Australian Bureau of Statistics

Statistical UPDATE

An Information Newsletter from the Queensland Office

Issue No. 15, November 2003

In This Issue

Editorial

My name is Ron Casey and my current position is the Director of the Population and Social Statistics Branch. I have always had a very keen interest in population statistics, and the attainment of my present position has been a goal of mine ever since I joined the ABS, even though it took me 30 years to get there!!

I joined the ABS in 1971 and have spent my entire career in the Queensland office. My work experience has covered most areas in the ABS, but over the last 10 years it has been predominantly in Client Services, where I was the Director before transferring into my current position in early 2000.

The Population and Social Branch encompasses a number of responsibilities, both national and Queensland specific. The largest unit in the branch is the Health and Vitals statistics National Processing Centre, which has responsibility for the collection and processing of all births, deaths, marriages and divorces registered in Australia each year, which includes the coding of cause of death using the International Classification of Diseases (ICD-10).

This information is not collected directly by the ABS, but rather obtained as an administrative by-product from the Registrar-General for Births, Deaths and Marriages in each state and territory, and from the Family Law Court in the case of divorces.

Ron Casey

Although the data we receive from these sources are of very high quality, the major focus of the section is to maintain, and even improve upon the data quality through the strong relationships we have with the data suppliers. The section also has national responsibility for the annual Private Health Establishments Collection.

The other national responsibility of the branch is the National Ageing Statistics Unit (NASU), which was only established within the ABS in April 2002. The major role of NASU is to improve the understanding of ageing issues within Australia, primarily through the production of analytical reports produced by the unit, and the support of analysis undertaken by others. A significant role of NASU in the future will be the provision of statistical leadership in the development and promotion of standards and definitions, to enable greater comparability between sources of ageing-related research.

The Queensland specific responsibilities of the branch comprise the annual production of Estimated Resident Population (ERP) for statistical local areas within Queensland, the maintenance of the Australian Standard Geographical Classification, and assisting the adoption of standard Indigenous identification in Queensland Government administrative data sources. Major challenges that have recently been addressed are the production of annual ERP figures for Indigenous communities, and a major review of south-east Queensland statistical geography, to be effective from July 2006.

If there are any issues you would like to discuss, please feel free to give me a call on my direct line 07 3222 6312 or email me on <ron.casey@abs.gov.au>.

— Ron Casey

Geocoding — Mesh Blocks, the Base Unit

Across its statistical collections the ABS uses a common standard for geographical areas known as the Australian Standard Geographical Classification (ASGC). The smallest building block currently in use for statistical data collection is the Census Collection District (CD), typically comprising 100 to 220 households. CDs are, however, subject to certain constraints, consequently they do not always align to desired geographic regions.

One method of avoiding this shortcoming is through the use of geocoding — a process of allocating latitude and longitude to each individual dwelling or business, thereby describing its position on the surface of the earth. Once a statistical unit has been geocoded it is a relatively simple process to code it to any geographical classification simply by 'overlaying' the geocoded point with a set of regions in a Geographical Information System. The power of geocoding lies in the fact that once a statistical unit has been allocated a latitude and longitude it can be coded to any geographical classification. The ABS has been experimenting with the geocoding of statistical units for several years but until now geocoding has been relatively difficult due to poor address information, particularly in rural and regional Australia. The soon to be completed Geocoded National Address File (G-NAF) will solve many of the practical problems of geocoding and enable the ABS and others to cost effectively geocode large address lists. Geocoding of individual households, however, has the potential to create public concern about confidentiality.

To obtain most of the advantages of geocoding without any compromise to confidentially the ABS proposes to develop a new micro-level geographical unit known as a mesh block. Mesh blocks will on average contain 20 to 50 households and could be created to align with the widest range of administrative and natural boundaries. Only very basic census data would be available at the mesh block level, perhaps only number of dwellings and population counts, but the full range of census data would be available for combinations of mesh blocks.

If statistical and administrative geographies are to share a common building block then mesh blocks must be implemented in a manner that is more consistent and precise than statistical applications alone would require. It is vital that state governments fully participate in the consultation process and inform the ABS on how to define mesh blocks in a way that would be consistent with state use for statistics but also for local authority boundaries, geographical names, electoral purposes, etc. Once designed and readily available, mesh blocks have the potential to become a new building block of Australian geography so that any organisation developing a set of regions would build up its areas simply by adding mesh blocks together in whatever combination best suited its purpose. This in turn would ensure that census data could be accurately derived for those regions.

Geocoding — Mesh Blocks, the Base Unit — *continued*

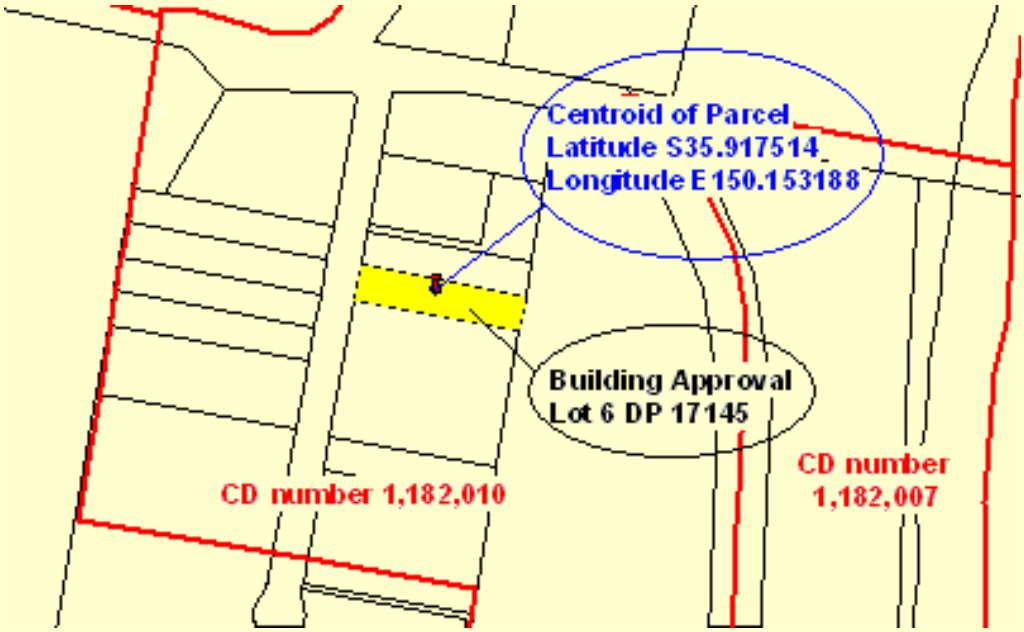
A panel of experts is currently advising the ABS on ideal design parameters for mesh blocks and an ABS position paper will be published in February 2004, followed by an intensive consultation with states and territories and other key stakeholders in March/April 2004.

For further information contact Frank Blanchfield on 02 6252 7759 or <frank.blanchfield@abs.gov.au>.

Population Estimates, Building Approvals and Geocoding

stimating population change between censuses requires a detailed picture of exactly where residential building activity is occurring. That is why the ABS asks local government councils for detailed location information for each building approval. This allows the ABS to determine the census collection district (CD) code for each approval. This is important information for the conduct of the 5-yearly census of population and housing as well as for estimation of population between censuses.

In late 2001, the ABS negotiated to introduce a new file format for building approvals reports produced for the ABS. This new format incorporates geocodes (coordinates of latitude and longitude) which uniquely locate any building site on the surface of the earth.



Councils with a Geographical Information System can readily output the latitude and longitude of a parcel of land from it for inclusion in their approvals report to the ABS.

Apart from the precision which geocoding offers in identifying the location of each parcel of land, its major advantage lies in its permanence. While CD boundaries are often adjusted after each census based on changes in population, the geocoding of each parcel of land remain constant. Once a building approval has been allocated a geocode the ABS can use that information to determine the correct CD code with fewer resources and far greater accuracy than ever before.

The end result is more accurate population estimates.

For further information contact Keith Allen on 1800 811 017 (toll free) or <keith.allen@abs.gov.au>.

State Statistical Priorities Paper for 2004 — Your Department's Input Needed by December!

The mission of the ABS is to assist and encourage informed decision-making research and discussions with governments and the community, by providing a high quality, objective and responsive national statistical service.

To assist us to deliver on our mission, the ABS asks Queensland state government departments each year, through the Office of the Queensland Government Statistician, to identify the key statistical priorities needed to deliver on their key policy priorities. This, in combination with other information and research, assists the ABS to identify important existing and emerging national statistical issues which may be implemented in the forward work program of the ABS. It also assists the Queensland office of the ABS in collaboration with the Office of the Queensland Government Statistician, to meet Queensland Government priority statistical needs.

Submissions to the Office of the Queensland Government Statistician for the 2004 state statistical priorities paper are due by 3 December.

For more information contact: Walter Robb on 07 3224 5072 or <walter.robb@treasury.qld.gov.au>.

Building Approvals Statistics — Economic Canary and Growth Indicator

Have you ever wondered why the ABS produces building approvals statistics each month?

Simply put, the building industry is regarded as one of the best guides to the health of the Australian economy. Each month, governments analyse the statistics published by the ABS, trying to comprehend what's really happening in the building industry and, by extension, the Australian economy as a whole.

Building statistics are also used to identify the main areas of population growth, on the assumption that where the population grows rapidly, the demand for services (transport, education, health, etc.) will increase at a similar rate. They are also an input for the intercensal estimates of residential population which are used in the Commonwealth formula for allocation of funds to state and local governments each year.

Industry uses building statistics in much the same way — to locate the growth areas and predict the level of demand for their products and services, to identify the most profitable locations for new outlets, to monitor trends in the use of different building materials and generally to stay one step ahead of both the consumer and competitors.

Accurate building statistics are a key requirement for both government and industry and the ABS is dependent on local government approving authorities to provide high-quality, timely data for publication each month.

The main features of building publications are freely available on the ABS web site <www.abs.gov.au> and publications can be viewed free in either electronic or hard copy form at your local library. Time series data are also available on the ABS web site or through the ABS consultancy service by telephoning 1300 135 070. Most state and local government employees have free access to all this information through ABS Data on Data Hub.

For further information contact Darryl Rowe on 08 8237 7596 or <darryl.rowe@abs.gov.au>.

Detailed Data for the Analyst — Confidentialised Unit Record Files

Confidentiality of data supplied to the ABS is our prime concern and is enforced by law. Under the *Census and Statistics Act 1901* the ABS can release unit record data provided this is done: '...in a manner that is not likely to enable the identification of a particular person or organisation to which it relates.' These microdata are released as Confidentialised Unit Record Files (CURFs).

A CURF will be produced by the ABS only where there is a demonstrated user demand, and the CURF specifications comply with confidentiality requirements. The release of a CURF is at the discretion of the Australian Statistician.

The unit records are protected from identification in a number of ways. The name, address and all other information which would enable an individual or business to be easily identified are removed. Some records with unusual characteristics which might make them identifiable from the crowd are altered to more usual values and some very unusual records (the tall poppies) are removed altogether.

A second line of protection from identification is control of the mode of access to more detailed data, restrictions on how the data may be used and limitations on the size and nature of outputs obtained from unit record data.

The third line of protection is a binding legal undertaking from each user and the CEO of the organisation regarding the use to which the CURF is to be applied, including an undertaking that no attempt will be made to identify the units to which the data applies, backed up by logging / auditing the use of the CURF to ensure the undertaking is followed.

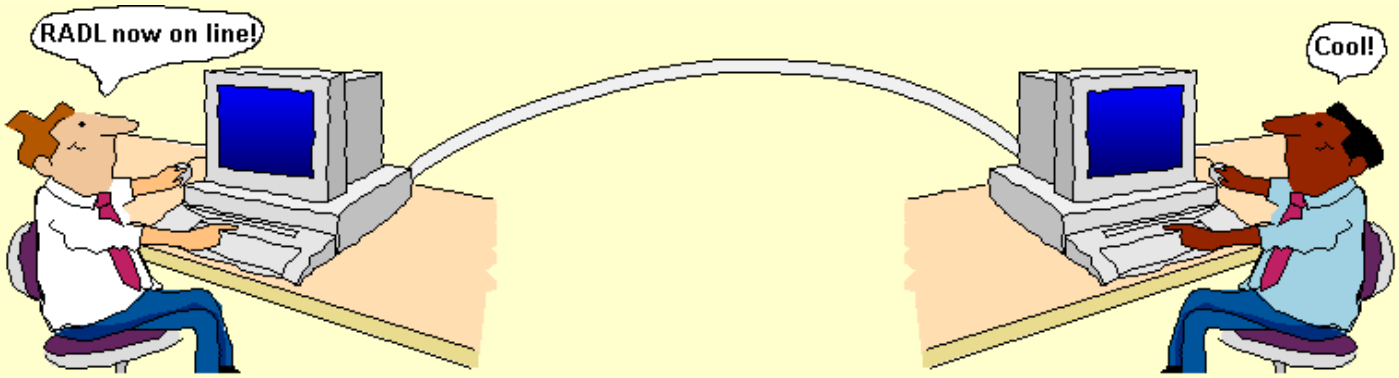
The least detailed unit record files are available on CD–ROM. These may be accessed by the client on their own computer, but an analysis based on this kind of CURF is, like the data, somewhat restricted.

More detailed CURFs may be accessed through the Remote Access Data Laboratory (RADL). This allows access from any computer with Internet connection. The CURF remains within the ABS premises, user activity is monitored and there are restrictions on the kind of queries permitted and the size and type of outputs.

The most detailed CURFs are available via the ABS Data Laboratory (ABSDL). This is for specialist applications requiring a high level of detail. Using the ABSDL, it may be possible to use data from collections where previously CURFs could not be produced. The ABSDL may allow users to integrate CURF data with other datasets in a way that does not identify individuals. User activity is kept under ABS supervision and although there is more freedom in the kinds of queries that are permitted, there are greater restrictions on the nature and size of outputs which can be removed from the ABS environment.

If you would like access to one or more CURFs, the CURF user training manual (required reading for all CURF users) is available on the ABS web site <www.abs.gov.au> under Access to ABS CURFs. Conditions of access, costs, the undertakings required, user obligations and other details are also set out.

For further information contact the CURF Management Unit at <curf.management@abs.gov.au>.



URGENT NOTICE — Statistical Update Will Be Electronic Only in the Near Future

WE NEED YOUR EMAIL ADDRESS! Subscribers who do not currently receive an electronic copy are requested to email your details to <arthur.poulter@abs.gov.au>. This will ensure you will continue to receive this newsletter promptly each quarter.

Advantaged and Disadvantaged Areas — SEIFA 2001

SEIFA 2001 is a product developed especially for those interested in the assessment of the welfare of Australian communities.

These indexes show where the affluent (as opposed to just high income earning) live; where disadvantaged (as opposed to the unemployed) live; and where the highly skilled and educated (as opposed to the tertiary educated people) live.

The four indexes are:

- Index of advantage/disadvantage -

A new index for SEIFA 2001. This index is a continuum of advantage to disadvantage and is available for both urban and rural areas. Low values indicate areas of disadvantage, and high values indicate areas of advantage. It takes into account variables such as the proportion of families with high incomes, people with a tertiary education and employees in skilled occupations. indexes are:

- Index of disadvantage -

This index is derived from attributes such as income, educational attainment, unemployment and dwellings without motor vehicles. In particular it focuses on low income earners, relatively lower educational attainment and high unemployment.

- Index of economic resources -

Variables for this index include those relating to the income, expenditure and assets of families, such as family income, rent paid, mortgage repayments and dwelling size.

- Index of education and occupation -

This index includes variables relating to the educational and occupational characteristics of communities, such as the proportion of people with a higher qualification or those employed in a skilled occupation.

SEIFA 2001 provides information and rankings for a wide range of geographic areas from small areas such as a collection district (CD) to large areas such as statistical divisions. Alternatively, users will be able to customise areas to their own specifications.

Geographic areas available are:

- ASGC main structure; collection district, statistical local area, statistical sub-division, statistical division and state.
- Local government area structure; local government area, statistical local area and collection district.
- Census specific hierarchies; Commonwealth electoral divisions, state electoral divisions, postal area and suburbs.

SEIFA 2001 is available as a stand-alone product or as an add-on datapack to CDATA 2001. The ABS has developed indexes to allow ranking of regions/areas, providing a method of determining the level of social and economic well-being in each region.

For further information contact Greg Lawrence on 07 3222 6280 or <g.lawrence@abs.gov.au>.

Australia's Population Is Ageing

Population Projections, Australia, 2002–2101 (cat. no. 3222.0) was released in September 2003 giving population projections from 2002 to 2101 for Australia and from 2002 to 2051 for the states/territories and capital city/balance of state.

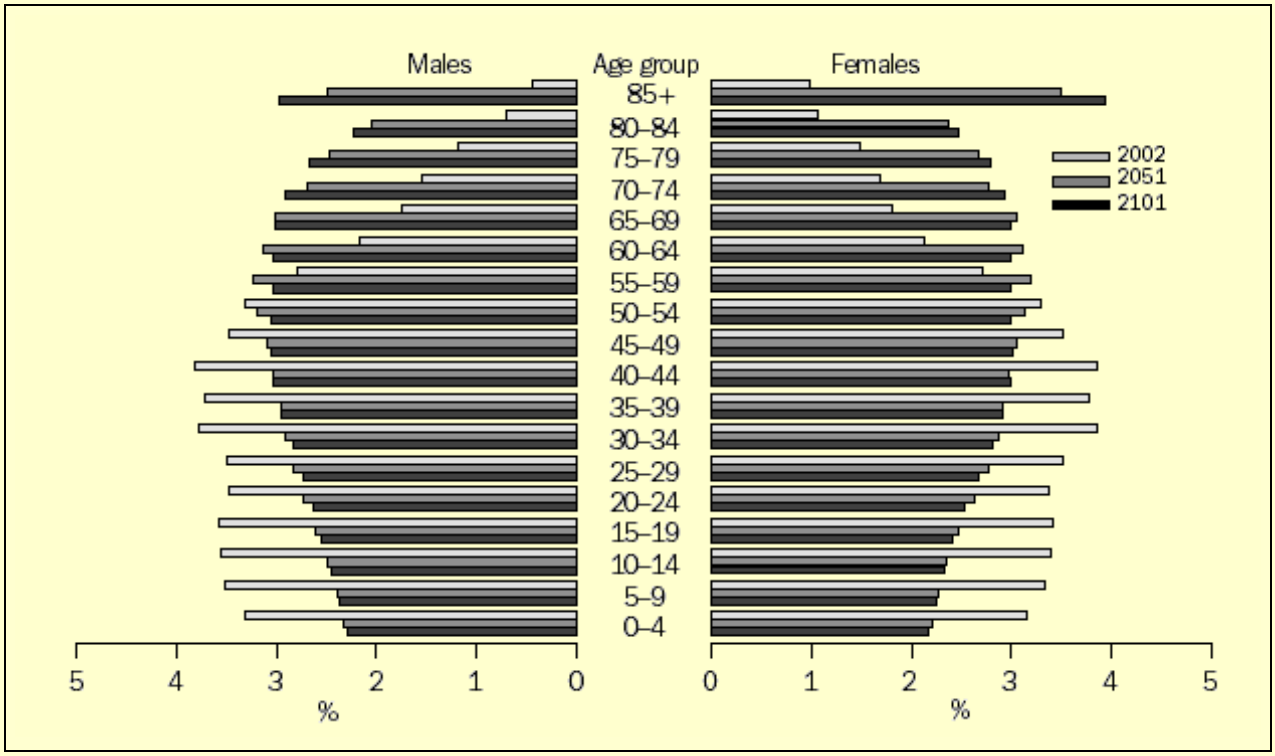
Of all the changes that are projected to occur in Australia's population, ageing is the most dramatic, resulting from major changes in the age structure of the population, particularly over the next 50 years.

The projections show that the ageing of the population, which is already evident in the current age structure, is set to continue. This is the inevitable result of fertility remaining at low levels over a long period while mortality rates decline. The median age (the age at which 50% of the population is older and 50% younger) at June 2002 of 35.9 years is projected to increase to between 40.4 years and 42.3 years in 2021 and between 46.0 years and 49.9 years in 2051. By 2101 the median age is projected to be between 47.9 years and 50.5 years.

The ageing of the population affects the entire age structure of the population. The proportion of the population aged under 15 years is projected to fall from 20% (4.0 million) of the population at June 2002, to between 12%–15% in 2051 (2.8 million to 4.8 million) and 12%–15% in 2101 (3.6 million to 5.5 million). The proportion of the population aged 50 years and over is projected to increase from 29% at June 2002 (5.7 million) to between 46%–50% in 2051 (11.5 million to 14.3 million) and 47%–51% in 2101 (9.6 million to 18.0 million).

Consequently, the age structure of the population is projected to change noticeably by 2051, with a greater concentration of people aged 50 years and over and lower proportions of young people. This distribution is also evident in projections for 2101.

PROJECTED POPULATION AGE STRUCTURE, As at 30 June, Series B* —Australia



*Series B is the medium series. Details regarding the particular assumptions used for births deaths and immigration are available in *Population Projections, Australia, 2002–2101*.

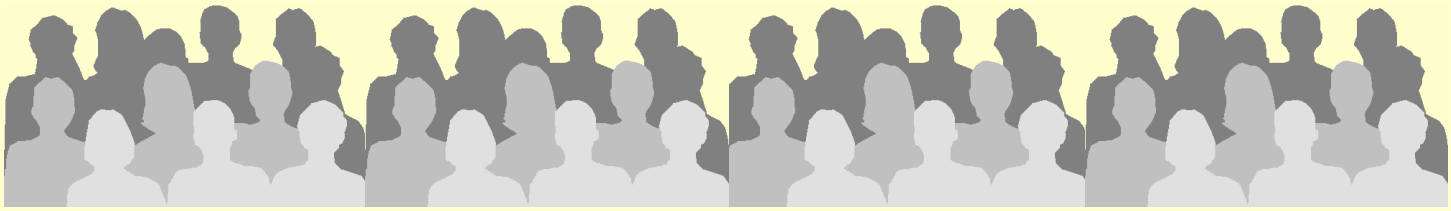
The projections for Queensland also show that the ageing of the population in Queensland will continue. The median age of the Queensland population was 35.3 years in 2002 and is projected to increase to between 45.7 years and 50.3 years by 2051.

Australia's Population Is Ageing — *continued*

PROJECTED POPULATION, Series B*, Queensland—As at 30 June

*Series B is the medium series. Details regarding the particular assumptions used for births deaths and immigration are available in *Population Projections, Australia, 2002–2101*.

For further information contact Matthew Montgomery on 02 6252 6487 or <matthew.montgonery@abs.gov.au>.



20 Million on 4 December 2003

Australia's official population is estimated to reach 20 million on 4 December 2003.

The Australian Statistician, Dennis Trewin, said the population milestone would form part of Australia's demographic history.

"It is a nice round number and there has already been some debate about precisely when it will be reached," he said.

"The ABS official estimate of 4 December takes into account all the information that we have available from births, deaths, overseas arrivals and departures and the 2001 Population Census."

Mr Trewin said it was not possible to determine who exactly the 20 millionth Australian would be because of the variable nature of population increases.

However, it could be a person born around that time, a person who arrives as a permanent settler in Australia, or an Australian citizen returning home after living overseas for more than 12 months.

For further information contact Patrick Corr on 02 6252 6411 or <patrick.corr@abs.gov.au>.

Tourism Action Plan

The ABS hosted the tourism statistics consultative group meeting in August 2003. Users discussed the tourism information development plan (IDP) and the strategies proposed by the ABS following the review of the survey of tourist accommodation (STA).

Participants supported the development of the tourism IDP. The plan will identify the data needs of key stakeholders and encourage industry and government to adopt a broad, strategic and coordinated approach to the development of tourism statistics.

Users asked the ABS to develop a tourism action plan to coordinate key actions for improving tourism information. A draft was recently sent to users for comment. The ABS will continue to seek feedback from key users. An important part of this process will be reaching agreement on action points and commitment to their progression.

These developments will be considered in the context of government policy such as the Tourism White Paper.

For more information contact Linda Fardell on 02 6252 6348 or <linda.fardell@abs.gov.au>.

Our e MAIL notification service — free bulletins on just the data you require on the day it's released.

Free ABS Email Notification Service

The ABS has developed a free email notification service whereby users may register their interest in a topic on the ABS web site to receive an email alert whenever there is a release related to that topic.

Users can now register for the service from a link 'Email Notification Service' on the ABS home page in the Statistical Releases section. A product list with check boxes allow users to register for one topic, many topics or all releases. For example, people who subscribe to 'Census statistical products and services' will be sent an email notification about any products released that day which have catalogue numbers that start with 20. Users can also unsubscribe from one or all releases and query their subscriptions.

To use the service it's just a matter of ticking as many boxes as you like, entering your email address and clicking on the Subscribe button. You will then be sent a confirmation email, which must be returned to enable the ABS to activate the subscription. Querying and unsubscribing follow similar processes.

If the product has a Main Features, a link in the notification email will be linked to Main Features. Alternately, if the product does not have a Main Features it will be linked to the ABS on-line catalogue entry. From either Main Features or catalogue, the user will be able to access the related publication, spreadsheet, etc. through the 'Related Links' section. The email will also contain a link to the week's forthcoming releases and the ABS web site.

Inquiries regarding the email notification service should be sent through the Subscription Support link on the email notification page which will generate an email and a reply will be forwarded back to you shortly.

For further information contact Donna Gallagher on 02 6252 6800 or <donna.gallagher@abs.gov.au>.

STATISTICAL DEVELOPMENTS

Industrial Disputes Now an Electronic Quarterly

Following the December 2003 issue, scheduled for release in March 2004, the ABS will replace the current monthly publication *Industrial Disputes, Australia* (cat. no. 6321.0) with a quarterly electronic publication, commencing with the publication for March quarter 2004. The December 2003 issue of 6321.0 will be the final release in the form of a paper publication.

The quarterly electronic publication, containing a small number of summary tables, will be available free of charge from the ABS web site <www.abs.gov.au> or for state and local government users, through ABS Data on the Data Hub. The move to an electronic publication containing summary tables, and the use of the ABS web site for distribution will provide for easier access to industrial disputes statistics.

More detailed tables will continue to be available as electronic spreadsheets, through the ABS web site, AusStats and ABS@ (ABS Data on the Data Hub) or on request, at applicable charges. The eight spreadsheets currently available electronically will be replaced with a new series of spreadsheets containing quarterly data. The current spreadsheets contain an extended time series (back to 1983) of the data that is provided in the current version of 6321.0.

The ABS is undertaking a user consultation, advising users of these changes and seeking their comments, to feed into decisions on the final make-up of the electronic publication and associated electronic spreadsheets.

We would appreciate your comments on the use you and your organisation make of the current electronic spreadsheets, and your suggestions for changes to the spreadsheets.

For further information contact Harry Kroon on 02 6252 6753 or <harry.kroon@abs.gov.au>. State government user comments should be directed to <lynn.collins@treasury.qld.gov.au>.

Information Development Plans

A major development in the ABS in 2002–03 has been the concept of Information Development Plan (IDPs) in defined fields of statistics.

The purpose of an IDP is to provide a framework for looking at the key policy issues, the data requirements to address those issues, to identify the available data (both ABS and non-ABS data) and to establish what additional data are needed and get agreement on who has the responsibility to supply the data.

The concept of IDPs has been strongly supported by all interested parties as an IDP creates a shared understanding of the issues involved and a shared commitment to the actions to be undertaken.

One aspect that is of particular importance in developing an IDP is to correctly identify from the beginning what the key issues are and what questions of policy are driving them.

For example, during 2002–03, a draft IDP was prepared for education and training statistics. It identified key issues, provided agreed directions for improving relevance, coverage comparability and quality of education statistics for Australia and identified responsibilities for progressing individual strands of work and monitoring overall progress.

For further information contact Greg McNamara on 07 3222 6155 or <greg.mcnamara@abs.gov.au>.

STATISTICAL DEVELOPMENTS

The Queensland Economy: 1991–92 to 2001–02

Queensland in Review is a suite of articles on the ABS web site <www.abs.gov.au> that provides information on Queensland over the past 10 years. A new page titled 'The Economy' has been added to Queensland in Review. This page will host a number of economic articles with statistics and related links on the Queensland economy.

The first article released looks at the Queensland economy between 1991–92 to 2001–02. *The Queensland Economy: 1991–92 to 2001–02* analyses Queensland's gross state product (GSP), GSP per person, economic growth and purchasing power over the past decade.

A second article *Components of Queensland's Economic Growth per Person* was released recently. Components of economic growth include labour productivity, average hours worked, employment rate, participation rate and proportion of the population aged 15 years or more. Users are encouraged to check periodically for future updates.

Other Queensland in Review topics are:

- General,
- Population Characteristics,
- Social Characteristics of Population,
- Economic Characteristics of Population and
- Industry.

A new topic titled The Environment will be added soon.

To get to Queensland in Review:
1. Go to the ABS home page <http://www.abs.gov.au>,
2. Click on Themes ,
3. Click on Queensland (under the Regional heading),
4. Under the Statistics heading, go to Queensland in Review.

For further information contact Shell McConville 07 3222 6428 or <shell.mcconville@abs.gov.au>.

CENSUS

Census Data — Supplied Your Way

Are you a government agency, private business or a member of the public requiring census data?

If so the ABS has Information Consultants ready to advise and assist you to obtain just the information you require!

Tailored to meet your specific needs, the Customised Table Service is able to provide detailed data on social, economic and demographic characteristics down to collection district level (approximately 225 households).

The Customised Table Service gives you maximum flexibility in the selection of census variables and geographic areas. For example, you could get information on certain population characteristics within a 10 km radius of a possible location for a new business.

If you need help, ABS Information Consultants can assist with specifying your tables and provide information on pricing. Indicative prices for customised tables can also be obtained using the Census Table Specification Service which can be downloaded to a user's desktop from a CD–ROM.

To obtain the CD–ROM, email your postal details to <census2001@abs.gov.au> or call the National Information and Referral Service on 1300 135 070 for more information.

Indigenous Peoples' Health and Welfare

The Health and Welfare of Australian Aboriginal and Torres Strait Islander Peoples, 2003 (cat. no. 4704.0), the fourth biennial joint report by the ABS and the Australian Institute of Health and Welfare is now available.

It is a compendium covering the demographic, social and economic context; housing and environmental health; health services provision, access and use; community services; mothers and babies; ill health; health risk factors; mortality; Torres Strait Islanders; and recent developments in the collection of Indigenous statistics.

At the 2001 Census, 42% of Indigenous adults were employed, compared with 58% of non-Indigenous adults. The unemployment rate was 22% for Indigenous males compared with 8% for non-Indigenous males and 18% for Indigenous females compared with 7% for non-Indigenous females.

The average equivalised household income was $364 a week for persons in Indigenous households compared with $585 a week for persons in other households. (For an explanation of equivalised household income see the Glossary of *The Health and Welfare of Australian Aboriginal and Torres Strait Islander Peoples, 2003*.)

In discrete Indigenous communities, 31% of permanent dwellings managed by Indigenous Housing Organisations needed major repairs or replacement. Of people living in discrete communities, 62% use bore water as the main source of drinking water, while 17% had access to town water. In communities of 50 or more people not connected to town water, over a quarter had drinking water that failed quality tests at least once in the previous year, while a fifth of these communities (representing 8% of the population in communities) had not been tested in the last 12 months.

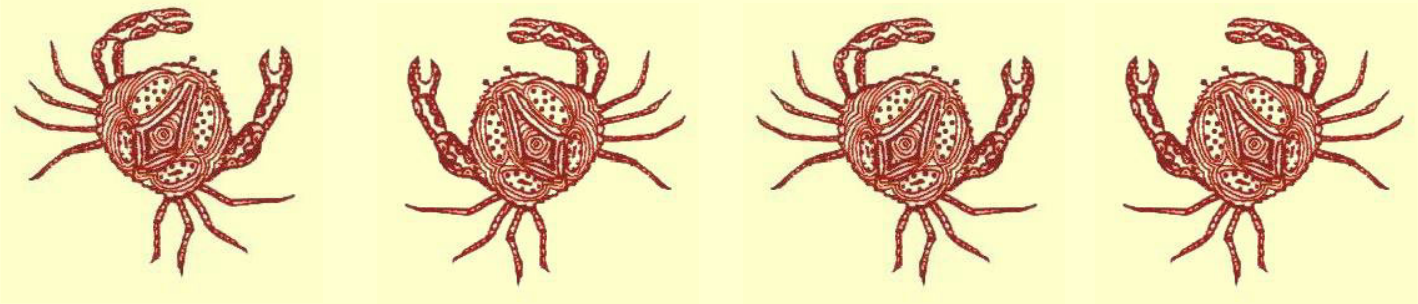
In 2001, some 57,000 people living in discrete Indigenous communities lived more than 100 km from a hospital, but most had access to a community health centre in their community. There were, however, 174 communities (3,255 people) which were 100 km or more from either a hospital or a community health centre.

The age-specific death rate for persons identified as Indigenous in Queensland, South Australia, Western Australia and the Northern Territory was at least double that for the total Australian population for all age groups below 75 years. The largest differences occurred between ages 35–54 years, where the Indigenous death rates were up to five times those of the total Australian population.

For statistical clarification purposes contact Jenny Coccetti on 08 8943 2195 or <jenny.coccetti@abs.gov.au>.

To purchase a copy of the publication please call the National Information and Referral Service on 1300 135 070.

To purchase spreadsheets of the data contained within the tables and graphs please access the ABS web site <www.abs.gov.au> under Themes, Indigenous or to download the publication free, go to the AIHW web site <www.aihw.gov.au>.



Cluster Sampling (How to Lower the Cost of Household Surveys)

In the previous issue of *Statistical Update* we saw how to minimise the relative standard error of a survey by *stratified sampling*, the process of dividing the population to be sampled into groups which were similar, usually in size, then sampling each group. This technique gives a smaller relative standard error for each group and thus for the whole survey without increasing the sample size. However, for ABS household surveys, only geographic stratification is operationally feasible. This is because geography is the only information available with which to stratify the population. While geographic stratification is operationally feasible, it results in minimal reduction in relative standard errors. This is because people and households in a geographic strata are typically not very similar.

Optimisation of social surveys needs a different technique. One way to reduce the cost of social surveys is to minimise the amount of travelling needed by interviewers by *cluster sampling*.

Like stratified sampling, cluster sampling involves some prior knowledge of the population to be sampled, but in this case the knowledge is the geographic location of the households. A multistage area sample is necessary as there are no comprehensive and up to date lists of dwellings in the whole of Australia, so it is necessary to select and sub-select areas until appropriately small listing units are obtained.

The process involves dividing each state into a number of areas which each could be representative of a particular *geographic* stratum. When the whole of Australia has been divided into a patchwork of primary selection areas defined by the strata, each area has its census collection districts (CDs) numbered in serpentine order for selection purposes. A selection is then made from these by computer, with the probability of selection of each CD in proportion to the number of clusters in it (at the last census).

Each selected CD is then counted, either on the ground or from the air and divided into blocks of 40 to 50 households. One or more blocks (usually one) is then selected by computer to represent the CD, again with probability proportional to size.

The blocks are divided into clusters — groups of dwellings which could constitute a selection for the survey. Thus, if a block is four times the cluster size it consists of four possible population survey samples (i.e. four clusters):
Sample 1: dwellings 1, 5, 9, 13 - - - -
Sample 2: dwellings 2, 6, 10, 14 - - - -
Sample 3: dwellings 3, 7, 11, 15 - - - -
Sample 4: dwellings 4, 8, 12, 16 - - - -

Clusters are not compact groups but are the groups which could be selected using a random start and the appropriate skip interval to give the final desired sample size and relative standard error. The number of clusters to be selected from a stratum equals the number of clusters in the stratum divided by the state skip.

While each household in the state or Australia has an equal chance of selection (a fundamental necessity for a survey to be valid), cluster sampling does mean that remote areas tend to be left out and regional estimates are less reliable.

Better estimates could be provided by simple random sampling, which selects individual persons or dwellings at random from Australia. Simple random sampling would, however, involve a large amount of travelling because selected households would be geographically dispersed. Although cluster sampling is generally *less accurate* than a sample of the same size selected by simple random sampling, as it is not as representative of the population, the savings outweigh the loss of accuracy of the survey. Increasing the number of dwellings in a cluster would reduce travel for the interviewers and increase the savings, but is likely to increase the relative standard error (and vice versa). The most appropriate number of dwellings in a cluster is always a balance between travel cost and accuracy.

For further information contact Shaynie Paton on or <shaynie.paton@abs.gov.au>.

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