4	0.4	0.2	0.2
Non-Met. Victoria	2.7	3.6	1.3	1.2	0.9	1.3	1.0	1.5	0.4	0.5
Brisbane	3.5	4.6	1.6	1.7	1.3	1.5	1.4	1.7	0.5	0.6
Cairns	18.2	21.3	9.4	8.8	6.7	8.9	8.3	10.2	3.6	4.3
Mt Isa	40.4	37.2	20.5	22.2	14.4	19.7	22.0	24.2	15.3	19.0
Cape York	69.9	77.4	38.3	40.2	31.9	33.7	50.0	56.4	37.7	38.3
Rockhampton	7.8	10.7	4.1	3.7	2.7	4.0	3.4	4.3	1.2	1.5
Roma	8.8	11.0	4.3	3.9	2.7	4.0	3.5	4.2	1.2	1.6
Torres Strait	92.4	91.2	53.1	51.0	39.6	44.6	76.8	85.2	76.1	81.4
Townsville	11.1	13.6	5.4	5.5	4.0	5.6	4.9	6.2	2.0	2.6
Adelaide	2.8	3.8	1.3	1.4	1.0	1.4	1.1	1.4	0.4	0.5
Ceduna	10.6	18.3	6.1	6.3	4.8	6.5	6.0	8.1	1.6	2.7
Port Augusta	14.8	21.8	7.0	7.8	6.2	7.1	8.0	11.2	3.0	3.9
Perth	3.4	4.4	1.5	1.8	1.2	1.5	1.4	1.7	0.4	0.6
Broome	42.1	43.3	25.6	24.1	22.7	21.9	26.5	28.2	20.8	21.4
Kununurra	67.0	63.6	37.2	37.6	30.6	34.5	40.6	44.4	36.7	35.3
Narrogin	5.9	8.5	3.1	2.6	1.9	2.8	2.4	2.9	0.8	0.9
South Hedland	18.8	25.8	12.3	12.4	10.3	12.1	12.3	14.9	14.3	13.2
Derby	79.7	82.2	44.1	46.4	37.8	41.5	56.9	69.6	52.2	54.3
Kalgoorlie	16.2	21.5	8.7	9.6	7.1	8.8	8.9	10.9	6.0	6.2
Geraldton	18.4	28.0	11.0	10.1	7.0	11.0	10.0	12.5	4.7	5.2
Tasmania	7.2	7.6	3.5	3.3	2.9	3.5	3.2	4.1	1.2	1.6
Alice Springs	36.0	40.1	15.1	21.7	12.9	17.8	16.6	25.0	13.9	16.0
Jabiru	88.8	87.0	47.6	46.6	41.1	42.0	70.5	78.1	58.1	64.5
Katherine	69.3	71.2	34.8	39.1	30.2	34.8	45.1	56.9	33.0	36.5
Apatula	91.2	82.4	43.8	50.8	44.2	43.4	73.1	76.4	71.1	68.6
Nhulunbuy	69.8	79.9	38.2	39.3	35.7	34.9	54.9	60.1	50.5	49.7
Tennant Creek	79.5	76.3	39.7	44.9	36.7	40.7	59.7	66.7	39.1	50.1
Darwin	18.1	23.9	10.0	11.4	7.1	11.2	8.9	11.0	5.5	7.3
ACT	2.5	2.9	1.1	1.3	0.9	1.2	1.1	1.4	0.3	0.5
Major cities	2.3	3.0	1.1	1.1	0.8	1.1	1.0	1.1	0.4	0.5
Inner regional	5.6	6.9	2.8	2.7	1.9	2.8	2.3	2.9	0.8	1.1
Outer regional	11.0	14.1	5.8	5.8	3.9	5.9	5.0	6.4	2.0	2.6
Remote	26.6	33.0	15.3	15.7	11.4	15.0	14.6	18.5	7.9	9.3
Very remote	61.6	67.9	35.4	36.7	29.5	33.7	42.8	50.4	29.3	32.0

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

SUMMARY AND IMPLICATIONS

Policy development in Indigenous affairs often proceeds with dated population estimates and with little understanding of the likely impact of changing demographic parameters on future Indigenous population size and composition. To the extent that policy itself can influence demographic outcomes, this represents a significant deficiency in current planning methodology. To stimulate a dialogue around such issues, the present analysis models the national and regional population impacts of a continuation of existing mortality and fertility regimes compared to a situation where these converge. The effects of inter-regional migration are also considered.

If current rates of fertility and mortality were to continue over the 25-year period from 2006 to 2031, then the Indigenous population as a whole would increase from 517,023 to 847,915—a total increase of 64 per cent. This is necessarily a conservative estimate, since it does not allow for any future error of census closure. This is partly because this error is unpredictable, and partly because the longitudinal data required to estimate shifting census capture are not available. With a long-term annualised growth rate of 2.00 per cent per annum, the growth rate implied by this projection is lower than that observed in recent years as a consequence of population ageing. Interestingly, for historic reasons if nothing else, a continuation of this conservative growth rate would see the Indigenous population reach the one million mark by the year 2040.

By comparison, the non-Indigenous population is projected to grow at a lower rate of 0.96 per cent per annum, even despite allowance for a net international migration gain of 180,000 people per annum. This lower growth reflects sustained lower fertility and a much older age structure compared to the Indigenous population. Thus, even with a slowing in the Indigenous growth rate over the 25-year period, the Indigenous share of the Australian population is projected to increase from 2.5 per cent presently to 3.2 per cent in 2031.

Aside from the obvious impact of overall population size in setting the scale and scope of policy liabilities, the major implications to arise from the projections presented here come from shifts in age structure and population distribution. From a fiscal perspective, an interesting dynamic is established by the Closing the Gap scenario which assumes convergence in mortality and fertility. On the one hand, this has little effect on overall future population levels, which are still projected to rise to around 829,000. On the other hand, it affects the age composition of the population quite noticeably. This becomes much older in profile as a consequence of 'closing the gap', with enhanced rates of growth in the populations of prime working age and old age and reduced growth in the infant and school-age groups.

This enhancement of structural ageing in the Indigenous population raises a number of issues regarding the urgency that might be afforded to policy efforts on education, employment and retirement. As Jackson (2008: 225) has poignantly noted in regard to the first of these, the non-Indigenous population was educated before it became 'old' and the risk now is that the Indigenous population will become old before it becomes educated. This clearly has implications for future workforce participation and in this regard Jackson (2008: 231) has also noted the potential for relative improvement in Indigenous economic status presented by the 'demographic gift'—that period in demographic transition when the bulk of the population is found in the key workforce age groups with work, savings and investments potentially highest and dependency ratios lowest (Bloom & Williamson 1998). Finally, against a background of population ageing, it is not only the level, but also the nature of workforce participation that requires attention. While it has been argued that higher incidence of poverty and shorter life expectancy may mean that Indigenous workers have a greater need to access superannuation early to deal with particular financial situations (Pragnell 2002), the convergence model notionally deals with at least part of this case. In the meantime,

the key constraint on retirement savings remains the minimal savings impact of the superannuation guarantee due to low Indigenous occupational status and intermittent work (Pragnell 2002). Thus, in order to counter a projected increased burden on pensions, convergence of socioeconomic status is required to manage the effects of demographic convergence, although most population modelling would assume a clear positive association between these (Kirk 1996; Lutz, Goujon & Doblhammer-Reiter 1999), not least for the Indigenous Australian population (Caldwell 2002).

The other clear consequence of demographic convergence is an enhancement of the shift that has long been observed in overall Indigenous population distribution in favour of urban locations (Taylor 2003). In the projections this is enhanced by the convergence model, as the general reduction in Indigenous women's fertility serves to highlight a growing gap between cities and remote areas in terms of the contribution to growth in the former from Indigenous births to non-Indigenous women. However, it is inter-regional migration that has the greatest potential impact on redistribution. If recent trends in inter-regional migration continue, growth rates in major cities to 2016 are projected to be almost 17 per cent higher compared to the 'no-migration' scenario. While higher growth than this is projected for Brisbane, Perth, and Adelaide, lower growth is forecast for Sydney in line with a continuation of net migration losses that have been observed there since the 1970s (Taylor & Bell 1996, 1999). Within this broad pattern, shifts in the Indigenous share of regional populations occur due to differential Indigenous and non-Indigenous migration rates. For the most part these produce higher relative Indigenous growth, with the most prominent example found in the Alice Springs region, where the Indigenous share of regional population is projected to rise substantially.

While migration plays a major role in regional Indigenous population change, and while the underlying ethos of the Closing the Gap agenda implicitly (and sometimes explicitly) seeks to stimulate rural-urban migration and movement generally up the settlement hierarchy (Taylor 2006), it remains difficult to model the spatial pattern of Indigenous migration. This is due to the lack of understanding of key socioeconomic determinants, and also because factors that might directly impact on movement in the form of government policies and associated social investments keep on changing (Taylor 2007, in press). To ensure greater confidence in projections there is also a need to better understand the socioeconomic and cultural precedents of demographic transition, the complex processes that shape identity in statistical collections, and the demographic consequences of intermarriage.

The scenarios presented here are heuristic only. They simply reflect the logic of sustaining into the future recently observed demographic parameters, compared to following through on the idea of convergence in sociodemographic outcomes over timescales that reflect stated policy ambitions. As such, they are designed to sketch out the effects on the size and composition of Indigenous population of no change in current conditions compared to maximum change. Of these, it is clear from the analysis that the composition of the population is the most affected, with potentially significant consequences for policy.

NOTES

1. The ABS has proposed to undertake projections by Indigenous Region in their latest series (to 2021). These are planned for release in September 2009 (ABS 2009a).

2. ERPs for five-year age groups are not available at the SLA level. For this reason, the ERPs are allocated based on the age distribution of the 2006 usual resident counts.

3. The age structure for each Indigenous Region can be found in ABS (2008b) and is reproduced for this paper and made available as a .csv file at <**http://www.anu.edu.au/caepr/Publications/WP/2009WP56.php**>. This file also contains the estimated age structure of each of the five Remoteness Classifications.

4. Full details for all the projections in this paper are provided in a .csv file available as a link at <**http://www.anu.edu.au/caepr/Publications/WP/2009WP56.php**>. Males and females are grouped together in Table 6. However in the .csv file that accompanies this paper, projections are also provided by sex, as well as for the other five-year intervals (2016, 2021 and 2026).

5. The six targets are:

    1. close the life expectancy gap within a generation
    2. halve the gap in mortality rates for Indigenous children under five within a decade
    3. ensure access to early childhood education for all Indigenous four years olds in remote communities within five years
    4. halve the gap in reading, writing and numeracy achievements for children within a decade
    5. halve the gap for Indigenous students in year 12 attainment or equivalent attainment rates by 2020, and
    6. halve the gap in employment outcomes between Indigenous and non-Indigenous Australians within a decade (Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) 2009: 5).

FaHCSIA: Department of Families, Housing, Community Services and Indigenous Affairs

APPENDIX 1
DETAILED METHODOLOGY AND ASSUMPTIONS

In this section, detailed information on the assumptions used for each component of the demographic equation is given.

FERTILITY AND PROJECTED BIRTHS ($births_{t,t+1}$)

To estimate change in the Indigenous population three types of births need to be estimated. The first of these is births of Indigenous children to Indigenous mothers. These are calculated for each five-year age group from age 15–19 through to age 45–49 based on State-specific fertility estimates from 2005, 2006 and 2007 (ABS 2007a).

The second type of births are those of Indigenous children to non-Indigenous mothers. These births are estimated by taking an average of a fertility and paternity rate. The fertility rate is calculated by the same five-year age groups for non-Indigenous females by taking the births of Indigenous children to Indigenous mothers away from the total number of Indigenous births at the State level and dividing by the non-Indigenous female ERP. The paternity rate is calculated by using the same number of births but dividing by the Indigenous male ERP.

For completeness, births of non-Indigenous children to Indigenous mothers should also be calculated. However, research using 2001 Census data showed this to be negligible (Kinfu & Taylor 2005) and no calculation is made here.

Indigenous births (to Indigenous and non-Indigenous mothers), were allocated using a masculinity ratio of 50.4 to reflect the national census counts for those aged 0–4 years. Non-Indigenous births were allocated at a rate of 51.3 males to 48.7 females using the same methodology.

After applying the above fertility rates, a total of 49,233 births of Indigenous children to Indigenous mothers were projected between 2006 and 2011 as well as 19,500 births of Indigenous children to non-Indigenous mothers (a total of 68,733 Indigenous children). This is compared to 1,294,136 non-Indigenous children born over the same period. So, while Indigenous Australians made up only 2.50 per cent of the population in 2006, 5.04 per cent of births that were projected to occur over the next five-year period were estimated to be identified as Indigenous. While a significant proportion of these Indigenous births were to non-Indigenous mothers, the main reason for the much higher number of Indigenous births was the greater share of Indigenous females of childbearing age and their relatively higher rates of fertility at most age groups.

MORTALITY AND PROJECTED DEATHS ($deaths_{t,t+1}$)

Balancing to a certain extent the births that are projected to occur are those who die over the same period. The proportion of those in each five-year age group who die over a given period is calculated using State-specific life tables from ABS (2009b). These are applied to each Indigenous Region or SLAs in respective remoteness categories.

Based on these mortality rates, it was estimated that 6,250 Indigenous males who were alive in 2006 will die over the five years that follow. This is higher than the number of female deaths estimated to occur over the same period (5,002), reflecting the lower life expectancy of males relative to females. The corresponding number of deaths of non-Indigenous males was projected to be 407,281 and non-Indigenous females 385,013.

Interestingly, there were fewer Indigenous compared to non-Indigenous deaths (1.40%) over the period than would be expected based on the share of the population. What this means is that although age-specific mortality rates are relatively high for the Indigenous compared to non-Indigenous population, this difference was not large enough to counterbalance the relatively young Indigenous population.

NET OVERSEAS MIGRATION ($immigration_{t,t+1} - emigration_{t,t+1}$)

For the non-Indigenous population, one of the main sources of population growth is net international migration. That is, more people make permanent moves to Australia than those who leave. From 2011 the ABS projects international net migration to equal 180,000 per annum (ABS 2008c). This is the rate that is assumed to hold per year over the period for which projections are being made.

While there will be some Indigenous Australians who emigrate and some who return to Australia each year, the net effect on the population is likely to be negligible. Furthermore, there is no Indigenous identifier on passenger arrival or departure cards. For these reasons, all 180,000 additional people who (in net terms) enter Australia per year are assumed to be non-Indigenous.

The rate of inward and outward international migration is very different in different parts of Australia. Most international migrants move to the large capital cities (at least initially), with employment rates and other characteristics of the population influencing where people emigrate from. This is captured to a certain extent by the ABS estimating a separate level of net migration for each State and Territory. This is used as the basis for the calculations in this paper, with those projected to each State allocated to each Indigenous Region based on the proportion of the State's recent migrants (arrived between 2002 and 2006) in that Indigenous Region in 2006.

NET INTERNAL MIGRATION ($immigration_{t,t+1} - outmigration_{t,t+1}$)

The final term in the demographic equation is internal migration from one region or remoteness category to another. Historic rates of migration (that is from 2001–06) are used as an estimate of migration between 2006 and 2011. These are calculated for four age cohorts for each Indigenous Region and by 5-year age cohorts for the Remoteness Classification. These are given respectively in Tables A1 and A2 below.

Table A1. Five-yearly net migration rates assumed for separate age cohorts by Indigenous Region

	Indigenous				Non-Indigenous			
Region	0–14	15–29	30–54	55+	0–14	15–29	30–54	55+
Queanbeyan	-0.5	-4.7	-0.2	4.2	5.9	-10.1	7.8	6.0
Bourke	-10.8	-11.7	-6.6	-3.5	-16.9	-17.5	-8.6	-4.7
Coffs Harbour	4.0	0.1	3.4	1.5	4.3	-5.3	4.8	4.3
Sydney	-6.2	0.3	-7.1	-5.1	-4.9	0.3	-5.0	-4.4
Tamworth	-0.2	-6.1	0.4	1.4	0.2	-10.4	0.1	-0.3
Wagga Wagga	-1.6	-3.6	-1.3	1.0	-0.5	-8.5	0.2	1.3
Dubbo	-1.7	-8.3	1.9	1.4	-5.1	-16.3	-2.9	-0.7
Melbourne	-0.8	9.4	0.1	-3.2	-2.0	3.5	-1.7	-1.6
Non-Met. Victoria	2.3	-1.1	4.2	1.9	3.3	-8.3	3.5	2.9
Brisbane	2.8	9.2	3.5	0.9	5.2	7.6	4.8	2.2
Cairns	4.9	1.3	2.5	0.2	2.7	-0.4	3.1	2.8
Mt Isa	-11.9	-9.8	-3.5	-3.3	-24.9	5.2	-16.8	-15.8
Cape York	-1.3	-3.5	0.7	1.2	-14.3	-5.8	5.1	-6.5
Rockhampton	5.4	0.9	3.6	4.1	6.5	-4.0	6.5	5.3
Roma	0.9	-5.4	-1.5	4.0	4.5	-8.0	3.6	4.8
Torres Strait	-14.2	-14.8	-6.9	-2.7	-42.9	-4.0	-25.6	-30.2
Townsville	7.0	6.9	3.6	4.5	5.0	4.9	3.2	1.4
Adelaide	2.2	8.0	-0.8	-0.1	-0.1	-1.1	-0.3	-0.1
Ceduna	3.7	-6.0	3.6	-0.9	-3.1	-9.4	0.1	0.0
Port Augusta	-4.4	-3.5	1.3	2.2	-5.9	-11.7	-3.0	-2.0
Perth	5.3	9.1	2.0	1.3	0.8	2.4	-0.2	-1.2
Broome	-9.7	-10.6	-5.9	1.7	-17.1	13.1	-8.3	-4.0
Kununurra	-10.5	-8.3	-4.6	-5.2	-30.8	22.6	-12.8	-11.4
Narrogin	0.6	-5.0	-2.4	4.7	4.2	-10.2	5.2	7.0
South Hedland	-1.1	-0.9	4.5	1.6	-17.2	5.0	-6.9	-20.1
Derby	-7.6	-5.0	1.0	3.9	-40.4	3.5	-21.1	-18.2
Kalgoorlie	-2.9	0.7	-1.7	-7.7	-14.9	0.6	-11.1	-7.4
Geraldton	0.6	-4.5	-3.9	-1.1	-5.0	-12.2	-2.6	-1.2
Tasmania	1.7	-3.9	0.6	-0.4	1.6	-4.8	2.9	2.9
Alice Springs	10.2	9.6	8.5	6.6	-15.2	-6.3	-12.7	-13.6
Jabiru	-3.9	-1.6	-0.4	-4.9	-14.6	28.7	-17.3	-17.5
Katherine	-0.8	-2.3	-1.3	-3.9	-24.0	2.0	-18.8	-3.0
Apatula	-6.2	-2.6	-5.1	-5.2	-45.3	13.4	-17.6	-4.4
Nhulunbuy	-0.3	-1.2	-1.6	-0.6	-10.2	-1.9	4.3	-27.4
Tennant Creek	-11.8	-10.6	-6.4	-0.8	-37.1	-0.3	-23.5	-19.5
Darwin	9.6	2.6	5.5	6.3	-7.1	6.7	-5.2	-6.9
ACT	-0.5	11.1	0.7	-8.1	-2.2	8.1	-1.2	-4.8

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

Table A2. Five-yearly net migration rates assumed for separate age cohorts by Remoteness Classification

Age cohort	Major cities	Inner regional	Outer regional	Remote	Very remote
Indigenous					
0–4 years	-0.6	3.7	2.6	-4.9	-4.5
5–9 years	0.9	3.3	4.1	-6.6	-9.3
10–14 years	6.6	1.7	-1.8	-10.2	-7.6
15–19 years	10.0	-6.4	-4.4	-3.2	-3.6
20–24 years	3.6	-1.8	0.2	-1.6	-3.6
25–29 years	-0.4	1.7	3.4	-4.9	-2.1
30–34 years	-0.5	3.9	1.6	-3.9	-3.1
35–39 years	0.0	2.7	0.0	-2.4	-2.1
40–44 years	-1.3	1.7	2.4	-0.6	-2.4
45–49 years	-1.4	1.6	1.8	0.1	-1.8
50+ years	-1.8	2.4	2.7	-2.4	-2.0
Non-Indigenous					
0–4 years	-1.9	7.2	1.9	-11.5	-15.5
5–9 years	-0.7	4.6	-0.6	-18.5	-32.9
10–14 years	3.3	-3.1	-11.3	-29.0	-33.9
15–19 years	6.7	-17.3	-15.3	-2.1	10.7
20–24 years	-0.1	-2.4	3.9	9.0	12.5
25–29 years	-1.9	8.4	2.5	-7.5	-3.8
30–34 years	-2.0	8.7	2.4	-11.6	-11.0
35–39 years	-1.2	5.4	1.0	-9.5	-14.3
40–44 years	-0.7	3.0	0.5	-7.2	-4.9
45–49 years	-1.1	3.2	1.8	-4.0	-2.4
50+ years	-1.5	4.5	1.5	-6.2	-10.0

Source: Authors' calculations using the ABS Census of Population and Housing 2006.

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