

Senate Standing Committee on Finance and Public Administration
Inquiry into the implementation of the National Health Reform Agreement

SUBMISSION BY THE AUSTRALIAN BUREAU OF STATISTICS February 2013

The Australian Bureau of Statistics (ABS) is Australia's national statistical organisation. Our role is to assist and encourage informed decision making, research and discussion by leading Australia's national statistical system.

This ABS submission responds to a formal request from the Committee for any response the ABS may have in respect of the terms of reference (c), in relation to Australia's population estimates and any changes to the way they are determined. It provides a summary of the process by which Australia's official population estimates are compiled and the methodological change that was introduced as part of the 2011 Census of Population and Housing. It also includes information on the use of official population estimates in various agreements and the ABS position in relation to those uses.

The compilation of Australia's official population estimates

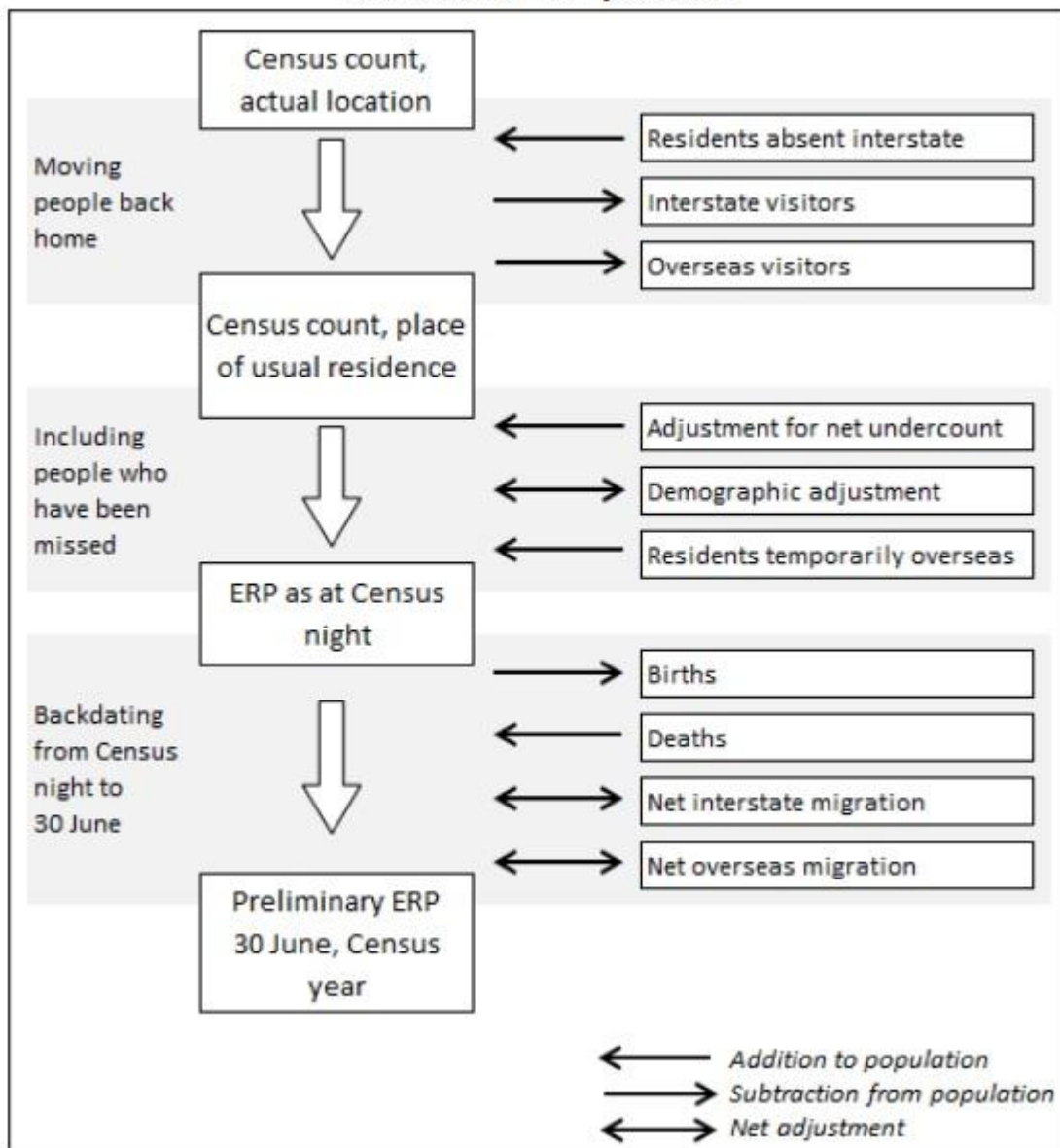
The ABS produces official population estimates for Australia and each of the states and territories on a quarterly basis. These estimates are known as estimated resident population, or ERP. They are published in *Australian Demographic Statistics* (ABS cat. no. 3101.0), together with a range of other important population information – most notably the population change components of births, deaths and migration.

ERP is calculated using the 'demographic balancing equation', which derives a population at the end of a period by starting with the population at the start of the period, adding births that occurred, subtracting deaths that occurred and factoring in the net migration outcome for the period.

Every five years the ABS uses information from the most recent Census, which is the best source of information about Australia's population, to 'rebase' (or 'recalibrate') ERP. To do this, the ABS uses data from the Census and makes an adjustment for net undercount or overcount (i.e. people missing from Census counts or counted multiple times) as determined by the Census Post Enumeration Survey – a short survey run in the period immediately following the Census. An adjustment is also made for Australians who were temporarily overseas on Census night. From this, the ABS produces the official estimate of the number of people who usually reside in Australia.

The following diagram provides a simple overview of this process.

Census to ERP process



The rebasing process concludes with the backdating of ERP from Census night (the most recent being 9 August 2011) to 30 June (in the case of the most recent Census, to 30 June 2011). This new estimate for 30 June is the new 'base', from which the ABS estimates the official population estimate until the next Census, using the population components of births, deaths and migration.

The difference between the original estimates and the rebased estimates is referred to as the 'intercensal error'- that is, the accumulated error in the population components that is taken to have occurred over the five years since the previous base at the start of the intercensal period.

Even in Australia's official population estimates, which are very well respected internationally, some intercensal error is inevitable and unavoidable. Sometimes the value of the intercensal error is positive (ie. the population was overestimated, as was the case in 2011) and sometimes the intercensal error is negative (ie. the population was underestimated, as was the case in 2006). Over the last 30 years, the intercensal error has alternated between positive and negative values, with

three intercensal periods where it was positive (1986-1991, 1996-2001 and 2006-2011) and three where it was negative (1981-1986, 1991-1996 and 2001-2006).

The intercensal error for the preliminary rebased population estimate for the 2006-2011 period was 294,000. This intercensal error was more than three times greater than the previous intercensal error. The next section of this submission will show that around 84% of this intercensal error (around 247,000 people) can be directly attributed to a change in the ABS methodology used to calculate the undercount adjustment. The residual amount (47,000 people, or 16% of the total intercensal error) is well within the historical range of previous intercensal errors.

Methodological changes made in the 2011 cycle

In compiling the preliminary official population estimates based on the 2011 Census, the ABS introduced an important innovation that directly improved the quality of ERP for 30 June 2011. The introduction of Automated Data Linking (ADL) into the processing of the 2011 Census Post Enumeration Survey (PES) resulted in an improved, and lower, measure of net undercount than would have been derived had the same methodology used in processing the 2006 PES been used. In other words, the 2011 PES found that more people were actually counted by the Census than would have been suggested by the previous PES methodology.

This major improvement resulted in a lower estimate of how many people the ABS needed to add to the 2011 Census counts when deriving Australia's official population estimates for 30 June 2011. The ABS estimated that the previous method would have added in around 247,000 people who were not actually in the population.

This comparison of the new method and the previous method has also enabled the ABS to determine that too many people were added to Census counts for earlier 'base' years (e.g. 1991, 2001 and 2006). The ERP figures for these years are therefore higher than those calculated using the new methodology.

Since the previous base (ie. 30 June 2006) and the new base (ie. 30 June 2011) are both fixed estimates that do not change during the rebasing process, the conventional demographic treatment for intercensal error is to spread the total amount evenly through the series for the previous five years, as the intercensal error is usually assumed to have accumulated over the five years and cannot be attributed to a particular source or reference period.

In 2011, this conventional demographic treatment was applied in determining the preliminary, 2011 Census, rebased ERP estimates that were released by the ABS on 20 June 2012. It resulted in a downward revision of population growth over the 2006-2011 period from 1.8% (average annual growth) that had been indicated in the population components of births, deaths and migration, to 1.5%. That is, both the standard intercensal error attributable to the accumulated error in population components and the large impact of the methodological improvement were spread over the 2006-2011 period, back to the fixed base at 2006.

To assist users, the ABS provided general guidance on how to effectively use the preliminary official population estimates, pending the availability of final estimates. This supporting information was published in *Australian Demographic Statistics* (ABS cat. no. 3101.0) on 20 June 2012, and then again, with additional information, on 27 September 2012. The ABS has also provided technical advice to a number of users on their use of the preliminary official population estimates, although the decisions on how to actually use the estimates is one for users, taking into account their own particular requirements.

In determining how to calculate the final, 2011 Census, rebased ERP estimates (which will be released on 20 June 2013), the ABS consulted key users of population estimates on whether the larger than normal intercensal error caused by the methodological change warranted a different treatment to the conventional one used in producing the preliminary estimates. As a result, on 18 December 2012 the ABS announced in *Australian Demographic Statistics* (ABS cat. no. 3101.0) that it intends to adjust historical ERP to reflect the different undercount adjustments that would have been used had the 2011 PES methodology been available in earlier years. In other words, ABS intends to revise historical population data from 1991 to 2011, to ensure population growth in recent years reflects population components of births, deaths and migration.

The revised official population estimates that the ABS will release on 20 June 2013 will therefore ensure that Australia's official population estimates not only reflect the best possible estimate of how many people we have in Australia today, but also our best estimate of how many people there were in our recent past.

The use of population estimates in various agreements

Population estimates are used extensively within the Australian community, including in a range of agreements. Although the ABS acknowledges that the official population estimates and changes in these estimates are specifically referenced in various agreements, including agreements that adjust payments to reflect changes in population, it neither endorses nor disapproves of the terms of the agreements and decisions made by parties in relation to those agreements. In addition, the ABS does not provide a position on disputes arising from the interpretation of terms of an agreement that reference official population estimates.

The ABS is the central statistical authority for the Australian government. It is required by law to publish official population estimates. It abides by codes of professional practice that include being open and transparent about underlying methodology. The ABS provides regular explanatory information to support users in understanding both population trends and methodological changes, but does not comment on the specific use (or otherwise) of official population estimates by other organisations or individuals.