



## **Information Paper**

# **Labour Force Survey Sample Design**

**Australia**

**November 2007**



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**Labour Force Survey  
Sample Design**

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**November 2007**

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## ABBREVIATIONS

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<b>ABS</b>	Australian Bureau of Statistics
<b>ASGC</b>	Australian Standard Geographical Classification
<b>BSD</b>	Brisbane Statistical Division
<b>LFS</b>	Labour Force Survey
<b>LGA</b>	local government area
<b>MSR</b>	major statistical region
<b>RSE</b>	relative standard error
<b>SD</b>	statistical division
<b>SR</b>	statistical region
<b>SRS</b>	statistical region sector





# INTRODUCTION

## OVERVIEW

The Australian Bureau of Statistics (ABS) has been conducting the Labour Force Survey (LFS) since 1960. Originally the survey was conducted quarterly, before becoming monthly in February 1978. The LFS provides timely and reliable information on the labour market activity of the usually resident civilian population of Australia aged 15 years and over.

Every five years, following the availability of data from the Census of Population and Housing, the ABS reviews the LFS sample design. While the design has remained broadly the same since the introduction of the LFS, the review ensures that the survey continues to accurately reflect the geographic distribution of the Australian population, and remains efficient and cost-effective.

The review based on 2006 Census data has been completed, and the new sample design will be implemented in the LFS over the period November 2007 to June 2008. This paper outlines the sample design; the methodology of the LFS; the changes arising from this redesign; and the impact of the redesign on the LFS at national, state and regional levels.

The new sample design results in a smaller sample size which is compensated for by the introduction of the composite estimation method in June 2007. As a result, for the key LFS estimates, standard errors are maintained at the levels achieved under the previous sample design. Standard errors for the Northern Territory are improved.

## LABOUR FORCE SURVEY DATA

Survey estimates of the number of employed and unemployed people, the unemployment rate and the labour force participation rate are of considerable interest each month. The rate of change in the level of employment is a key economic indicator. The unemployment rate (the proportion of the labour force who are unemployed) is the main measure of unutilised labour, while the participation rate (the proportion of the population in the labour force) reflects changes in total labour availability.

The survey collects a wide range of information about the population. For employed people, this includes information such as whether they work full-time or part-time, and their industry, occupation, hours worked and status in employment. For people who are currently unemployed, the survey also collects information about whether they are looking for a full-time or part-time job, how long they have been unemployed, and about the characteristics of their last job (industry, occupation, and reason for leaving). The survey also collects personal characteristics such as sex, age, marital status, relationship in household, participation in school and tertiary education, birthplace and year of arrival in Australia.

LFS employment and unemployment measures align closely with the standards and guidelines set out in Resolutions of the International Conference of Labour Statisticians. Descriptions of the underlying concepts and structure of Australia's labour force statistics, and of the sources and methods used in compiling the estimates are presented in *Labour Statistics: Concepts, Sources and Methods* (cat. no. 6102.0.55.001), which is available on the ABS web site <[www.abs.gov.au](http://www.abs.gov.au)>.

Survey estimates are published monthly in *Labour Force, Australia* (cat. no. 6202.0). Time series data are released at the same time in *Labour Force, Australia, Spreadsheets* (cat. no. 6202.0.55.001). More detailed data are available one week later in *Labour Force, Australia, Detailed - Electronic Delivery* (cat. no. 6291.0.55.001) and in the quarterly

## INTRODUCTION *continued*

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LABOUR FORCE SURVEY  
DATA *continued*

release *Labour Force, Australia, Detailed, Quarterly* (cat. no. 6291.0.55.003). These products are available on the ABS web site at <[www.abs.gov.au](http://www.abs.gov.au)> (Statistics). Further information about the LFS can also be found on the ABS web site at <[www.abs.gov.au](http://www.abs.gov.au)> (Themes — Labour).

## SURVEY METHODOLOGY

### COLLECTION METHODOLOGY

LFS information is collected from the occupants of selected dwellings by specially trained interviewers. Interviews are generally conducted during the two weeks beginning on the Monday between the 6th and the 12th of each month. The information obtained relates to the week before the interview (referred to as the reference week). Selected dwellings remain in the survey for eight months.

Prior to August 1996, all interviews were conducted face-to-face with respondents. Over the period August 1996 to February 1997, the ABS introduced the use of telephone interviewing to collect LFS data. Under this approach, the first interview is conducted face-to-face and subsequent interviews are conducted by telephone (where this is acceptable to the respondent).

Interviewers may collect all information about each household member within the scope of the survey from the first responsible adult with whom the interviewer makes contact (rather than speaking to each individual personally). Where the person interviewed is unable to supply all of the details for another member of the household, that individual is interviewed personally.

### SCOPE AND COVERAGE

The scope of a survey is the population about which information is to be collected. In the LFS, scope is restricted to the usually resident civilian population of Australia aged 15 years and over (excluding the Jervis Bay Territory, the Territory of Christmas Island and the Territory of Cocos (Keeling) Islands, which are out-of-scope for most ABS collections other than the Census of Population and Housing). The LFS does not include members of the permanent defence forces; certain diplomatic personnel of overseas governments, customarily excluded from census and estimated population counts; overseas residents in Australia; and members of non-Australian defence forces (and their dependants) stationed in Australia.

In the LFS, the survey applies coverage rules to ensure that each person is associated with only one dwelling, and hence has only one chance of selection. Persons who are away from their usual residence for six weeks or less at the time of interview are enumerated at their usual residence (relevant information may be obtained from other usual residents present at the time of the survey). The chance of a person being enumerated at two separate dwellings in the one survey is considered to be negligible.

LFS estimates relate only to place of usual residence, and the data are calculated in such a way as to add up to independently estimated counts of the usually resident civilian population aged 15 years and over, a procedure which compensates for any under-enumeration in the survey.

### NON-RESPONSE

Non-response arises when no information is collected from one or more occupants of a selected dwelling.

For both face-to-face interviews and telephone interviews, interviewers make a number of attempts to contact households at different times of the day and on different days during the week. For households unable to be contacted by telephone, a face-to-face visit is attempted. If the household still cannot be contacted within the survey period after repeated attempts (and if the dwelling has been verified as not vacant), it is listed as a non-contact. Non-contact is the most common form of non-response.

## SURVEY METHODOLOGY *continued*

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### NON-RESPONSE *continued*

The response rate commonly quoted for ABS household surveys refers to the number of fully responding private dwellings divided by the number of private dwellings in the sample after allowing for sample loss. A fully responding private dwelling is one where all persons in scope and coverage answered all questions relevant to their circumstances. Examples of sample loss for the LFS include: households where all persons are out of scope and/or coverage; vacant dwellings; dwellings under construction; dwellings converted to non-dwellings; derelict dwellings; and demolished dwellings. Averaged over the five years from September 2002, the LFS response rate was 96.5%.

## SAMPLE DESIGN

### SAMPLE SELECTION

The LFS sample consists of three components, which are separately identified and sampled:

- private dwellings (houses, flats, etc.);
- non-private dwellings (hotels, motels, caravan parks, hospitals, homes for the aged, university colleges, boarding houses, etc.); and
- Indigenous community dwellings.

The sample of private dwellings is obtained by a multi-stage approach. Using the Statistical Division and Subdivision structure of the Australian Standard Geographical Classification (ASGC), Australia is first divided into almost 100 geographical areas. In general, these areas are then sub-divided and grouped (stratified) according to locality, population density, remoteness and growth, then:

- in the first stage of selection, a sample of census collection districts is randomly selected (with probability proportional to number of dwellings) to represent each area;
- in the second stage of selection, each selected collection district is divided into smaller areas called blocks, of which one block is selected randomly (again with probability proportional to number of dwellings); and
- in the third stage, a sample of dwellings in the selected block is taken using systematic equal probability sampling.

In less populated areas, an additional stage precedes the selection of collection districts to ensure that the sample is not too geographically spread (as that would lead to unacceptable enumeration costs).

The sample of non-private dwellings is obtained by compiling a list of non-private dwellings in Australia. A sample is taken from this list such that each geographical area and each different type of dwelling is represented. For smaller non-private dwellings, each occupant is included in the survey; for larger dwellings, a sub-sample of occupants is taken.

The sample of Indigenous community dwellings is obtained by:

- identifying those states and territories with a statistically viable number of 'Indigenous' census collection districts (those with a high proportion of Indigenous community dwellings);
- selecting a sample of Indigenous communities within those census collection districts with probability proportional to the size of the community; and
- taking a sample of dwellings in those selected communities using systematic equal probability sampling.

### ALLOCATION OF SAMPLE

The LFS is primarily designed to provide reliable estimates of the key labour force statistics for the whole of Australia and, secondarily, for each state and territory.

The most accurate national estimates would be gained if the total sample for Australia were to be allocated in proportion to the population of each state or territory. However, for each state or territory to have estimates as accurate as one another, approximately equal size samples would be needed for each.

## SAMPLE DESIGN *continued*

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### ALLOCATION OF SAMPLE *continued*

The allocation of the sample across the states and territories is designed as a compromise between the accuracy of national estimates and state or territory estimates. The proportion of the population in the sample (known as the sampling fraction) differs across states and territories, but not to the extent that would realise identical sample sizes for each state and territory. Within each state or territory, each dwelling has the same probability of selection.

### SAMPLE ROTATION

One of the primary requirements of the survey is to provide a measure of change in the characteristics of the labour force over time, especially month-to-month variations.

The best estimates of change from one month to the next would be obtained if the survey was collected from essentially the same sample of dwellings each month while providing for population growth. However, it is neither reasonable nor properly representative to continually retain the same respondents in the survey. A proportion of the sample is therefore deliberately replaced each month. This procedure is known as sample rotation.

Since the monthly LFS began in 1978, one-eighth of the sample has generally been replaced each month. The sample can be thought of as consisting of eight sub-samples (or rotation groups), with a new rotation group being introduced into the sample each month to replace an outgoing rotation group. This replacement sample usually comes from the same area as the outgoing one.

Sample rotation enables reliable measures of monthly change in labour force statistics to be compiled, as seven-eighths of the sample from one month are retained for the next month's survey. At the same time, the sample rotation procedure ensures that no dwelling is retained in the sample for more than eight months.

The component of the sample that is common from one month to the next makes it possible to match the characteristics of most of the people in those dwellings: this group is referred to as the 'matched sample'. The availability of this matched sample permits the production of estimates of 'gross flows' — the number of people who change labour force status between successive months.

## METHOD OF ESTIMATION

### BENCHMARKS

LFS estimates of the number of people employed, unemployed and not in the labour force are calculated in such a way as to add up to independently estimated counts (benchmarks) of the usually resident civilian population aged 15 years and over. These benchmarks are based on Census of Population and Housing data, adjusted for under-enumeration and updated monthly for births, deaths, interstate migration and net permanent and long-term migration.

There are two sets of benchmarks used in the LFS. The first set of benchmarks are classified by state or territory of usual residence, part of state of usual residence (capital city, rest of state), age and sex. The second set are classified by LFS Statistical Region of usual residence and sex (known as 'regional benchmarks'). Each cross-classification of benchmark variables is known as a benchmark cell.

### WEIGHTING

To derive labour force estimates for the entire population in the scope of the survey, expansion factors (weights) are applied to the sample responses. The weighting method ensures that LFS estimates conform to the benchmark distribution of the population by age, sex and geographic area. This reduces sampling variability and compensates for any under-enumeration or non-response in the survey (but does not overcome any bias arising from non-response).

The LFS estimation method, a form of composite estimation, exploits the overlapping design of the LFS sample. It does this by combining the previous six months' sample responses with the current month's responses to produce the current month's estimates.

Initially, composite estimates for 11 sets of key LFS estimates are derived using the sample responses for the current month and previous six months:

- Weighting factors known as BLUE B1 Multipliers are applied to the seven months' sample responses. They determine the extent to which the responses over the seven month 'window' contribute to the current month's LFS estimates. They are based on the correlation structure observed in historical LFS data. While taking account of the BLUE B1 multipliers, the weights of the sample responses are adjusted to align with current month population benchmarks;
- Hence the weight assigned to a sample response is dependent on the geographic area, age and sex of the respondent as well as the month in which the response was collected and the number of months the rotation group has been in the sample; and
- The set of composite estimates is produced from the seven-months weighted dataset.

Finally, the current month's sample responses are weighted to both the population benchmarks and to the set of composite estimates produced from the seven-months weighted dataset. The current month's estimates are produced from this weighted dataset, where the estimates for each characteristic of interest are obtained by summing the weights of the persons in the sample with that characteristic.

Further information about the LFS estimation method can be found in the information paper *Forthcoming Changes to Labour Force Statistics, 2007* (cat. no. 6292.0) which is available on the ABS web site <[www.abs.gov.au](http://www.abs.gov.au)>.

### RELIABILITY OF ESTIMATES

The accuracy of a sampling estimate refers to how close that estimate is to the true population value. The variation between the two is referred to as 'the error of the sampling estimate'. The total error of the sampling estimate results from two types of error:

- sampling error, which occurs because data were obtained from a sample rather than the entire population; and
- non-sampling error, which arises from imperfections in reporting, recording or processing of the data that can occur in any survey or census.

One measure of sampling error is given by the standard error of the estimate, which indicates the extent to which that estimate might have varied by chance because only a sample of dwellings was surveyed. There are about 2 chances in 3 that the estimate that would have been obtained if all dwellings had been included will differ by less than one standard error from a sample estimate, and about 19 chances in 20 that the difference will be less than two standard errors.

Expressing the standard error of an estimate as a percentage of the estimate to which it relates offers another useful measure of sampling variability: the relative standard error (RSE).

Standard error estimates published in association with survey results are mathematically modelled after each sample redesign, using many different estimates from several months of survey responses.



## PREVIOUS SAMPLE REDESIGNS

### CHANGES INTRODUCED

The basic sampling methodology of the LFS has remained much the same since the first survey was run in 1960. The main changes in sample design and estimation procedures introduced at each redesign since the LFS commenced can be summarised as follows.

1971 redesign:

- the introduction of different sampling fractions across states and territories
- a reduction in sample size through reducing the overall sampling fraction from 1 in 100 to about 1 in 150.

1976 redesign:

- the introduction of regional stratification
- the introduction of a one-eighth rotation scheme in the non-private dwelling sample
- an increase in the Australian Capital Territory sampling fraction from 1 in 200 to 1 in 100.

1981 redesign:

- a change in estimation procedure from state/territory of enumeration to state/territory of usual residence
- transfer of caravan parks from the private dwelling sample to the non-private dwelling sample
- as a result of population growth, reduction of sample fraction in Western Australia from 1 in 90 to 1 in 100.

1986 redesign:

- a reduction in the overall sampling fraction of approximately 13%, resulting in a total initial sample size about 3,000 persons (4%) less than that at the start of the 1981 redesign sample
- changes to certain regional boundaries in New South Wales, Victoria and Queensland.

1991 redesign:

- the introduction of a new allocation formula for state and territory sampling fractions, resulting in an increase in the sampling fractions for territories and a decrease for states
- transfer of predominantly long-stay caravan parks from the non-private dwelling sample to the private dwelling sample
- changes made to regional boundaries in Victoria and Queensland
- a reduction in the total initial sample size of about 3,000 persons (4%), compared with that initially resulting from the 1986 redesign.

1996 redesign:

- improved design efficiency arising from the introduction of telephone interviewing (which enabled selection of a less-clustered design)
- an overall reduction in the initial sample size of about 1,500 persons (2%) compared with that initially resulting from the 1991 redesign.

2001 redesign:

- the introduction of a sample frame for Indigenous communities as an aid to enumeration
- a move to reliance on the ASGC Remoteness structure rather than population density during sample selection in less populated areas

## PREVIOUS SAMPLE REDESIGNS *continued*

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### CHANGES INTRODUCED *continued*

- a change in non-private dwelling enumeration from all hotel and motel units to only those occupied by usual residents
- a small gain in sample efficiency arising from the use of improved information in the technical stages of sample design and of sample selection
- a reduction in the initial sample size of about 1,500 persons (3%) compared with that initially resulting from the 1996 redesign.

## 2006 SAMPLE REDESIGN

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### REDESIGN AIMS

Reflecting its importance in maintaining the efficiency and effectiveness of the LFS, development of the 2006 redesign included these key aims:

- to achieve a level of accuracy for national employment and unemployment estimates comparable with the previous sample design;
- to improve the level of accuracy of the Northern Territory estimates over the previous sample design, while minimising the impact on the level of accuracy among the other states and the Australian Capital Territory;
- to contain the costs of collection for the LFS sample; and
- to provide sufficient sample for the LFS over the five year period 2008-2012.

### DESIGN CHANGES

A number of improvements were considered in developing the new design. The more significant changes to be implemented are:

- the inclusion of the territories in the allocation formula for state and territory sampling fractions, resulting in an increase in sample allocation for the Northern Territory and a decrease in sample allocation for states and the Australian Capital Territory
- better identification of expected growth areas in states and territories, resulting in an improved private dwelling sample over time
- significant changes made to regional boundaries in Queensland and minor changes to those in New South Wales
- a reduction in the initial sample size of about 6,800 persons (11%) compared with that initially resulting from the 2001 redesign, due to the need to accommodate increased operational costs through a conversion of efficiency gains from the use of composite estimation into a smaller sample size.

### SAMPLE ALLOCATION

In the previous three designs (1991 to 2001), the LFS sample was allocated to the states proportional to the square root of their population, a method known as Carroll allocation. The territories were excluded from the allocation formula, because to include them would have resulted in a sample size in the territories which was considered too large to manage operationally at the time. Instead, the sample size for the territories was set at a level that was considered manageable.

For some time, concerns have been raised regarding the high standard errors associated with the LFS estimates for the Northern Territory. To address these concerns, the 2006 sample design includes the territories in the allocation formula. This results in a large increase in sample size for the Northern Territory and a small decrease for the other states and the Australian Capital Territory.

### SAMPLE SIZE

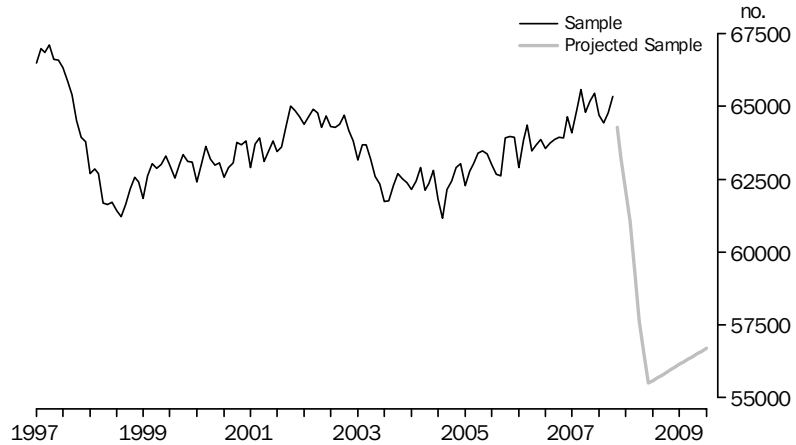
Use of a constant sampling fraction between sample redesigns has the effect that the number of dwellings in the sample increases as the population grows.

The graph below shows the number of persons enumerated in the LFS sample from 1997 to 2007, illustrating the gradual increase in the number of persons enumerated between each redesign. While this results in some improvement in the accuracy of the survey results, the improvement is partially offset by a deterioration in the efficiency of the sample in the period since the previous redesign.

SAMPLE SIZE *continued*

Further, as more dwellings are added to the survey over time, the operational costs of collecting the data increase. To offset these increases in cost, the sample size is reduced at each redesign. The decrease in sample size following the 1996 and 2001 Census redesigns can be seen on the graph below. The grey line at the right shows the expected decrease in sample size during the period November 2007 to June 2008, as the sample from the 2006 Census redesign is implemented.

LABOUR FORCE SURVEY SAMPLE: PERSONS



In the 2006 design, the initial sample size is expected to be about 11% smaller than at the start of the 2001 design. This 11% reduction is due to the need to accommodate increased operational costs, achieved by a conversion of efficiency gains from the use of composite estimation into a smaller sample size. Since the 2001 design, operational costs have increased due to external pressures (notably the tight labour market and difficulties in contacting householders in some situations). To alleviate cost pressures, the ABS is reducing the 2006 initial sample size.

The ABS is able to maintain the quality of the employment estimates at the national and state and territory level by using the efficiencies gained from the new estimation method introduced in June 2007. For other estimates, the quality will not be maintained because the new estimation method does not provide the same efficiency gains.

When the new sample is fully implemented in June 2008, it is expected that there will be about 26,500 private dwellings; 1,300 non-private dwellings; and 200 Indigenous community dwellings in the sample. This is expected to result in about 55,500 persons responding to the survey, covering about 1 in 305 (0.33%) of the population aged 15 years and over.

SAMPLING FRACTIONS

As for the 2001 design, the state and territory sampling fractions were an output from the design process, rather than an input. Table 1 gives the sampling fractions used for each state and territory, from the 1976 Census redesign to the new, 2006 Census redesign.

## 2006 SAMPLE REDESIGN *continued*

### SAMPLING FRACTIONS

*continued*

TABLE 1. REDESIGN SAMPLING FRACTIONS, By year of redesign

	1976	1981	1986	1991	1996	2001	2006
New South Wales	1 in 200	1 in 200	1 in 230	1 in 277	1 in 300	1 in 321	1 in 380
Victoria	1 in 200	1 in 200	1 in 230	1 in 242	1 in 257	1 in 270	1 in 336
Queensland	1 in 140	1 in 140	1 in 160	1 in 195	1 in 222	1 in 239	1 in 315
South Australia	1 in 100	1 in 100	1 in 115	1 in 139	1 in 147	1 in 149	1 in 184
Western Australia	1 in 90	1 in 100	1 in 115	1 in 146	1 in 160	1 in 165	1 in 246
Tasmania	1 in 60	1 in 60	1 in 70	1 in 75	1 in 83	1 in 90	1 in 103
Northern Territory	1 in 100	1 in 100	1 in 115	1 in 75	1 in 85	1 in 98	1 in 54
Australian Capital Territory							
	1 in 100	1 in 100	1 in 115	1 in 75	1 in 85	1 in 86	1 in 117

Sampling fractions have changed from the 2001 design due to:

- the inclusion of the territories in the sample allocation formula,
- a reduction in the 2006 initial sample size, and
- population increases since the 2001 redesign.

### PHASE-IN PERIOD

In order to reduce the potential impact of the change in sample on labour force statistics, the new sample will be introduced progressively, taking advantage of the existing sample rotation scheme.

The private dwelling sample in larger urban centres and less remote areas, and the sample of Indigenous community dwellings, will be phased-in over the period November 2007 to June 2008. One-eighth of the new sample will be introduced each month under existing sample rotation arrangements. This represents 86.8% of the total sample.

The rest of the sample (in the more remote, less populated areas and for non-private dwellings) will be introduced in two stages: in March 2008 for New South Wales, Western Australia, the Northern Territory and the Australian Capital Territory; and in April 2008 for Victoria, Queensland, South Australia and Tasmania.

This method of implementation means that most of the changes to labour force statistics due to differences between the two samples, or any other influences, will be spread over the eight months. This approach is broadly comparable with that adopted for the 1996 and 2001 redesigns. In contrast, the approach adopted for the 1981 redesign saw the new sample introduced in one month, while in the 1986 and 1991 redesigns, the new sample was introduced over four months.

With the lower than normal proportion of common selections of matched sample for the February-March and March-April 2008 surveys, gross flows statistics will represent lower populations than usual in those months. The matched sample in those months is expected to fall from the usual 80% to about 75% of the population.

## IMPACT ON STANDARD ERRORS

### STANDARD ERRORS

Standard errors associated with the redesigned sample will be broadly comparable to those of the previous sample for employment estimates, and will be slightly higher for unemployment estimates (The exception is the Northern Territory, where standard errors will be substantially lower due to the significant increase in the sample size.). This impact is expected to be fully evident once the transition from old to new sample is complete. The transition itself will also have an impact on the standard errors of LFS estimates.

As noted earlier, most of the sample is phased-in over the period November 2007 to June 2008, and the remainder is introduced in March and April 2008. Over the eight months, the LFS sample will become progressively smaller because the total new sample is smaller than the total current sample. Therefore, the standard errors will progressively change from the current levels to the new levels by July 2008.

There is expected to be an additional short-term impact on the standard errors during the transition. The two-stage implementation of the remaining sample reduces the efficiency of the estimation method as there will be a lower than normal proportion of common selections between the surveys for February, March and April 2008. As a result, the standard errors for level and month-to-month movement estimates will be somewhat higher in March and April 2008 than in other months.

The standard errors are published each month for selected estimates in *Labour Force, Australia* (cat. no. 6202.0). These published standard errors have been statistically modelled as a function of the estimate itself. The ABS makes these models available on the ABS web site <[www.abs.gov.au](http://www.abs.gov.au)> to allow the estimation of the standard error of any LFS statistic. The ABS will modify these models to reflect the progressive change in sample.

The modified standard errors will be incorporated into the November 2007 issue of *Labour Force, Australia* (cat. no. 6202.0), which will be released on 13 December 2007. The revised models will be made available through the product *Labour Force Survey Standard Errors, Data Cube, 2007* (cat. no. 6298.0.55.001), which will also be released on 13 December 2007. Although the ABS is not revising the information paper *Labour Force Survey Standard Errors, 2005* (cat. no. 6298.0), it will still contain relevant information on how to use the revised models. The ABS will review the standard error models when a sufficient number of months of data are available from the new sample.

### RELATIVE STANDARD ERRORS

Table 2 below shows the target RSEs for the 2001 sample design, the RSEs actually achieved during the 2001 sample design, and the target RSEs for the 2006 sample design. The table shows that the 2001 target RSEs were not achieved in some cases, due to the large decrease in the size of the unemployed population over the design period.

The table shows that, averaged over the life of the new sample design, RSEs for employment at the national, state and territory level are expected to be very similar to those achieved under the previous sample design. For estimates of employed, the negative impact of the reduction in the 2006 initial sample size is offset by the improved precision of the new estimation method.

## IMPACT ON STANDARD ERRORS *continued*

### RELATIVE STANDARD ERRORS *continued*

RSEs for unemployment at the national, state and territory level are expected to be slightly higher than those achieved under the previous sample design. This is because the efficiencies gained from the new estimation method introduced in June 2007 apply more to employment than unemployment. Also, the proportion of unemployed persons has decreased since the 2001 redesign.

The exception is the Northern Territory, where RSEs for employment and unemployment are expected to be lower than under the previous sample design. They are expected to reduce significantly: by around 40% for employment, and by around 30% for unemployment.

TABLE 2. LFS RELATIVE STANDARD ERRORS, By year of redesign

	EMPLOYMENT RSE (%)			UNEMPLOYMENT RSE (%)		
	2001 <i>target</i> RSE	2001 <i>achieved</i> RSE	2006 <i>design</i>	2001 <i>target</i> RSE	2001 <i>achieved</i> RSE	2006 <i>design</i>
New South Wales	0.8	0.8	0.8	4.7	5.0	5.0
Victoria	0.8	0.8	0.8	4.7	5.1	5.3
Queensland	1.0	0.9	0.9	4.6	5.6	5.7
South Australia	1.2	1.1	1.1	5.6	6.6	6.7
Western Australia	1.0	1.0	1.0	5.7	6.4	7.1
Tasmania	1.7	1.6	1.5	7.4	8.7	8.3
Northern Territory	4.2	3.8	2.3	16.3	19.1	12.9
Australian Capital Territory	1.3	1.3	1.3	10.6	12.8	13.9
Australia	0.4	0.4	0.4	2.2	2.5	2.6

## REGIONAL ESTIMATES

### LFS STATISTICAL REGIONS

While the LFS is designed primarily to produce reliable estimates at the national, state and territory levels, it also delivers estimates for a number of regions within states. LFS Statistical Regions were established to meet user interest in small area data from the LFS. These regions were originally established following analyses of data from Censuses of Population and Housing, extensive consultation with major users of labour force data, consideration of regional population levels required to yield reliable estimates, and the need for consistency with other statistical collections.

The LFS Statistical Regions used for the publication of labour force statistics are based on the standard geographical regions defined in *Australian Standard Geographical Classification (ASGC)* (cat. no. 1216.0). They are revised at each sample redesign to align with the ASGC edition current for the Census on which the design is based. The ASGC is available on the ABS web site <[www.abs.gov.au](http://www.abs.gov.au)> (Statistics).

### QUALITY OF ESTIMATES

As with state and national estimates, regional labour force estimates are subject to sampling error. Compared with estimates at state level, estimates for regions are based on smaller samples and are subject to higher relative standard errors.

The LFS is not designed to provide accurate regional estimates. However, in recent years, the ABS has taken steps to improve the quality of the small area estimates from the LFS. With the February 2004 survey, the LFS introduced regional population benchmarks for estimating and releasing regional labour force estimates. The benchmarks are classified by LFS Statistical Region of usual residence and sex. Regional labour force estimates were revised back to January 1999, to include regional benchmarks.

This change has made a modest improvement in the quality of regional labour force estimates, without compromising the quality of the national, state and territory estimates. Care should still be taken in the interpretation of regional estimates. Standard errors for each region are available through the product *Labour Force Survey Standard Errors, Data Cube, 2007* (cat. no. 6298.0.55.001) or on request. In addition, ABS customarily issues cautionary notes regarding the high degree of variability of LFS regional estimates, particularly for the regions with smaller populations. Greater improvement in the quality of small area estimates from the LFS would require a substantial increase in sample size (and hence in the cost of the survey and in respondent load).

For more information on the quality of estimates for these regions refer to the feature article [Labour Force Survey Regions](#) published in the July 2004 issue of *Australian Labour Market Statistics* (cat. no. 6105.0). This publication is available on the ABS web site <[www.abs.gov.au](http://www.abs.gov.au)> (Statistics).

### DATA COMPARABILITY

Regional statistics from the LFS are especially variable at the time of sample re-selection, as the new sample selected to represent each region may have different characteristics to the old sample.

Consequently, it can be expected that some regional series will suffer quite noticeable disturbances during the period November 2007 to June 2008 as the new LFS sample is gradually implemented. As a result of the method of implementation of the new LFS sample, regions in more remote areas will be more subject to disturbances than those in less remote areas.



### REGION CHANGES

LFS Statistical Region boundaries are revised at each sample redesign to align with the Australian Standard Geographical Classification (ASGC) edition current for the Census on which the design is based. For previous redesigns, the revised LFS Statistical Regions were introduced at the same time as the new sample began to be phased-in.

However, since the previous redesign, the ABS has introduced regional benchmarks. Because of this, it is not possible to introduce the 2006 LFS Statistical Regions until those regional benchmarks have been reviewed. The population benchmarks are reviewed after each census (every five years) when revised population estimates are produced. The population benchmarks based on the 2006 Census will not be finalised by November 2007, when the new LFS sample begins to be phased-in. Instead, the ABS expects to rebase and revise all LFS estimates to reflect the 2006 population benchmarks by February 2009.

Therefore, the regional labour force estimates will continue to be produced for the 2001 LFS Statistical Regions until February 2009. In February 2009 the regional labour force estimates will be produced for the 2006 LFS Statistical Regions. At the same time, the ABS will release revised historical regional labour force estimates based on the new regions. Continued use of the 2001 LFS Statistical Regions (until February 2009) will not have any effect on the quality of the regional labour force estimates or on the continuity of the LFS regional series.

The Appendix to this Information Paper lists both the 2001 and 2006 LFS Statistical Regions and details any differences between them. In 2006, there are major boundary changes in south-east Queensland and minor changes in New South Wales. Any boundary changes resulting in a population transfer of 1,000 persons or more are noted, as are certain name changes.

For more information on how LFS regions are formed refer to the feature article [Labour Force Survey Regions](#) published in the July 2004 issue of *Australian Labour Market Statistics* (cat. no. 6105.0). This publication is available on the ABS web site <[www.abs.gov.au](http://www.abs.gov.au)> (Statistics).

## OTHER ESTIMATES

### LABOUR FORCE SURVEY

The LFS is designed primarily to provide estimates of key labour force statistics. There are 11 sets of key monthly estimates, which are used as benchmarks in the estimation method introduced in June 2007. The ABS is reducing the 2006 initial sample size by using the efficiencies gained from that estimation method and from improved design. The standard errors associated with these 11 sets of key monthly estimates will be affected in the manner explained in the preceding sections of this information paper.

The LFS provides other non-key monthly estimates. When the estimation method was introduced in June 2007, the standard errors associated with these non-key estimates were typically no larger than the standard errors produced by the previous estimation method. The reduction in 2006 initial sample size will have an impact on the standard errors of these non-key monthly estimates. Standard errors will not be maintained at current levels and will suffer some degradation. The exception is the Northern Territory, where standard errors will be lower due to the significant increase in the sample size.

The LFS also provides quarterly estimates, such as employment by industry and occupation. As for the non-key monthly estimates, standard errors will not be maintained at current levels.

For a complete list of the 11 sets of key monthly estimates, refer to the information paper *Forthcoming Changes to Labour Force Statistics, Australia, 2007* (cat. no. 6292.0).

### ASSOCIATED SURVEYS

A number of surveys are conducted each year as supplements to the LFS. These annual, biennial or irregular collections provide statistics on particular aspects of the labour force and on other topics such as environmental issues, education and child care. A recent example is *Labour Force Experience, Australia, February 2007* (cat. no. 6206.0); refer Appendix 2 of that publication for a list of all labour force related supplementary surveys. The supplementary surveys are conducted on part of the LFS sample, consequently, the reduction in 2006 initial sample size for the LFS also applies to them. Due to the infrequency of the collections, these surveys are unable to obtain any efficiency gains from the estimation method introduced in June 2007. Therefore, following the redesign, standard errors on most estimates will not be maintained at current levels. The exception is estimates for the Northern Territory, where the large increase in sample size will result in lower standard errors.

The multi-purpose household survey is also conducted as a supplement to the LFS. This annual survey provides statistics for a small number of labour, social and economic topics. The 2005-06 survey provided statistics on five topics, including *Work-Related Injuries, Australia, 2005-06* (cat. no. 6234.0). The survey is conducted on a proportion of the outgoing rotation group of the LFS sample. The total sample for this survey is not affected by the reduction in 2006 initial sample size for the LFS. The sample size for this survey is being maintained by increasing the proportion of persons surveyed in the outgoing rotation group. However, due to the sample being distributed across states/territories differently from the 2001 design, the Northern Territory will have lower standard errors while for Western Australia, the Australian Capital Territory and Tasmania standard errors will not be maintained at current levels. The redistribution of the sample is unlikely to have a noticeable impact on the standard errors of most national estimates from the survey.

# APPENDIX 1 2001 LFS STATISTICAL REGIONS

<i>LFS Statistical Region</i>	ASGC 2001 CODE		CHANGE FROM ASGC 1996
<b>New South Wales</b>			
<b>Sydney MSR</b>		<b>11</b>	
Inner Sydney and Inner Western Sydney SRs	1104	1128	
Inner Sydney SR		1104	
Inner Western Sydney SR		1128	
Eastern Suburbs SR		1108	
St George-Sutherland SR		1112	
Canterbury-Bankstown SR		1116	
Fairfield-Liverpool and Outer South Western Sydney SRs	1120	1124	
Fairfield-Liverpool SR		1120	
Outer South Western Sydney SR		1124	
Central Western Sydney SR		1132	
North Western Sydney SR		1136	Previously Outer Western Sydney SR and Blacktown: change of name only.
Lower Northern Sydney SR		1144	
Central Northern Sydney SR		1148	Previously Hornsby Ku-ring-gai SR and Baulkham Hills: change of name only.
Northern Beaches SR		1152	
Gosford-Wyong SR		1156	
<b>Balance of New South Wales MSR</b>			
Hunter SR		1964	
Newcastle SRS		19641	
Hunter excluding Newcastle		19642	
Illawarra and South Eastern SRs	1968	1972	
Illawarra SR		1968	
Wollongong SRS		19681	
Illawarra excluding Wollongong	19683	19684	
South Eastern SR		1972	
Richmond-Tweed and Mid-North Coast SRs	1976	1980	
Northern, Far West-North Western and Central West SRs	1984	1988	1992
Northern, North Western and Central West SDs	130(a)	135(a)	140(a)
Far West SD			160(a)
Murray-Murrumbidgee SR			1996
<b>Victoria</b>			
<b>Melbourne MSR</b>			
Outer Western Melbourne SR			2102
North Western Melbourne SR			2106
Inner Melbourne SR			2108
North Eastern Melbourne SR			2112
Inner Eastern Melbourne SR			2116
Southern Melbourne SR			2120
Outer Eastern Melbourne SR			2124
South Eastern Melbourne SR			2126
Mornington Peninsula SR			2128
<b>Balance of Victoria MSR</b>			
Barwon-Western District SR			2964
Central Highlands-Wimmera SR			2968
Loddon-Mallee SR			2972

## APPENDIX 1 2001 LFS STATISTICAL REGIONS *continued*

<i>LFS Statistical Region</i>	ASGC 2001 CODE	CHANGE FROM ASGC 1996
Goulburn-Ovens-Murray SR	2974	
All Gippsland SR	2976	
<b>Queensland</b>		
<b>Brisbane MSR</b>		
Brisbane City Inner Ring SR	3104	
Brisbane City Outer Ring SR	3108	Compared with the 1996 design, the estimated resident population aged 15 years and over increased by 3,800 (0.9%) at the 2001 Census, transferred to the City of Brisbane from the City of Ipswich.
South and East BSD Balance SR	3112	
North and West BSD Balance SR	3116	Compared with the 1996 design, the estimated resident population aged 15 years and over decreased by 3,800 (1.2%) at the 2001 Census, transferred from the City of Ipswich to the City of Brisbane.
<b>Balance of Queensland MSR</b>		
South and East Moreton SR	3964	
North and West Moreton SR	3968	
Wide Bay-Burnett SR	3972	
Darling Downs-South West SR	3976	
Mackay-Fitzroy-Central West SR	3980	Compared with the 1996 design, the estimated resident population aged 15 years and over increased by 9,800 (4.0%) at the 2001 Census, with the transfer of Bowen Shire from Northern-North West SR.
Northern-North West SR	3984	Compared with the 1996 design, the estimated resident population aged 15 years and over decreased by 9,800 (5.8%) at the 2001 Census, with the transfer of Bowen Shire to Mackay-Fitzroy-Central West SR.
Far North SR	3988	
Gold Coast City Parts A and B SRSs	31122 39641	
<b>South Australia</b>		
<b>Adelaide MSR</b>		
Northern Adelaide SR	4104	
Western Adelaide SR	4108	
Eastern Adelaide SR	4112	
Southern Adelaide SR	4116	
<b>Balance of South Australia MSR</b>		
Northern and Western SA SR	4964	
Southern and Eastern SA SR	4968	
<b>Western Australia</b>		
<b>Perth MSR</b>		
Central Metropolitan SR	5104	
East Metropolitan SR	5108	
North Metropolitan SR	5112	
South West Metropolitan SR	5116	
South East Metropolitan SR	5120	
<b>Balance of Western Australia MSR</b>		
Lower Western WA SR	5964	
Remainder-Balance WA SR	5968	
<b>Tasmania</b>		
Greater Hobart-Southern SRS	61041	
Greater Hobart Statistical Division	605(a)	
Southern Statistical Division	610(a)	
Northern SRS	61042	
Mersey-Lyell SRS	61043	
<b>Balance of Tasmania</b>	610(a) 61042 61043	
<b>Northern Territory</b>		

(a) ASGC Main Structure entity.

## APPENDIX 1 2001 LFS STATISTICAL REGIONS *continued*

<i>LFS Statistical Region</i>	ASGC 2001 CODE	CHANGE FROM ASGC 1996
Northern Territory		7
<b>Australian Capital Territory</b>		
Australian Capital Territory		8
Australian Capital Territory and South Eastern SR	8	1972

## APPENDIX 2 2006 LFS STATISTICAL REGIONS

<i>LFS Statistical Region</i>	ASGC 2006 CODE		CHANGE FROM ASGC 2001	
<b>New South Wales</b>				
<b>Sydney MSR</b>		<b>11</b>		
Inner Sydney and Inner Western Sydney SRs	1104	1128		
Inner Sydney SR		1104		
Inner Western Sydney SR		1128		
Eastern Suburbs SR		1108		
St George-Sutherland SR		1112		
Canterbury-Bankstown SR		1116		
Fairfield-Liverpool and Outer South Western Sydney SRs	1120	1124		
Fairfield-Liverpool SR		1120		
Outer South Western Sydney SR		1124		
Central Western Sydney SR		1132		
North Western Sydney SR		1136		
Lower Northern Sydney SR		1144		
Central Northern Sydney SR		1148		
Northern Beaches SR		1152		
Gosford-Wyong SR		1156		
<b>Balance of New South Wales MSR</b>		<b>19</b>		
Hunter SR		1964	Compared with the 2001 design, reduced by the transfer of area to Northern, Far West-North Western and Central West SRs. No Urban Centres/Localities affected.(a)	
Newcastle SRS		19641		
Hunter excluding Newcastle		19642	Compared with the 2001 design, reduced by the transfer of area to Northern, North Western and Central West SDs. No Urban Centres/Localities affected.(a)	
Illawarra and South Eastern SRs	1968	1972	Compared with the 2001 design, reduced by the exchange of area with Murray-Murrumbidgee SR. No Urban Centres/Localities affected.(a)	
Illawarra SR		1968		
Wollongong SRS		19681		
Illawarra excluding Wollongong	19683	19684		
South Eastern SR		1972	Compared with the 2001 design, reduced by the exchange of area with Murray-Murrumbidgee SR. No Urban Centres/Localities affected.(a)	
Richmond-Tweed and Mid-North Coast SRs	1976	1980		
Northern, Far West-North Western and Central West SRs	1984	1988	1992	Compared with the 2001 design, enlarged to include area from Hunter SR. No Urban Centres/Localities affected.(a)
Northern, North Western and Central West SDs	130(b)	135(b)	140(b)	Compared with the 2001 design, enlarged to include area from Hunter excluding Newcastle. No Urban Centres/Localities affected.(a)
Far West SD			160(b)	
Murray-Murrumbidgee SR			1996	Compared with the 2001 design, enlarged by the exchange of area with Illawarra and South Eastern SRs. No Urban Centres/Localities affected.(a)
<b>Victoria</b>				
<b>Melbourne MSR</b>		<b>21</b>		
Outer Western Melbourne SR		2102		
North Western Melbourne SR		2106		
Inner Melbourne SR		2108		
North Eastern Melbourne SR		2112		
Inner Eastern Melbourne SR		2116		
Southern Melbourne SR		2120		
Outer Eastern Melbourne SR		2124		

(a) An ASGC Urban Centre is a population cluster of 1,000 people or more; and a Locality is a population cluster of between 200 and 999 people.

(b) ASGC Main Structure entity.

## APPENDIX 2 2006 LFS STATISTICAL REGIONS *continued*

<i>LFS Statistical Region</i>	ASGC 2006 CODE	CHANGE FROM ASGC 2001
South Eastern Melbourne SR	2126	
Mornington Peninsula SR	2128	
<b>Balance of Victoria MSR</b>	<b>29</b>	
Barwon-Western District SR	2964	
Central Highlands-Wimmera SR	2968	
Loddon-Mallee SR	2972	
Goulburn-Ovens-Murray SR	2974	
All Gippsland SR	2976	
<b>Queensland</b>		
<b>Brisbane MSR</b>	<b>31</b>	<i>Compared with the 2001 design, reduced by the transfer of Gold Coast City Part A SRS to Balance of Queensland MSR; and enlarged to include area from North and West Moreton SR and from South and East Moreton SR (affects many Urban Centres/Localities).(a)</i>
Brisbane City Inner Ring SR	3104	
Brisbane City Outer Ring SR	3108	
South and East BSD Balance SR	3112	<i>Compared with the 2001 design, reduced by the transfer of Gold Coast City Part A SRS to a new 2006 SR (affects many Urban Centres ); and enlarged to include area from South and East Moreton SR (no Urban Centres/Localities affected).(a)</i>
North BSD Balance SR	3120	<i>Compared with the 2001 design, formed from the northern part of North and West BSD Balance SR and by the transfer of area from North and West Moreton SR.</i>
Ipswich City SR	3124	<i>New in 2006. Compared with the 2001 design, formed from the western part of North and West BSD Balance SR and by the transfer of area from North and West Moreton SR.</i>
<b>Balance of Queensland MSR</b>	<b>39</b>	<i>Compared with the 2001 design, enlarged to include Gold Coast City Part A SRS from Brisbane MSR; and reduced by the transfer of area from North and West Moreton SR and from South and East Moreton SR to Brisbane MSR (affects many Urban Centres/Localities).(a)</i>
Gold Coast SR	3965	<i>New in 2006. Compared with the 2001 design, formed from Gold Coast City Part A SRS and Gold Coast City Part B SRS and by the transfer of area from South and East Moreton SR (affects many Urban Centres/Localities ).(a)</i>
Gold Coast North SRS	39651	<i>Compared with the 2001 design, formed from Gold Coast City Part A SRS and by the transfer of area from Gold Coast City Part B SRS (no Urban Centres/Localities affected).(a)</i>
Gold Coast South SRS	39653	<i>Compared with the 2001 design, formed from most of Gold Coast City Part B SRS and by the transfer of area from South and East Moreton SR (affects many Urban Centres/Localities).(a)</i>
Sunshine Coast SR	3966	<i>New in 2006. Compared with the 2001 design, formed from part of North and West Moreton SR.</i>
West Moreton SR	3969	<i>New in 2006. Compared with the 2001 design, formed from the remainder of North and West Moreton SR and South and East Moreton SR after all other area losses.</i>
Wide Bay-Burnett SR	3972	
Darling Downs-South West SR	3976	
Mackay-Fitzroy-Central West SR	3980	
Northern-North West SR	3984	<i>Compared with the 2001 design, reduced by the transfer of area to Far North SR. This affects Kowanyama (1,017 people in 2006) and Pormpuraaw (600 people in 2006).</i>
Far North SR	3988	<i>Compared with the 2001 design, enlarged to include area from Northern-North West SR. This affects Kowanyama (1,017 people in 2006) and Pormpuraaw (600 people in 2006).</i>
<b>South Australia</b>		
<b>Adelaide MSR</b>	<b>41</b>	
Northern Adelaide SR	4104	
Western Adelaide SR	4108	

(a) An ASGC Urban Centre is a population cluster of 1,000 people or more; and a Locality is a population cluster of between 200 and 999 people.

## APPENDIX 2 2006 LFS STATISTICAL REGIONS *continued*

<i>LFS Statistical Region</i>	ASGC 2006 CODE		CHANGE FROM ASGC 2001
Eastern Adelaide SR		4112	
Southern Adelaide SR		4116	
<b>Balance of South Australia MSR</b>		<b>49</b>	
Northern and Western SA SR		4964	
Southern and Eastern SA SR		4968	
<b>Western Australia</b>			
<b>Perth MSR</b>		<b>51</b>	
Central Metropolitan SR		5104	
East Metropolitan SR		5108	
North Metropolitan SR		5112	
South West Metropolitan SR		5116	
South East Metropolitan SR		5120	
<b>Balance of Western Australia MSR</b>		<b>59</b>	
Lower Western WA SR		5964	
Remainder-Balance WA SR		5968	
<b>Tasmania</b>			
Greater Hobart-Southern SRS		61041	
Greater Hobart Statistical Division		605(a)	
Southern Statistical Division		610(a)	
Northern SRS		61042	
Mersey-Lyell SRS		61043	
<b>Balance of Tasmania</b>	<b>610(a)</b>	<b>61042</b>	<b>61043</b>
<b>Northern Territory</b>			
Northern Territory		7	
<b>Australian Capital Territory</b>			
Australian Capital Territory		8	
Australian Capital Territory and South Eastern SR	8	1972	Compared with the 2001 design, reduced by the exchange of area between South Eastern SR and Murray-Murrumbidgee SR. No Urban Centres/Localities affected. (b)

(a) ASGC Main Structure entity.

(b) An ASGC Urban Centre is a population cluster of 1,000 people or more; and a Locality is a population cluster of between 200 and 999 people.









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