

POPULATION ESTIMATES : AN OUTLINE OF THE NEW CONCEPTUAL BASIS OF ABS POPULATION ESTIMATES

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Purpose of this paper

In preparation for the release of population estimates based on results from the 1981 Population Census, this paper explains the new conceptual basis to be used henceforth for official population estimates.

2. The publication, *Estimated Resident Population, Australia, States and Territories, 30 June 1981, 1976 and 1971 (Preliminary)*, (3217.0), is expected to be released on 31 March 1982. In about two month's time, quarterly estimates for the period 1971 to 1981 and estimates by age and sex for June 1981 will be issued in *Australian Demographic Statistics Quarterly* (3101.0). Back revisions of the population by age and by sex for previous years will be published in *Estimated Age Distribution of the Population, Australia* (3201.0) in June/July 1982. In June 1982, ABS State offices will publish preliminary Local Government Area (LGA) estimates for June 1976 and 1981 (persons only).

3. Publication of detailed figures from the 1981 Census will commence in April—an *Information Paper—Census 81 : Data Release Plans* (2142.0 issued on 3 November 1981) sets out precise publication plans.

How population estimates are compiled

4. In order to appreciate the new conceptual basis of the population estimates, it may help to outline in general terms how ABS population estimates are compiled.

5. The starting point is a count of the population at a particular date, obtained from the population census. This counts people at their actual place of location within Australia on census night. Population estimates at census date are then compiled on the basis of this count, in a series of steps explained later in this paper. Each subsequent quarter these estimates are updated (intercensal estimates) by adding estimates of natural increase (births less deaths) and net migration.

6. Until 1966, official population estimates for Australia, States and LGAs were simply the census counts plus estimates of natural increase and net migration (both

short term and long term) since the preceding census. From 1966 onwards it was admitted that there was no satisfactory basis on which to estimate net short term movements within the country. Consequently intercensal estimates for States and LGAs thereafter took internal movements into account only according to changes in place of usual residence, not all movements as would have been required in order to be on the same conceptual basis as the census counts.

7. For intercensal estimates from September 1976 onwards there was a further change in concept. Instead of adding total net overseas movements each quarter, only net long term and permanent movements were taken into account. Just as short term internal movements were ignored in estimating changes in State and LGA numbers after 1966, henceforth short term overseas movements were ignored in estimating the changes in Australian, State and LGA numbers.

8. Since the early 1970s there had been a large increase in both numbers and quarter-to-quarter fluctuations of short term movements overseas, and it was judged that the needs of most users of statistics would be met more adequately if the official population estimates did not include short term movements. It was in any case increasingly difficult to estimate the State and LGA of actual location of short term overseas visitors.

9. At the time when the basis for intercensal estimates for the years 1976-81 had to be decided, classifications by place of usual residence were not available from the census, nor were data on Australians temporarily overseas. Therefore intercensal estimates from 1976 to 1981 were made on a hybrid conceptual basis. The starting point was according to place of actual location, but changes from quarter to quarter were estimated according to place of usual residence.

10. With the 1981 Census, place of usual residence was included in the preliminary tabulations and analyses were undertaken of records of Australian residents temporarily overseas. Henceforth ABS population estimates will be wholly according to place of usual residence and will be referred to as Estimated Resident Population.

11. This is the basis on which OECD requests member countries to report population estimates and, indeed, most member countries simply have no records of short term movements across (or within) their boundaries.

12. If population estimates on some other conceptual basis are required by users for a particular purpose, the ABS may be able to supply them on request. Most census results will be tabulated as census counts, place of actual location, but tabulations of person characteristics will be available according to place of usual residence, by State and LGA for Australian residents in Australia on census night.

The Estimated Resident Population at census date

13. Bearing in mind that since 1976 intercensal population change has been estimated on a usual residence basis, the change to a new conceptually consistent series (the Estimated Resident Population) essentially involves making estimates as at census date on a usual residence basis. The steps are:

- (a) adjusting the 1981 census counts (actual location basis) to obtain counts on the basis of usual residence (hereafter referred to as 'Census Counts, Place of Usual Residence');
- (b) adjusting the Census Counts, Place of Usual Residence, for census under-enumeration; and
- (c) adding to the adjusted Census Counts, Place of Usual Residence, the number of residents temporarily overseas at census date.

14. The result is the Estimated Resident Population at Census Date. The next three sections of the paper explain these three steps. A detailed exposition is being prepared and will be available on request from Demography Section, Australian Bureau of Statistics, P.O. Box 10, Belconnen, A.C.T. 2616.

Census Counts, Place of Usual Residence

15. The 1981 Census was a census of where people were actually located on census night. This has been the traditional way of taking Australian censuses and 1981 was no exception.

16. However, the 1981 Census Schedule included a question (Question 8) which asked 'Where does each person usually live?'. From the answers to this question it is possible to compile, for Australia, the States and each LGA, counts of the following:

Residents away interstate
Interstate visitors
Overseas visitors.

17. Adding to the census counts (actual location) the first item, and subtracting the second and third items, yields 'Census Counts, Place of Usual Residence'.

Adjusting for census under-enumeration

18. The Australian census ranks high in world comparisons of accuracy, but some people are missed. In order to obtain a measure of the extent of this under-enumeration a post-enumeration survey (PES) is undertaken as soon as possible after the census. A PES has been carried out after each census since 1966, but that for 1971 was not sufficiently reliable to serve as a basis for population estimates.

19. The PES provides adjustment factors by sex and age for Australian and State populations. For LGA populations adjustment factors are calculated for persons only. All other data from the Population Census, such as Collectors' District data, person characteristics other than age and sex, and cross tabulations of data (other than age by sex for Australia and the States) will not be adjusted for under-enumeration.

Calculating residents temporarily overseas at census date

20. The Australian census does not attempt to enumerate residents temporarily overseas. Instead this component of the Estimated Resident Population is estimated from the passenger cards which are filled in by all persons arriving in or departing from Australia. Information on these cards enables an estimate to be made of residents temporarily overseas at 30 June 1981 according to their State and LGA of usual residence. By adding residents temporarily overseas to the Census Count, Place of Usual Residence adjusted for under-enumeration, an Estimated Resident Population (at census date) is derived.

Updating the Estimated Resident Population intercensally

21. Having calculated the Estimated Resident Population at census date, these estimates will be updated quarterly (i.e. from September 1981 onwards) for Australia and the States, and annually for LGAs, according to subsequent changes to the population, measured on a usual residence basis.

22. The following three sections summarise the steps to be taken to estimate the resident population intercensally for Australia, States and LGAs.

Australia

23. To the Estimated Resident Population of Australia at census date:

- (a) add births registered in Australia;
- (b) subtract deaths registered in Australia;
- (c) add permanent and long term arrivals from overseas; and
- (d) subtract permanent and long term departures overseas.

Note: 'Permanent' movement consists of persons who, on arrival, state that they intend to settle in Australia (settlers) and persons who are Australian residents (including former settlers) departing permanently, i.e. those who on departure state that they do not intend to return to Australia.

'Long term' movement is defined as visitors arriving from overseas and Australian residents departing overseas temporarily with the intention to stay, in Australia or abroad respectively, for twelve months or more, together with the departure of visitors and the return of Australian residents who had stayed, in Australia or abroad, for twelve months or more.

'Short term' movement is defined as travellers whose intended or actual period of stay, in Australia or abroad, is less than twelve months.

States

24. To the Estimated Resident Population of each State at census date:

- (a) add births registered in Australia according to the mother's State of usual residence;
- (b) subtract deaths registered in Australia according to the State of usual residence of the deceased;
- (c) add permanent and long term overseas arrivals according to the 'intended address in Australia';
- (d) subtract (i) permanent and long term departures overseas of residents (including former settlers) according to the State of usual residence, and (ii) long term visitors departing overseas according to the State in which they spent most time;
- (e) add estimates of interstate arrivals involving a change of State of usual residence; and
- (f) subtract estimates of interstate departures involving a change of State of usual residence.

LGAs

25. The Estimated Resident Population of each LGA at census date will be updated annually by taking into consideration the number of births and deaths in each LGA as well as other indicators of population change such as building approvals, school enrolments and electricity connections. Estimates produced from these indicators will be adjusted to add to the independently produced State estimates.

Revisions and intercensal adjustments

26. As well as the 1981 Estimated Resident Population, a quarterly time series on a consistent usual residence basis is being compiled for Australia and States back to 1971. Because of lack of data, estimates for LGAs will go back only to 1976.

27. For the period 1976-81 the first step was to establish an estimated resident population at the 1976 Census date. This was done following essentially the same procedure as outlined above for 1981. The second step was to calculate the 1976-81 intercensal discrepancy, which is the difference between the 1981 Estimated Resident Population and the 1981 estimate based on the 1976 Estimated Resident Population updated by births, deaths and net population movements (on a usual residence basis). This discrepancy is then distributed over the intercensal years.

28. For the period 1971-76 it was decided that this direct method could not be used because of the inadequacy of the 1971 PES. Instead the 1971 estimate for Australia was derived by working back from the 1976 census count (actual location, adjusted for under-enumeration) using the intercensal data on births, deaths and net overseas movement. Information on State of usual residence from the 1971 Census was then used to compile estimates of State populations. These State estimates were adjusted by the difference between the 1971 figure derived from 1976 and the actual 1971 census count. To the figures for Australia and the States were added estimates of residents temporarily overseas to obtain the Estimated Resident Population at June 1971. Because of the method employed there was no intercensal discrepancy to distribute over the years 1971 to 1976.

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