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Australian Bureau of Statistics

2001 census

Australia Online:

How Australians are Using Computers & the Internet

AUSTRALIAN CENSUS ANALYTIC PROGRAM

New Issue

Australian Census Analytic Program

Australia Online: How Australians are Using Computers and the Internet

2001

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PREFACE

This paper examines the socioeconomic and regional characteristics of users of home computers and the Internet in Australia using data from the 2001 Census of Population and Housing, the first to collect such information. It examines patterns of use at a national level for a range of socioeconomic variables. It identifies groups that are not connected and thus at greater risk of being on the wrong side of the digital divide. It looks at location of use for different population groups and the way in which using the Internet at work impacts on use at home. Lorenz curves are used to examine inequality of home computer and Internet use by income. The paper examines the rates of use between and within states and territories. Maps illustrate the spatial distribution of computer and Internet use by Postal Area (POA). The correlation between key socioeconomic variables and rates of use is examined as a first step in identifying particular regional factors. A multivariate regression analyses the separate effects of socio-demographic and regional factors impacting on Internet and home computer use.

The authors wish to acknowledge the support of the Australian Bureau of Statistics (ABS) for this project, which is conducted under the auspices of the Australian Census Analytic Program. They wish to acknowledge the financial support given by Centrelink and the School of Business, Law and Information Sciences at the University of Canberra, which allowed the research to proceed. Thanks also to Alicia Payne, Rebecca Cassells and Kristy Bewert for their research assistance, David Pederson for his statistical advice and Lex Weaver for comments on an earlier draft.

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ABREVIATIONS

The following abbreviations have been used throughout this publication.

STATES AND TERRITORIES OF AUSTRALIA

NSW	New South Wales
Vic.	Victoria
Qld	Queensland
SA	South Australia
WA	Western Australia
Tas.	Tasmania
NT	Northern Territory
ACT	Australian Capital Territory
Aust.	Australia

OTHER ABBREVIATIONS

ABS	Australian Bureau of Statistics
ASGC	Australian Standard Geographical Classification
CD	Collection District
ENGP	Proficiency in Spoken English
ICT	Information and Communication Technologies
IRSED	Index of Relative Socio-economic Disadvantage
IT	Information Technology
KPMG	Klynveld Peat Marwick Goerdeler
LANP	Language Spoken at Home
NATSEM	National Centre for Social and Economic Modelling
n.e.c.	Not elsewhere classified
PC	Personal Computer
POA	Postal Area
RA	Remoteness Area
SAS	Statistical Analysis System
SOS	Section of State
UK	United Kingdom
US	United States
USA	United States of America

CHAPTER 1 INTRODUCTION

Use of the Internet in educational institutions, the workplace and particularly at home has boomed during the past few years. Email is now an important and common means of communication and the world wide web is used for information exchange of all kinds. The power of the Internet as a tool continues to grow. Use of the Internet is rapidly becoming an increasingly common and critical part of commerce, education and social participation. Groups that do not have the opportunity to participate in the services provided by new telecommunications technology will be increasingly disadvantaged socially and economically.

Use of the Internet by individuals depends on many factors including where access is available (at work, school, home or in other locations), how affordable access is and the ability and interest of users. Businesses and government agencies are interested in who is using the Internet so as to target customers and service delivery. Governments, community organisations and social researchers are interested in who is not using the Internet, with a view to assessing the degree of exclusion from the information society and its impacts on social and economic outcomes. Policy makers are keen to target policies and programs to address this 'digital divide'. In Australia, there has been considerable interest in regional difference in the access and use of communication technologies. This has been in the context of concern about the economic decline and shrinking populations of regional communities and the Government's desire to fully privatise Telstra.

The ABS has collected information about use of the Internet by household as part of their surveys since 1998 and some information has been collected by private organisations such as KPMG. However, because of the size and scope of the surveys, research about the socioeconomic and regional characteristics of people who use computers and the Internet has been limited. In addition, with Internet access increasing very rapidly, previous work has become outdated.

In 2001, Australians were asked about their computer and Internet use in the Census of Population and Housing. This was the first census to ask these questions and gives us the first real opportunity to analyse Information Technology (IT) use by region and to consider how social and economic factors affect IT use without being impaired by sample size considerations. It also allows us to update previous work.

This paper has been completed under the auspices of the Australian Census Analytic Program, which provides researchers with access to unpublished

census data. It examines the socioeconomic and regional characteristics of people using computers at home and the Internet.

Chapter 1 provides a review of previous work and information about the computer and Internet use variables in the census.

Chapter 2 provides an overview of Australian computer and Internet use in 2001, and how key demographic factors, such as income and educational qualifications, impact on rates of use. Chapter 3 reports on use of computers and the Internet by young Australians (those under 25 years) focusing on location of use, and the influence of factors such as income and gender. Chapter 4 looks at where Australians use the Internet, and the key demographic factors associated with location of use. Chapter 5 provides an overview of those Australians who did not access computers or the Internet in 2001 (the 'unconnected'), and those factors closely associated with lower rates of use. Chapter 6 attempts to gauge the inequality of computer and Internet use by undertaking Lorenz curve analysis to compare the distribution of Internet and computer use against the distribution of income for the Australian population.

Chapter 7 examines the rates of use between and within states and territories. It includes maps which illustrate the spatial distribution of computer and Internet use by POA. Chapter 8 examines the correlation between key socioeconomic variables and rates of use.

Chapter 9 describes a multivariate regression analysis which identifies the separate effects of the socio-demographic and regional factors impacting on Internet and home computer use. It provides the available data, type of model and variables chosen to be included in the regression analysis. Chapter 10 presents and analyses the results of the regression.

Chapter 11 concludes and is followed by an Appendix containing tables of data.

1.1 PREVIOUS WORK

In 2000, the National Centre for Social and Economic Modelling (NATSEM) undertook a study to explore the social and economic characteristics of Australians with different levels of access to, and use of, communications services (Lloyd et al. 2000; Lloyd & Hellwig 2000). Using data from 1998 and 1999 ABS surveys and the KPMG household survey conducted in March 2000, this study found that a large proportion of Australians do not participate in the knowledge economy, but that this is attributable to social and economic circumstances, not simply location. The most important driver of Internet access was found to be educational qualification, followed by income. These findings challenged the notion of a rural 'digital divide', and found that supply-side strategies alone would not be sufficient to encourage the take-up of Internet and related services (Lloyd & Hellwig 2000).

Curtin (2001) in 'A Digital Divide in Rural and Regional Australia?' maintains that while living in a rural or regional area does not in itself determine rates of Internet access, there remains a regional element to the divide, and concludes

that the presence of fewer young, tertiary educated, high income earners in rural electorates is a major factor in lower rates of access.

Recent Australian research has continued to focus on demand-side factors, such as income, family structure and levels of education, to explain differing rates of communication and IT use. Using the Survey of Household Use of Information Technology conducted in 2000, the ABS found that households most likely to have access to computers and the Internet at home were those with children and on high incomes — income having a significant positive relationship with access to computers and the Internet at home (ABS 2002b). This study found that 53% of Australian households had a computer, while 33% had Internet access at home.

McLaren & Zappala (2002), working with a sample of children involved in The Smith Family's Learning For Life Program, analysed the factors influencing the use of Information and Communication Technologies (ICT) amongst financially disadvantaged families in Australia. Ethnicity, family structure, housing type and a household's main source of income were shown to be key factors influencing access. Following the inclusion of income and educational attainment in the model, regional influences 'disappeared' except in relation to an area's level of social disadvantage as measured by the Index of Relative Socio-economic Disadvantage (IRSED). The most common location for accessing the Internet was school and this report found a strong link between parents' level of education and home access. McLaren & Zappala stated that while schools play an important role in narrowing the gap, home access to ICT is important in children's educational performance, and finding ways to increase home access levels and providing parental support for low-income families should remain a policy priority.

The most recent study by the US Department of Commerce (a joint project involving National Telecommunications and Information Administration) found computer and Internet use has been increasing for all Americans in the last three years, regardless of income, education, age, employment status, ethnicity or gender (US Department of Commerce 2002). However, these characteristics remain the major factors determining different usage rates — with attained level of education being the most influential factor, followed by income and ethnicity. Disparities in usage rates are also attributable to age and employment status, while gender and geographic location of households have little effect on Internet and computer use. People with mental or physical disabilities are also less likely to use computers or the Internet. This report showed that use of computers in the workplace contributed to much higher rates of use at home, finding that 77% of households that have a household member using a computer at work also have a computer at home, while only 35% of households where no household member uses a computer at work have a home computer.

Likewise, Bucy (2000) examined data from two American polls in 1998, to reveal that while the online population is diversifying, income, education, family structure and age remain important social determinants. Statistics Canada

(1995) examined socioeconomic factors influencing ICT access in Canada, stressing that 'income is the passport to this electronic highway', and also the importance of Internet access to 'social wellbeing'.

1.2 DATA SOURCE

The data source used in this analysis is the 2001 Census of Population and Housing. The census counted all people in Australia on the night of 7th August 2001, with the exclusion of foreign diplomats and their families. Visitors to Australia are included in the census (but are excluded from this analysis). Australian residents outside the country on census night are excluded. However, those who are not required to undertake migration formalities, such as those on oil and gas rigs off the Australian coast are included. People are counted on an actual location or place of enumeration basis. In other words, if people are away from their home on census night their location is recorded as such rather than their usual residence (ABS 2001a, p. 14).

The 2001 census was the first to seek information on the use of personal computers (PCs) at home and Internet use. The question on computer use provides information relating to people's use of home computers in the week prior to census night, allowing for either a yes or no response. Home computers include: computers used at home for private and business purposes; portable computers; personal organisers; computers brought home from the workplace; and dedicated word processors (game machines are excluded).

The question on Internet use provides information relating to people's use of the Internet in the week prior to census night. The question allows for multiple responses — for example, a person who had used the Internet at home, at work and elsewhere, would be recorded as such for each category. Internet use includes the use of the Internet via such technology as Internet connections in private and business applications; Internet connection through a computer or set top box, games machine, mobile phone, or other means; and Internet used at other locations including libraries, Internet cafes, shops, educational institutions, or at a neighbour or friend's place of residence.

It is important to note that the census variables on computer and Internet use do not capture intensity of use, but simply whether or not the respondent accessed a computer or the Internet in the week prior to the census. People who did not indicate a response are classified as 'not stated' by the ABS. In this study, those classified as 'not stated' are excluded from the numerator when calculating rates of use, although the denominator remains the entire Australian population for that category. For this reason, the percentage of people using a home computer and the percentage of people not using a home computer do not add to 100% and similarly for Internet use.

In this analysis, home computer and Internet use is analysed against key demographic variables, such as age, sex, employment status, and Indigenous status — for a full definition of these variables see 'The Census Guide' (ABS 2002a).

As noted above, 2001 was the first time the computer and Internet use variables were collected in the census. The ABS has done an evaluation of the quality of the data collected about these variables (ABS 2003). They found that rates of multi-marking (when people mark more than one response in a yes/no question for example) and discrepancies were low. However, as a self-enumerating questionnaire, the census does have problems with non-response and inconsistencies for most questions.

For the home computer and Internet use questions, non-response rates were higher for children aged 0–4 years (perhaps because parents did not think this question was relevant to such young children) and for people aged 65 years or over (perhaps because a lack of understanding about the concepts or thinking that the question did not apply). The Northern Territory had high non-response rates, partly due to the high proportion of Indigenous people in the territory who had high rates of non-response.

The paper highlighted one significant concern about data quality. Almost 60,000 people who answered that they did not have a job responded that they used the Internet at work in the week prior to the census. Further analysis showed that a large proportion of this group were students and it seems that they classified school or university as 'work'. A large proportion of this group were not born in Australia, and the paper suggests that a lack of clarity in the question may have led to this response for these people. The ABS has not recoded these records and this should be taken into account when reading the following analysis.

Results from the census were compared with results from the Household Use of Information Technology Survey and Children's Participation in Cultural and Leisure Activities Survey. The census reported lower rates of use of both computers and the Internet. The paper explains this as due to the fact that these surveys asked about use in the previous 12 months while the census asked about use in the week before the census.

The paper recommends some changes to the questions and campaigns to improve non-response among the very young and old for the 2006 census.

One issue that the paper does not raise is the particularly high proportion of 0–4 year olds (and even 0–2 year olds) whose parents reported that they used the computer and/or the Internet. While many children evidently use these technologies significantly, it seems implausible that so many children aged under 2 years use computers and/or the Internet in a meaningful way. Again these responses could be the result of lack of understanding about the questions.

CHAPTER 2 KEY DEMOGRAPHIC FACTORS IN COMPUTER AND INTERNET USE .....

2.1 GENDER

In the week prior to the 2001 census, 42% of Australians or 7.88 million people used a computer at home, while 37% (6.97 million people) used the Internet.

2.1 HOME COMPUTER AND INTERNET USE, BY GENDER — 2001

	Computer use at home		*Internet use*	
	Millions	*%*	*Millions*	*%*
Males	4.0	43.5	3.6	38.7
Females	3.9	40.5	3.4	35.6
Persons	**7.9**	**42.0**	**7.0**	**37.1**

Source: 2001 Census of Population and Housing.

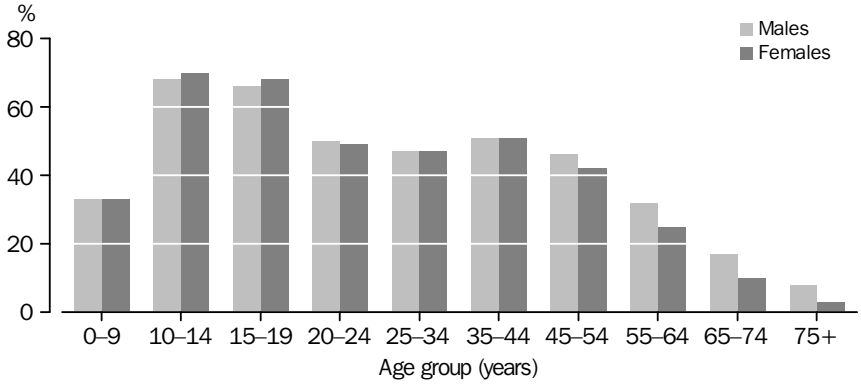
Previous Australian studies have shown that there is a small gender gap in home computer and Internet use. For example, Lloyd & Hellwig (2000) found that males were one percentage point more likely to have Internet access at home than females, in both 1998 and 1999. Interestingly, United States surveys have shown that for the last seven years there has been virtually no gender gap — in 2001 the difference in usage rates between men and women for computer use (looking at computer use anywhere, not just computer use at home) was 0.3 percentage points and for the Internet it was 0.1 percentage points (US Department of Commerce 2002, p. 14). However, Norris (2001) suggests that while some surveys have shown that the gap has closed recently in America, evidence about the gender gap remains inconclusive. For example, AC Nielsen's Net Watch surveyed 13 nations in North America, Europe and Asia in Spring 2000, and reported that women were less likely to be online in every country, including the United States, with almost twice as many male to female Internet users in Germany, Hong Kong and Taiwan (Norris 2001, Chapter 4, p. 9). Of course, it is possible that the gap may have narrowed since that survey was conducted.

The 2001 census showed that 44% of Australian men used a computer at home in the previous week, compared with 41% of women. Men are also more likely to use the Internet than women — 39% of men used the Internet in the week prior to the census, compared with 36% of women. This suggests that a gender gap, although small, remains in Australia.

2.2 AGE

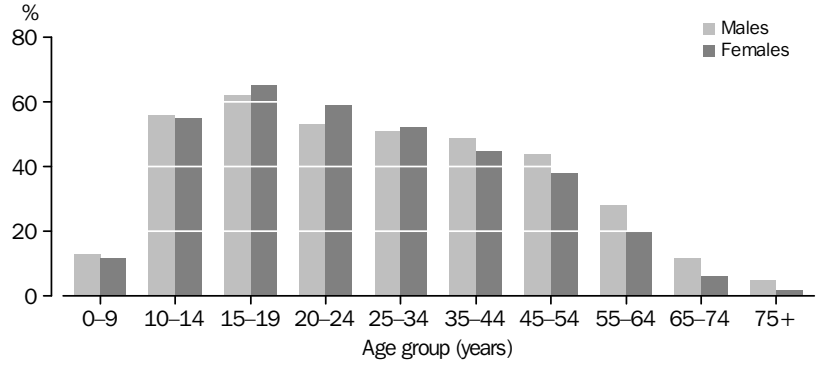
Graphs 2.2 and 2.3 show rates of computer use at home and Internet use broken down by age and gender. Interestingly, young children report quite high rates of computer use (only slightly below the Australian average), with one-third of those aged between 0–9 years using a personal computer at home in the week prior to the census. Internet use for this age group is well below average, but still above 10%. According to the census data, approximately 5% of 0–2 year olds used a computer at home and 1% used the Internet in the week prior to the census. As the census is a self-enumerating questionnaire, it is possible that these figures are overstated but it does suggest that children use the Internet from a very young age.

2.2 HOME COMPUTER USE, BY AGE AND SEX — 2001



Source: 2001 Census of Population and Housing. See table A.1 in the Appendix for more detail.

2.3 INTERNET USE, BY AGE AND SEX — 2001



Source: 2001 Census of Population and Housing. See table A.1 in the Appendix for more detail.

Not surprisingly, school age students have the highest rate of computer and Internet use — close to 70% of 10–19 year olds used a computer at home in the week before the census and almost 60% accessed the Internet. Those aged between 10–14 years are slightly less likely than older teenagers to use the Internet — however both age groups are far more likely to be online than the average Australian.

Rates of home computer use are much lower for 20–34 year olds with less than half of this group using a home computer. However, rates of Internet use are well above the national average and this group were more likely to be using the Internet than a computer at home in the week prior to the census. Approximately half of 20–24 year olds reported using a home computer in the week prior to the census, while 56% used the Internet. Compared to those in their twenties and early thirties, 35–44 year olds are slightly more likely to be using a computer at home and slightly less likely to be using the Internet. It seems that 20–34 year olds do not make the acquisition of a home computer a priority but make good use of IT in other locations. In the older age group, the presence of children in the family and slightly higher incomes may make home computer ownership more likely.

From middle age, rates of computer and Internet use decrease with age. With 28.6% of 55–64 year olds using a computer at home and one-quarter using the Internet. Amongst Australians over 75 years, only 5% reported using a computer at home and 3% used the Internet. Lower rates of use amongst older Australians may be due to limited opportunities for introduction to new technologies (such as those opportunities afforded in schools and workplaces), less perceived relevance in accessing online services and even physical constraints such as arthritis. Retirees on aged pensions are likely to be disproportionately disadvantaged as they are also likely to be low income earners (see Chapter 2).

Under the age of 45 years, males and females have very similar rates of computer use at home, with girls slightly more likely to have used a computer at home in the school age years. For people over 45 years of age, there is a significant gender gap with men much more likely to be using home computers than women. For example, in the 65–74 year age group, 17% of men and 11% of women used a computer at home.

The relationship between age and gender is very similar in terms of Internet use. However, interestingly, females are more likely to be using the Internet than males in the late school age years (15–19 years) and in their early twenties (a difference of about 6 percentage points). Males aged 35–44 years are slightly more likely to use the Internet than females in the same age group. Over 45 years of age, the differential between the sexes increases, with men aged 55–64 years 8 percentage points more likely to use the Internet than women.

The preceding analysis has shown that the gender gap in usage rates of both home computers and the Internet is due to lower rates of access by older women. Younger women match and, in some age groups exceed men, in terms of their use of home computers and the Internet.

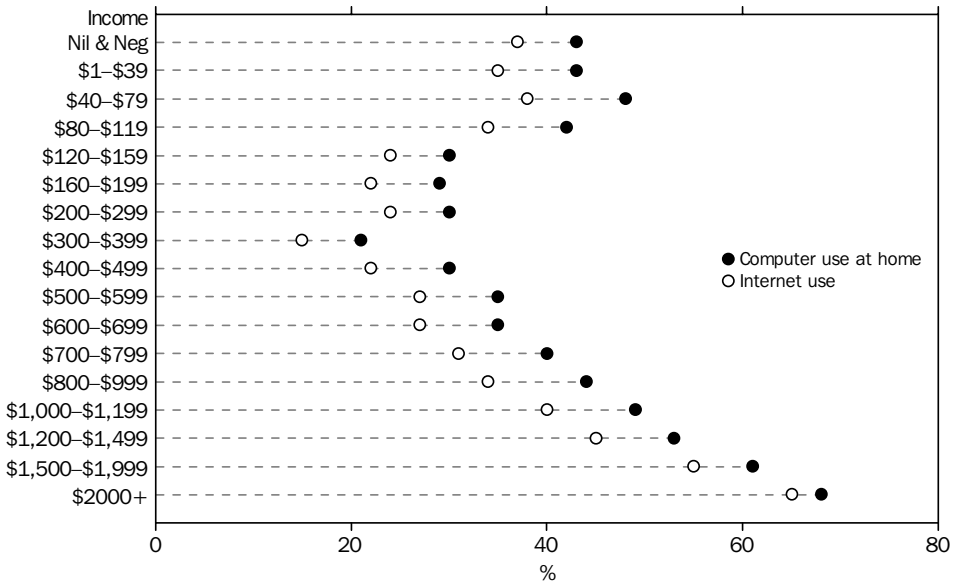
2.3 INCOME

As detailed in Chapter 1, previous studies in Australia and overseas have found that family income is a key factor in whether an individual uses a computer or the Internet. People with high incomes are more likely to access these technologies than those with low incomes (a relationship that has held true for each successive survey of computer and Internet use in the United States from 1997 to 2001 (US Department of Commerce 2002, p. 10)).

A similar trend was evident among the Australian population in 2001 with computer and Internet use generally increasing with weekly family income (graph 2.4). With the exception of people with very low family incomes (under $120 per week), rates of at-home computer use were below the national average for persons in families with incomes less than $800 per week, and rose steadily with higher levels of family income. Somewhat surprisingly, people with family incomes less than $120 per week have higher than average computer use, with 45% using a computer at home. The high proportion of students and young people amongst those computer users with family incomes under $120 per week partly explains the particularly high rates of use for this group. Analysis of the data showed that nearly two-thirds of these users are classified as full-time and part-time students, and nearly two-thirds are under 25 years of age. However, analysis by the ABS shows that even excluding students, rates of use by these low income people are high (ABS 2003).

The trend for Internet use is very similar; rates of Internet use were below average for people in families earning under $1,000 per week, with the exception of the group with low family income previously identified. Rates of Internet use were below rates of home computer use for all family income brackets, with rates converging for very high income earners. For people with family income over $1,000 per week, as income increases Internet use rises more sharply than computer use. For these high income groups, income appears to be a stronger predictor of Internet use than it is for computer use at home. This may be because those with a high family income are more likely to be using the Internet and computers at work, the latter not captured in census data (see also Chapter 4).

2.4 HOME COMPUTER AND INTERNET USE, BY FAMILY INCOME — 2001



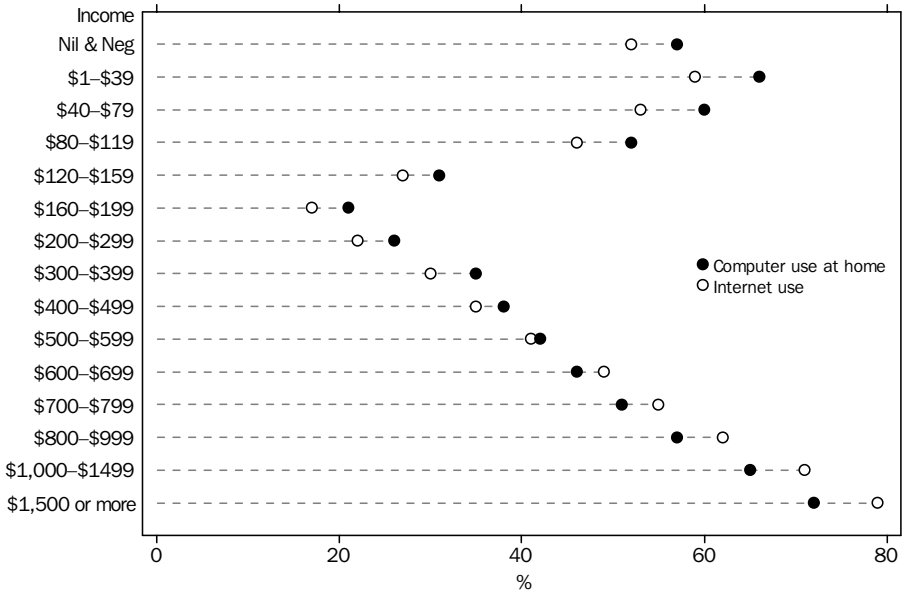
Note: Income denotes weekly family income. Family income is calculated by summing the individual incomes reported by all family members aged 15 years and over. Family Income is not calculated if any family member aged 15 years and over is absent or did not state their income.

Source: 2001 Census of Population and Housing. See table A.3 in the Appendix for more detail.

Persons in families with an income of between $120 and $499 per week have the lowest rates of computer and Internet use — less than one-third using a personal computer at home and less than one-quarter using the Internet. Only 15% of people with a family income of between $300 and $399 per week used the Internet in the week prior to the census. By contrast, more than two-thirds of those with a family income over $2,000 per week used a personal computer at home and 65% accessed the Internet. Although there is clearly a very large gap between high and low income families, it is interesting and somewhat surprising to note that even among high income families, 35% of people have not used the Internet in the previous week.

Graph 2.5 shows the relationship between individual income (rather than family income) and home computer and Internet use. This displays a trend similar to family income with a high level of use among those with particularly low incomes, falling for those in the low to middle income ranges and then rising strongly with higher incomes. In this case, however, the trends are more pronounced without the effects of averaging use and income across a family. It should also be noted that the 'dip' is at a lower income level than in the previous graph, which is to be expected because we are now looking at the income of individuals rather than the combined incomes of families.

2.5 HOME COMPUTER AND INTERNET USE, BY INDIVIDUAL INCOME — 2001



Note: Includes persons aged 15 years and over. Income denotes individual weekly income.

Source: 2001 Census of Population and Housing.

Approximately 72% of top income earners — those earning $1,500 per week or more — used a computer at home in the week prior to the census, and 79% reported having used the Internet. By comparison, only 21% of people earning between $160 and $199 per week, reported using a computer at home, and only 17% of this group used the Internet. A relatively high proportion of people in this income group are aged 55–74 years and/or female; these are groups which tend to have low rates of home computer and Internet access.

As with family income, people in the lowest individual income brackets had a very high rate of use for both computers and the Internet. For example, almost two-thirds of those earning $1–$39 per week used a computer at home, and nearly 60% used the Internet. As noted above, these low income bands capture students or youth who typically have very high rates of usage.

Rates of Internet use were below rates of computer use at home for people with individual incomes of below $500 per week; people earning over $500 per week are more likely to use the Internet than a computer at home, and the difference increases with income.

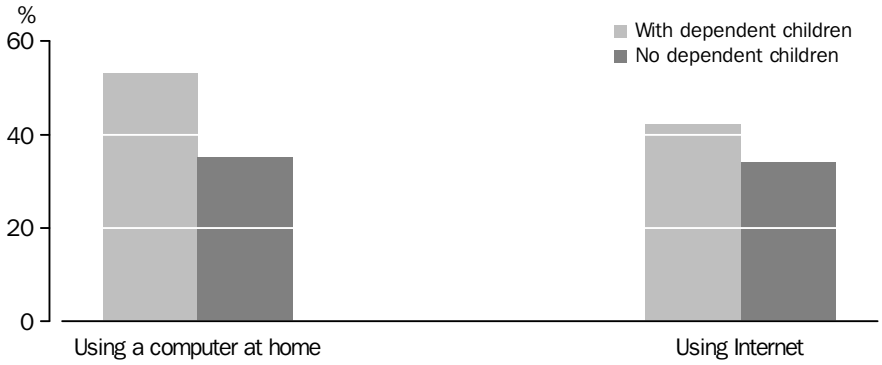
2.4 DEPENDENT CHILDREN

In addition to family income, previous research has shown that whether or not a family has children is a very important factor in the rate of Internet and computer use, and in a household's decision to purchase a personal computer. In terms of Internet access at home, Lloyd & Hellwig (2000) found that households with children are much more likely to have Internet access. In 2000, the ABS Survey of Household Use of Information Technology found that

72% of households with children under 18 years had home computer access compared to 43% of households without children, and 45% of households with children had access to the Internet at home compared with 26% of households without children (ABS 2002b). The gap in the United States is narrower — 70% of family households with children had a computer at home in 2001, compared with
59% of those without children, while 62% of households with children connected to the Internet, compared to 53% without (US Department of Commerce 2002, p. 44).

The 2001 census shows that Australians living in families with dependent children under the age of 25 years are much more likely to use personal computers at home and the Internet than families without children. Over half of Australians in families with dependent children used a computer at home and 42% used the Internet (graph 2.6). Families without dependent children have rates of computer and Internet use well below average, 31% and 32% respectively. As shown earlier, children have a very high use of technology and this will be impacting on these figures. However, it is also likely that families with children prioritise home computer and Internet access to provide education and entertainment opportunities for their children.

2.6 HOME COMPUTER AND INTERNET USE, BY FAMILY STRUCTURE — 2001



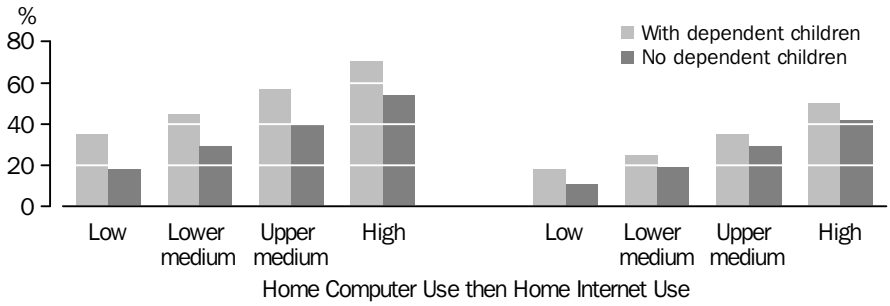
Note: Dependent children are defined as dependents under the age of 25 years.
Source: 2001 Census of Population and Housing.

Lloyd & Hellwig (2000) also found that income was more significant than the presence of children in a family, as an indicator of Internet usage. Adults in high income households without children, are more likely to have Internet access at home than low income families with children. In order to examine whether the same trend was evident in the census, families with and without dependent children were divided into four income groups — high ($1,500 per week and over), upper medium ($1,000–$1,499 per week), lower medium ($500–$999 per week) and low (under $500).

Graph 2.7 shows that for all income groups, families without dependent children have lower rates of home computer use than families with children. However, high income families without children have rates of home computer

use higher than most middle or low income families with children. The picture for Internet use (not illustrated here) is less clear. For low income families, having children increases the rate of Internet use by a significant margin. However, the difference is less pronounced for middle income families, and for high income families there is little difference between those with and without children. This may be impacted by high rates of use at work for high income people without children. For that reason, here we have chosen to examine Internet use at home (graph 2.7). This shows that families with dependent children have higher rates of use than those without at every income level. However, this shows even more strongly that income is more significant than having dependent children — families without dependent children having higher rates of use than those with dependent children in lower income groups.

2.7 HOME COMPUTER AND HOME INTERNET USE, BY FAMILY STRUCTURE, BY FAMILY INCOME — 2001



Note: Dependent children are defined as dependents under the age of 25 years. The income groups are as follows: high ($1,500 per week and over), upper medium ($1,000–$1,499 per week), lower medium ($500–$999 per week) and low (under $500).

Source: 2001 Census of Population and Housing.

2.5 EDUCATIONAL ATTAINMENT

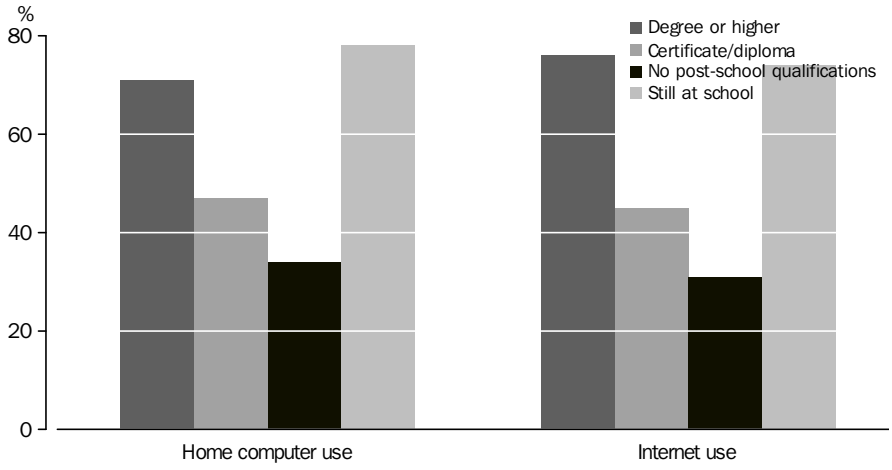
In undertaking multivariate analysis of Internet use, Lloyd & Hellwig (2000) found that educational qualification was the most important driver of people having an Internet connection at home, with a diploma or certificate adding 12 percentage points and tertiary qualifications adding 23 percentage points to Internet take-up, when all other factors were held constant. The US Department of Commerce study (2002) found that educational attainment was positively related to Internet and computer use (those with Bachelor degrees and education beyond college, were most likely to be both Internet and computer users from 1997 to 2001), and the study also found that the effect of educational attainment seemed to be independent of an individual's income.

The 2001 census data reflects these patterns. Excluding those still at school (who we have shown to have high rates of home computer and Internet use), Australians with higher levels of educational qualifications are, on average, more likely to use home computers and the Internet (graph 2.8). Over 70% of those

qualified to at least degree level use a computer at home. This compares with 47% who have a certificate or diploma and 34% without post-secondary qualifications. Computer use amongst those still at school is significantly higher than any other educational classification, with 78% of those still at school having used a computer in the previous week — almost twice the rate of the average Australian.

The differential according to education level is even more pronounced for Internet usage rates. Over three-quarters of those with at least a Bachelor degree used the Internet compared with 45% of those with a diploma or certificate. Among those without post-school qualifications, 31% used the Internet. Again, rates of Internet use are very high for those still at school, at 74%.

2.8 HOME COMPUTER AND INTERNET USE, BY LEVEL OF EDUCATION – 2001



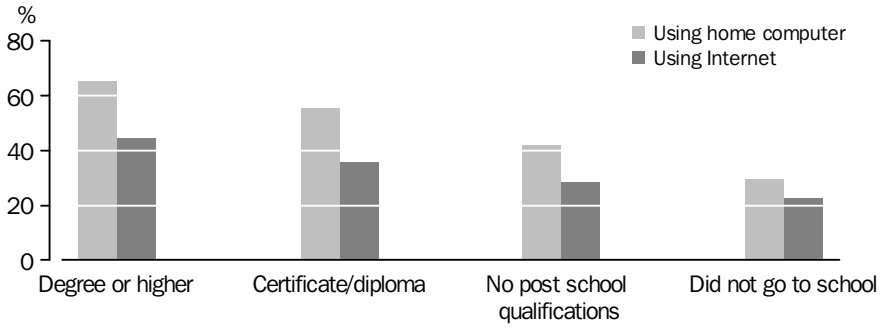
Source: 2001 Census of Population and Housing. See table A.5 in the Appendix for more detail.

Even within each of these broad groupings, rates of computer and Internet use increase with qualification level. For example, 86% of those with a post-graduate degree used the Internet in the week prior to the census compared with 74% of those with a Bachelor degree. Australians who have completed Year 12 or the equivalent have above average rates of computer and Internet use, 52% and 53% respectively. These rates fall to 32% and 27% respectively for those who have not gone beyond Year 10. Only 4% of Australians who did not go to school reported using a computer and only 3% reported having used the Internet. See table A.5 in the Appendix for more detail.

McLaren & Zappala (2002) found a strong association between level of parental education and information and communication technology access and use by their children. Graph 2.9 uses the census data to examine the link between parental educational attainment and the propensity of their children to use a home computer or the Internet. Children who had at least one parent holding a degree or higher qualification were over 50% more likely to be using a home computer than children where neither parent had received a post-school

qualification and twice as likely as children where neither parent had been to school. Similarly, nearly half of children with at least one parent holding a degree or higher qualification used the Internet. In comparison, less than 30% of children with neither parent holding a post-school qualification and one-quarter of children whose parents did not go to school used the Internet in the week prior to the census.

2.9 HOME COMPUTER AND INTERNET USE, BY PARENTS' LEVEL OF EDUCATION — 2001



Note: Level of Education refers to highest level of education for either parent. Dependent children are defined here as dependents under the age of 18 years.

Source: 2001 Census of Population and Housing.

2.6 EMPLOYMENT STATUS

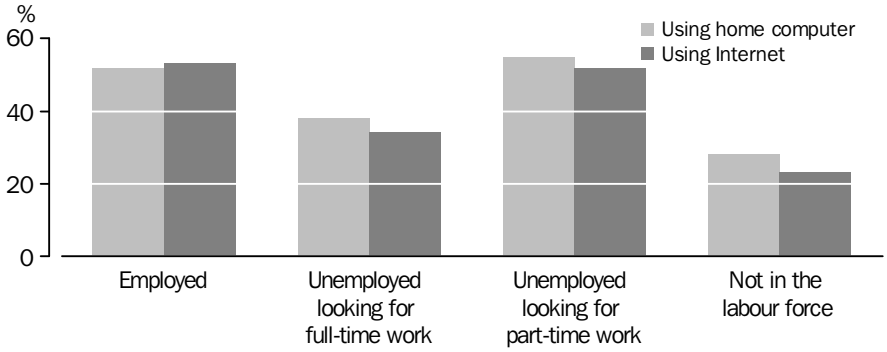
Labour Force Status

Just over half of Australians with a job, either as employees, employers, own account workers (that is self-employed) or as a contributing family worker, used a computer at home (graph 2.10). A similar proportion used the Internet. The employed were the only labour force group who used the Internet more than home computers.

Interestingly people classified as unemployed and looking for part-time work are much more likely to use a personal computer or the Internet than the average Australian — 55% used a computer at home and 52% used the Internet. In fact, someone classified as unemployed and looking for part-time work is more likely to use a computer at home and the Internet than someone who is employed in full-time or part-time work.

People who were unemployed and looking for full-time work recorded below average rates of at home computer use — 38% reported having used a computer at home — and slightly below average rates of Internet use, with 34% going online. Only 28% of respondents classified as not in the labour force used a computer at home, and less than one-quarter used the Internet in the week prior to the census.

2.10 HOME COMPUTER AND INTERNET USE, BY LABOUR FORCE STATUS — 2001



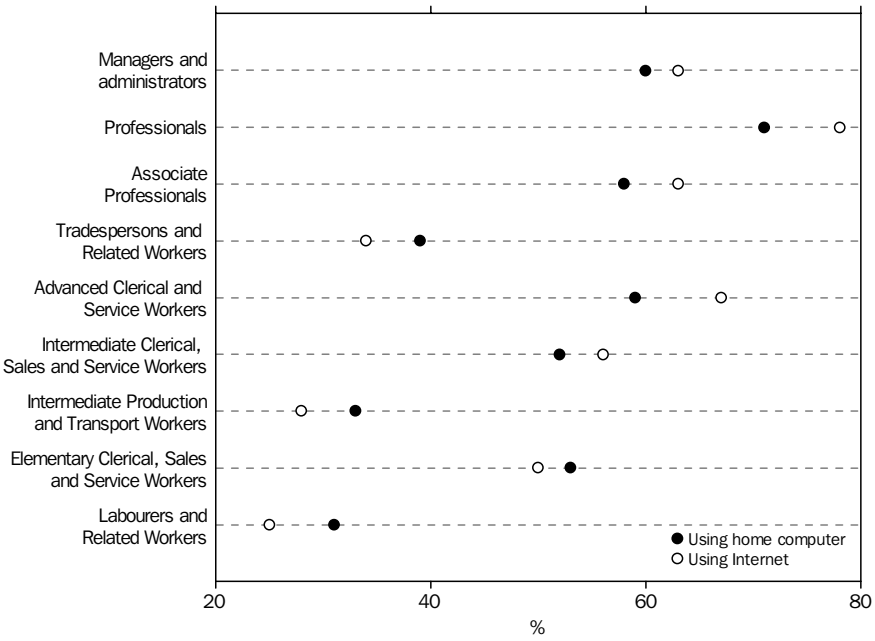
Note: Employed includes Employee; Employer; Own Account Worker; or Contributing Family Worker.
Source: 2001 Census of Population and Housing. See table A.6 in the Appendix for more detail.

Occupation

Occupation is likely to impact on rates of Internet and computer use, not just because those working in professional and managerial occupations are likely to have higher salaries, but because they are more likely to have Internet connections at work. Professionals are also more likely to receive computer equipment, such as laptops and digital organisers, and free or subsidised Internet access as requirements of their job, as well as training assistance and technical support, and exposure to new technologies. Industrial and manual workers, even where using computers at work, are less likely to have Internet access, and are less likely to 'acquire skills and experience which breeds comfort and familiarity with the web at home' (Norris 2001, Chapter 4, p. 7).

Graph 2.11 shows home computer and Internet use by occupation in Australia, and confirms the expectations above. Generally, white-collar workers tend to have high rates of use of both home computers and the Internet, while blue-collar workers tend to have low usage rates. Australians working in occupations classified as 'professional' (including scientists, accountants, engineers, medical practitioners, nurses, teachers) are the greatest users of both computers at home and the Internet (as a share of their population). Approximately 71% of professionals used a home computer and over three-quarters were online (twice as likely as the average Australian) in the week prior to the census. Managers and administrators, associate professionals, advanced clerical and service workers and both intermediate and elementary clerical, sales and service workers, also reported rates of home computer and Internet use well above the national average.

2.11 HOME COMPUTER AND INTERNET USE, BY OCCUPATION — 2001



Note: Occupation is collected in the census for all employed people aged 15 years and over. Two questions are used in the census. The first of these asks for occupation title (in main job held in the week prior to census night). The second asks for the main tasks usually performed by the person in their occupation. Collecting both occupation title and task information ensures more accurate coding of occupations. (Census Dictionary, cat. no. 2901.0).

Source: 2001 Census of Population and Housing. See table A.7 in the Appendix for more detail.

In contrast, labourers and related workers reported the lowest rates of personal computer and Internet use — less than one-third of this group used a computer at home and only one-quarter accessed the Internet in the week prior to the census. People in occupations classified as tradespersons and related workers, as well as intermediate production and transport workers, were also less likely than the average Australian to use a home computer or be online.

The relative proportion using a home computer and the Internet is similar within each of the occupation groups. However, those in generally white-collar occupations with high IT use tend to use the Internet more than a home computer, perhaps because they are likely to use a computer at work. Conversely, those in blue-collar jobs who have lower levels of IT use tend to have a higher rate of computer use at home. The combination of these two factors means that there is more variation by occupation type in the use of the Internet than there is in home computer use.

2.7 INDIGENOUS STATUS

The US Department of Commerce study found that differences in usage associated with race and Hispanic origin persist. In September 2001, rates of computer use were around 70% for Asian Americans, Pacific Islanders and Whites, compared with 56% for Blacks, and 49% for Hispanics. Internet use was also 20 percentage points lower amongst persons classified as Black or

Hispanic, than for those classified as White, Asian American or Pacific Islander (US Department of Commerce 2002, p. 20).

While the availability of national data on computer and Internet use by Indigenous Australians has been limited prior to the 2001 census, previous reports commissioned by New South Wales and Australian Capital Territory governments indicate that Aboriginal and Torres Straight Islanders are less likely to have computers at home and are much less likely to have access to the Internet (Curtin 2001) than non-Indigenous Australians.

According to the 2001 census, rates of personal computer and Internet use are much lower for Indigenous Australians than for non-Indigenous people. Only 18% of Indigenous people used a personal computer at home in the week prior to the census and only 16% of Indigenous people used the Internet, a rate less than half the national average.

2.12 HOME COMPUTER AND INTERNET USE, BY INDIGENOUS STATUS — 2001

	Home computer use	*Internet use*
	%	%
Non-Indigenous	44.1	39.0
Indigenous	18.0	15.9
Total population	**42.0**	**37.1**

Source: 2001 Census of Population and Housing. See table A.10 in the Appendix for more detail.

2.8 COUNTRY OF BIRTH AND ENGLISH PROFICIENCY

Table 2.13 shows that Internet and computer use varies widely depending on country of birth. Residents born in Australia have rates of computer and Internet use very close to the national average, as do those born in North West Europe. People born in North-East, Southern and Central Asia have particularly high rates of home computer and Internet use, as do those born in Sub-Saharan Africa (although the number is quite small). People born in other main English speaking countries (including New Zealand, South Africa, United States of America, Canada, United Kingdom and Ireland), South-East Asia, and the Americas have rates above the national average. On the other hand, Australian residents who were born in North Africa, the Middle East, Oceania and Antarctica record below-average rates of at home computer and Internet use. Those born in Southern and Eastern Europe have rates of Internet and at home computer use approximately half that of the average Australian.

For most of these country of birth groups, relative rates of home computer and Internet use are fairly similar. Indeed, in most cases, the gap between the rates is smaller for those not born in Australia suggesting that those born overseas are more likely to use the Internet relative to home computers, compared with

those who are Australian-born. It also suggests that while for many other socioeconomic characteristics there was greater inequity of Internet use than home computer use however, by country of birth this is less pronounced.

2.13 HOME COMPUTER AND INTERNET USE BY COUNTRY OF BIRTH — 2001

	Home computer use	*Internet use*
	%	%
Australia (incl. External Territories)	44.2	38.3
Other main English speaking countries	47.7	45.8
Oceania & Antarctica	36.9	35.5
North West Europe	41.0	37.7
Southern and Eastern Europe	20.7	18.7
North Africa and the Middle East	31.3	28.5
South-East Asia	44.3	42.0
North-East Asia	55.7	54.6
Southern and Central Asia	56.1	55.1
Balance of Americas	48.0	47.6
Sub Saharan Africa	53.5	53.9
Total	**42.0**	**37.1**

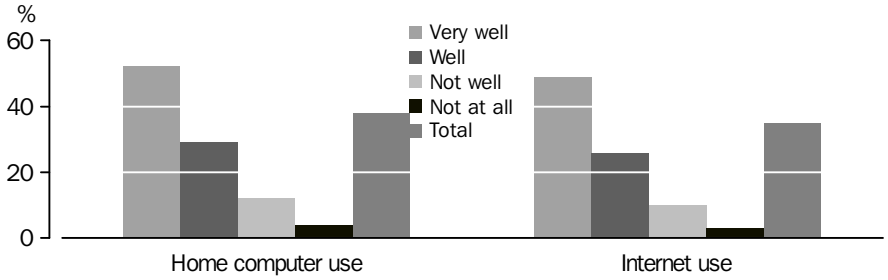
Note: Other main English speaking countries are New Zealand, United Kingdom, Ireland, United States of America, Canada and South Africa.

Source: 2001 Census of Population and Housing. See table A.9 in the Appendix for more detail.

Graph 2.14 shows the proportion of people who speak a language other than English at home and are using a home computer or the Internet, by their self-assessed level of English proficiency. Amongst those who speak a language other than English at home, rates of home computer and Internet use were slightly below those of the average Australian, 38% and 35% respectively. However, use of these technologies is strongly related to level of English proficiency. Those who rate their English as very good have rates of home computer and Internet use well above the national average. Over half of this group used a computer at home in the week prior to the census and almost half used the Internet.

Rates of access decrease significantly as English proficiency falls. Only about one in ten who do not speak English well used a home computer and the Internet, and of those who do not speak English at all, only 4% used a computer at home and 3% reported using the Internet. These low rates of use may be as a result of a lack of learning opportunity and links with other socioeconomic factors such as age and education. However, as Curtin (2001, p. 4) points out, "the English language dominates Internet-based commerce and general information sites" and it may be that those without good English ability do not gain extensive benefits from using Internet tools.

2.14 HOME COMPUTER AND INTERNET USE, BY PROFICIENCY IN SPOKEN ENGLISH — 2001



Note: For each person who speaks a language other than English at home this variable classifies their self-assessed proficiency in spoken English. Responses to the question on Proficiency in English are subjective. Proficiency in English is just an indicator of a person's ability to speak English and not a definitive measure of his/her ability.

Source: 2001 Census of Population and Housing. See table A.8 in the Appendix for more detail.

2.9 GEOGRAPHIC LOCATION

In Australia, concern about the digital divide has often taken a regional focus because of differences in metropolitan and regional rates of access to new telecommunications services. People in non-metropolitan areas have been thought to be digitally disadvantaged because of the relatively high costs and poor quality of service available to them. Lloyd & Hellwig (2000) found that in March 2000, 40% of adults in metropolitan areas had Internet access at home compared with 28% in other urban areas and 33% in rural areas. However, they concluded that region and state/territory of residence by themselves do not explain differences in Internet take up rates, and that social and economic factors are the key driving factors in whether Australians participate in the knowledge economy. Lower rates of access in regional areas were attributed to socioeconomic factors such as lower levels of income and education in these areas.

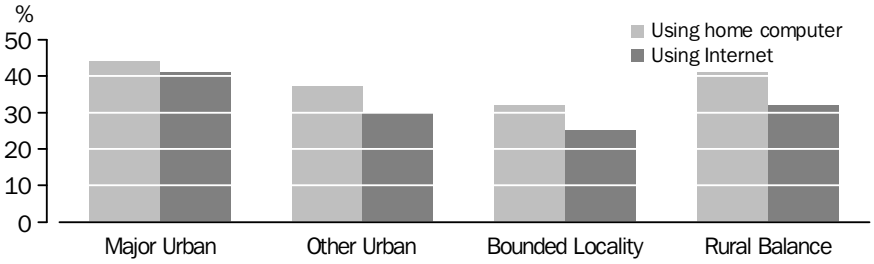
Curtin (2001) argued that while regional factors alone may not determine the digital divide there remains a regional dimension — concluding that the presence of fewer young, tertiary educated people and high-income earners in rural and provincial areas are major factors in lower access rates.

The US Department of Commerce study (2002) found that, in 2001, the rate of Internet use was higher for people living in areas classified as 'urban (not central city)' — 57% — than those in rural areas with 53%. But Internet use was lowest for people living in areas classified as central cities, with 49% of these people using the Internet. Over the period 1998 to 2001, there was particularly strong growth in Internet use amongst households in rural areas, with an average annual growth rate of 24%.

Chapters 7 and 8 examine in detail, the regional distribution of home computer and Internet use based on the 2001 census data. However, to give a first indication of regional differences in this chapter we examine computer and

Internet use using the Section of State (SOS) classification (graph 2.15). SOS represents an aggregation of non-contiguous geographical areas of a particular urban/rural type. The SOS defined here are Major Urban (population clusters of 100,000 or more), Other Urban (population clusters of 1,000–99,999), Bounded Locality (200–999), and Rural Balance (remainder of state or territory), but Migratory populations are excluded.

2.15 HOME COMPUTER AND INTERNET USE, BY SECTION OF STATE — 2001



Note: Section of State (SOS) represents an aggregation of non-contiguous geographical areas of a particular urban/rural type. The Sections of State (SOS) defined here are Major Urban (population clusters of 100,000 or more), Other Urban (population clusters of 1,000 to 99,999), Bounded Locality (200 to 999), and Rural Balance (remainder of state/territory) but exclude Migratory (ABS 2002a).

Source: 2001 Census of Population and Housing.

Computer and Internet use is highest in major urban centres. Of people in major urban centres, 44% used a computer at home (two percentage points greater than the national average) and 41% used the Internet (four percentage points greater than average). Interestingly, while rates of computer use at home and Internet use are lower in rural areas than in major urban centres, rates of access are lower again in the bounded localities and other urban areas. Bounded localities have the lowest rates of Internet and computer use, with 32% of people using a home computer and only one-quarter accessing the Internet. In other urban areas, 37% used a home computer and 30% used the Internet. Residents of rural areas have relatively high rates of home computer use (just one percentage point less than the Australian average). This is consistent with findings of a study by Pattinson et al. (1998) that found that farm household take-up was considerably higher than the non-metropolitan average and was more comparable to capital cities in general, most likely due to the composition of farms as a home based business. There is a gap between the rates of Internet use between the metropolitan and rural areas, but rural residents are more likely to use the Internet than those in small and medium-sized towns. This pattern complies with other research (Lloyd et al. 2000) that shows that it is people in small towns in regional areas, rather than rural residents, that have suffered economically. Although it is necessary to do multivariate analysis to disentangle the different effects, it is likely that lower incomes and education levels in these regional towns impact on the use of IT.

Although not directly comparable, the pattern of rates of Internet use by region is very similar to the rates of Internet access at home collected in the KPMG

Household Survey in 2000. This suggests that the regional divide had not been significantly eroded in the 18 months between the survey and the census.

The other interesting feature to note is that there is greater inequality of Internet use by region than there is inequality of home computer use. The gap between rates of access in major urban centres and in the other regions is much larger for Internet access than for home computer use. This may be due to people living in cities having greater opportunities to use computers in locations outside the home (particularly the workplace). It may also be that people in country regions have seen benefits of home computer use but due to supply problems, additional costs or simply a lack of knowledge about the Internet, are not Internet users to the same extent.

CHAPTER 3 YOUNG PEOPLE (UNDER 25 YEARS).....

Australians under the age of 25 years are by far the greatest users of computers and the Internet per head of population, with almost 51% of people under the age of 25 years using a computer at home, and 40% accessing the Internet. In 2001, people under 25 years were about 10% more likely to be online and 20% more likely to be using computers than the average Australian.

Those in upper primary and high school are the most intensive users of personal computers and the Internet of any age group. About two-thirds of 10–19 year olds accessed a computer at home, and well over half accessed the Internet in the week prior to the census (see table A.11 in the Appendix). For those aged 20–24 years Internet and computer use is a little lower but remains well above average; almost half of this age group used a personal computer at home and just over half accessed the Internet. Interestingly, almost 15% of very young children aged between 0–4 years reported using a computer at home and 3% used the Internet.

High rates of Internet and computer use at home are likely to be strongly associated with education and schooling, key drivers of Internet access. Young people have a substantial advantage from experience and education in the use of information and communication technologies from an early age (McLaren & Zappala 2002). Almost 80% of Australians still at school used a computer at home and 74% used the Internet.

The percentage of males and females under 25 years using personal computers and the Internet is very similar and does not exhibit the larger gender gap shown for those aged over 45 years. Females are in fact slightly more likely to be using computers at home between the ages of 10–19 years, and more likely to be using the Internet in later high school.

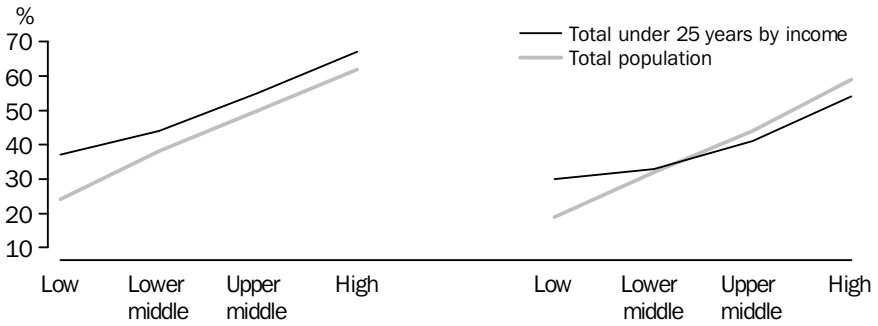
Females are also more likely to access the Internet than males in their early twenties. However, boys are slightly more likely to access the Internet when they are very young.

Those aged 10–19 years are more than twice as likely to access Internet services offered in other locations compared with the Australian average — probably mostly in schools, but also in public libraries and Internet cafes. In addition, a high proportion access the Internet at home.

As expected, the proportion of people using home computers and Internet increases with household income for those under 25 years of age. However, the difference between rates of use for low income and high income groups is less than the difference for all ages. Graph 3.1 shows that for those under 25 years, the difference between rates of home computer use for those in low income

households and those in high income households is 30 percentage points compared to 38 percentage points for the whole population. Similarly, the gap between rates of Internet use for high and low income earners is only 24 percentage points for those under 25 years, compared to 40 percentage points in the Australian population overall.

3.1 HOME COMPUTER AND INTERNET USE FOR PERSONS UNDER 25 YEARS BY HOUSEHOLD INCOME — 2001



Note: The income groups are as follows: high ($1,500 per week and over), upper middle ($1,000–$1,499 per week), lower middle ($500–$999 per week) and low (uner $500).

Source: 2001 Census of Population and Housing.

CHAPTER 4 LOCATION OF USE OF THE INTERNET .....

The census questionnaire asked people about where they used the Internet in the previous week — at home, work or elsewhere (which included libraries, Internet cafes, shops, educational institutions, or at a neighbour or friend's place of residence). The question allowed for multiple responses such as at home and at work, or at home, work and elsewhere.

Of those who used the Internet, almost three-quarters used it at home (table 4.1). About one-third used it at work and 18% used it in other locations. One-quarter of people who used the Internet used it in more than one location. Most of these used it at home and at work.

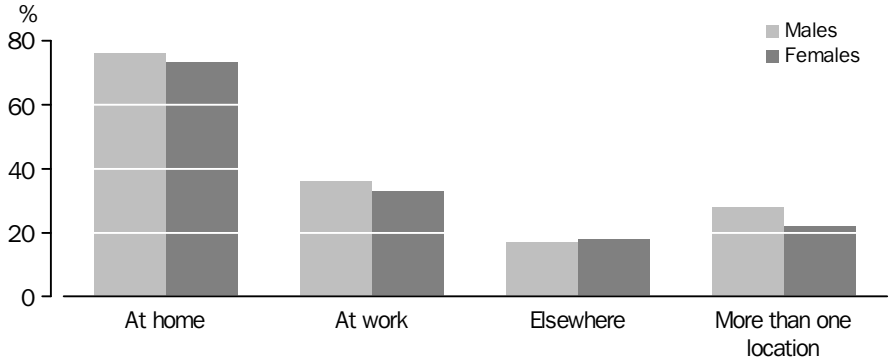
4.1 LOCATION OF INTERNET USE — 2001

Location	*% of all users*
At home	75
At work	34
Elsewhere	18
More than one location	25

Note: These are as a percentage of all Internet users.
Source: *2001 Census of Population and Housing.*

Men are more likely than women to use the Internet at home and at work, but slightly less likely than women to gain access in other locations (graph 4.2). Men are also considerably more likely to use the Internet in more than one location.

4.2 LOCATION OF INTERNET USE, BY GENDER — 2001



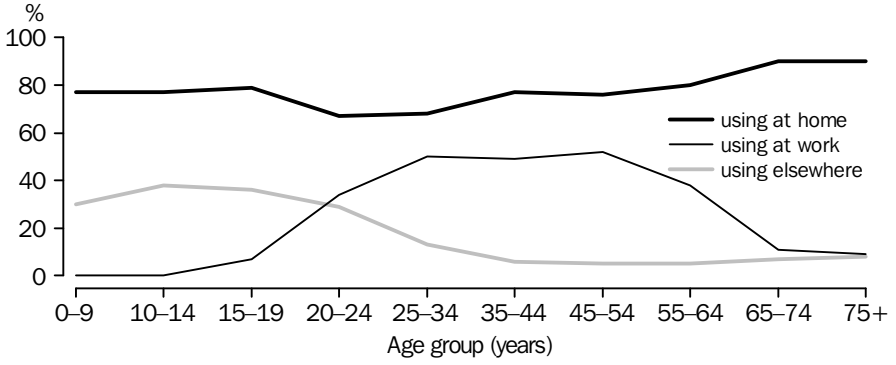
Note: As a proportion of all Internet users.
Source: 2001 Census of Population and Housing. See table A.2 in the Appendix for more detail.

Looking at Internet use in the three locations by age (graph 4.3), those in the younger age groups are most likely to be using the Internet at home, although a large percentage use it in other locations (probably mostly at school). Internet use at home dips slightly for those in their 20s and early 30s and then rises steadily after the age of 54 years (as noted earlier, when they have more disposable income and are more likely to have children in the house), with 90% of Internet users aged over 65 years accessing the Internet at home.

While the majority of 10–19 year olds are accessing the Internet at home, they are also by far the greatest users of Internet services offered elsewhere. Approximately 35% are taking advantage of access offered in public places such as schools, libraries and Internet cafes — schools particularly 'are important in closing or levelling the access gap, as most students use computers and Internet at school' (McLaren & Zappala 2002, p. 1). Use of Internet in other locations decreases with age but a significant proportion of those in their early 20s use the Internet in other locations. Very few Internet users over the age of 35 years — less than 10% — make use of Internet services offered elsewhere.

The proportion of users who access the Internet at work mirrors the typical labour force profile, rising from age 15–25 years, consistent to age 54 years and then declining. Almost 50% of 25–54 year olds using the Internet are using it at work. Among people in this age group, Internet use is divided between home (on average just under three-quarters are accessing the Internet at home) and work (half are accessing the Internet at work).

4.3 LOCATION OF INTERNET USE, BY AGE — 2001



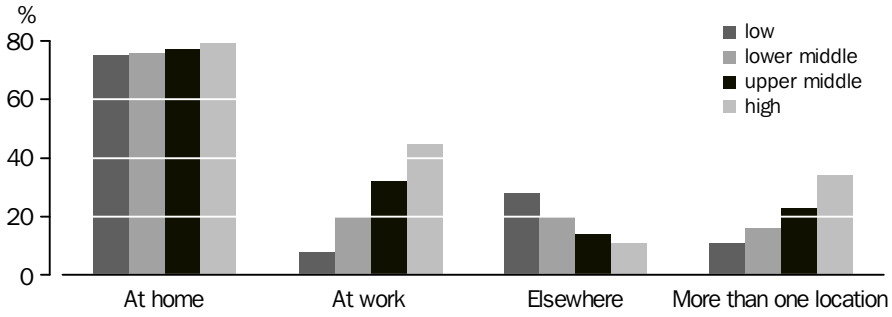
Note: As a proportion of all Internet users.

Source: 2001 Census of Population and Housing. See table A.2 in the Appendix for more detail.

Location of Internet use varies to some degree according to income level (graph 4.4). As income increases, so too does the proportion of people that use the Internet at work (probably because more of these people are in work and in white-collar occupations) and in more than one location. Conversely, low income users of the Internet are much more likely to gain access in other locations than groups with higher family incomes. A similar proportion of users in each group — 75% to 80% — accessed the Internet at home. It must be

remembered, however, that low income people have much lower access rates than people in high income families.

4.4 LOCATION OF INTERNET USE, BY FAMILY INCOME — 2001



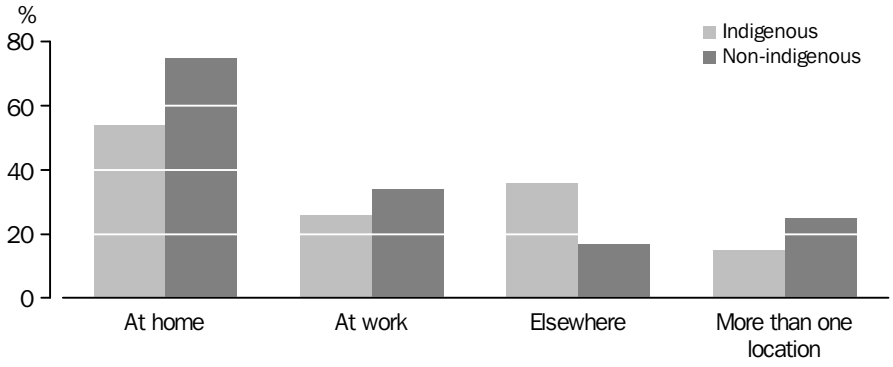
Note: As a proportion of all internet users. The income groups are as follows: high ($1,500 per week and over), upper middle ($1,000–$1,499 per week), lower middle ($500–$999 per week) and low (under $500).

Source: 2001 Census of Population and Housing. See table A.3 in the Appendix for more detail.

The higher the level of post-school qualification, the higher the rate of Internet use generally, and the narrower the gap between Internet use at home and at work (table A.5 in the Appendix). For those with post-graduate degrees the differential between Internet use at home and at work is only a few percentage points. Australians without qualifications beyond Year 12 have rates very close to the national average in terms of Internet use at home, but are less likely to be using the Internet at work.

As noted in Chapter 2, Indigenous people are much less likely to use the Internet than the rest of the population. There are also significant differences in where Indigenous people access the Internet (graph 4.5). Just over half of Indigenous users accessed the Internet at home. Coupled with the low proportion of Indigenous people who used the Internet, this indicates that less than one in ten Indigenous people accessed the Internet at home. Compared with the rest of the population, Indigenous users are much less likely to access the Internet at work as well. However, the proportion of Indigenous users accessing the Internet at other locations is well above the non-Indigenous population. This underlines the importance of schools and other locations such as community access centres in bridging the digital divide for Indigenous people.

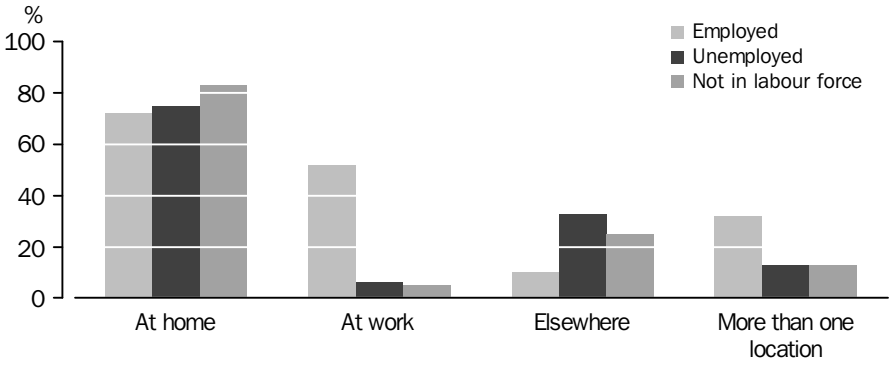
4.5 LOCATION OF INTERNET USE, BY INDIGENOUS STATUS — 2001



Note: As a proportion of all Internet users.

Source: 2001 Census of Population and Housing. See table A.10 in the Appendix for more detail.

4.6 LOCATION OF INTERNET USE, BY LABOUR FORCE STATUS — 2001



Note: As a proportion of all Internet users aged 15 years and over.

Source: 2001 Census of Population and Housing. See table A.6 in the Appendix for more detail.

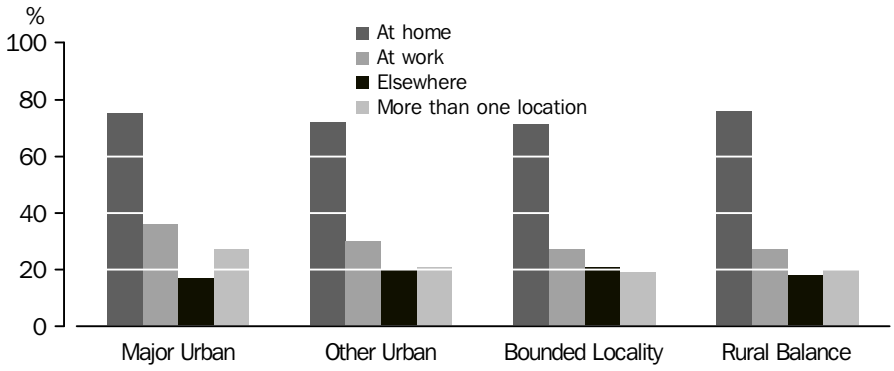
Not surprisingly, a high proportion of Internet users who are employed used the Internet at work (graph 4.6).[1] A fairly small number in this group used the Internet in other locations. Of those who were unemployed, three-quarters used the Internet at home but one-third used the Internet in other locations. A very high proportion of users not in the labour force access the Internet at home, but one-quarter of these people accessed the Internet in other locations. Since the unemployed and people not in the labour force over school age are unlikely to use Internet facilities provided in schools, it is likely that they are accessing the Internet in libraries and community access centres. Clearly provision of these amenities is important to overcoming the digital divide for such groups.

The pattern of location of Internet use does not vary greatly by SOS (graph 4.7). However, there are a number of noteworthy features. The proportion of users who access the Internet at work decreases as the size of the locality gets

1 A small proportion of those who are unemployed or not in the labour force indicated on the census that they had used the Internet at work. These responses have not been corrected. See Chapter 1 for more detail.

smaller. Users in major urban and rural areas are more likely to use the Internet at home, while a slightly greater percentage of people in smaller towns access the Internet in other locations.

4.7 LOCATION OF INTERNET USE, BY SECTION OF STATE — 2001



Note: As a proportion of all Internet users.

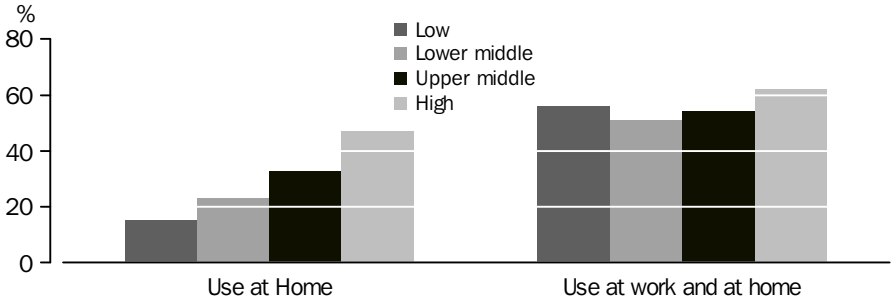
Source: 2001 Census of Population and Housing.

4.1 THE WORK — HOME CONNECTION

This section examines the relationship between use of the Internet at home and at work. Are Australians who used the Internet at work more likely to have used the Internet at home and to have accessed Internet services generally? Or is it that people who have an Internet connection at work feel less need for one at home. In the week prior to the census, 34% of the Australian working age population (15–64 years) used the Internet at home and 19% used the Internet at work. Over 1.3 million or 11% of working age Australians used the Internet both at home and at work.

While 34% of all working age Australians used the Internet at home, out of those who used the Internet at work, 56% also used it at home. It would seem that, as the United States study concluded, there is 'a critical connection between the workplace and home: exposure to a computer and the Internet in the workplace makes it substantially more likely for a computer and the Internet to be used at home' (US Department of Commerce 2002, p. 64). The connection is probably even stronger in that adults who have access at work may connect at home to provide benefit to their partner and/or children even if they do not use it themselves.

4.8 INTERNET USE AT HOME AND USE AT WORK AND AT HOME BY FAMILY INCOME — 2001



Note: Use at work and at home denotes increased liklihood of use at home, given use at work. The income groups are as follows: high ($1,500 per week and over), upper middle ($1,000–$1,499 per week), lower middle ($500–$999 per week) and low (under $500).

Source: 2001 Census of Population and Housing.

Graph 4.8 shows very clearly that those in high income families are much more likely than those in low income families to access the Internet at home (this includes all Australians not just those of working age). This is not surprising as high income families are more likely to have the financial means to obtain access at home. Graph 4.8 also shows that the increased likelihood of using the Internet at home given you use the Internet at work, is true for all levels of family income. There is also much less variation by income in rates of Internet use at home for those who already use the Internet at work, than rates of at home use amongst the entire Australian population. Interestingly, those in lower income families using the Internet at work are more likely than those in lower-middle income families to also use the Internet at home. Over 56% of those in low income families who use the Internet at work also use it at home, compared to 62% of those in high-income families, 54% of those in upper-middle and 51% of those in lower-middle income families. Provision of Internet services in the workplace may be important for levelling inequality in rates of home Internet use across income groups.

CHAPTER 5 THE UNCONNECTED

In Chapters 2 and 3, we focused on the characteristics of those using home computers and the Internet. Of more interest to policy makers aiming to address the digital divide are groups that are not accessing these technologies. In 2001, 10.2 million people or 54% of Australians did not use a personal computer at home, and 11 million or 58% did not access the Internet in the week prior to the census.

5.1 PERCENTAGE NOT USING HOME COMPUTER AND INTERNET FOR KEY DISADVANTAGED GROUPS – 2001

	Not using home computer	*Not using the Internet*
	%	%
Does not speak English at all	94.6	94.9
Did not go to school	93.9	94.5
Attended school to Year 8 or below	90.9	93.3
Aged 65 years+ (women)	88.3	90.6
Aged 65 years+	85.5	88.4
Family Income ($300–$399)(a)	77.4	82.9
Indigenous	78.7	78.8
Born in Southern and Eastern Europe	78.4	79.9
Not in labour force	70.8	75.3
Labourers	68.7	74.0

(a) per week
Source: 2001 Census of Population and Housing.

Of those people who did not use a computer at home or the Internet, many are likely to be elderly — 82% of people aged between 65 years and 74 years and 89% of people aged over 75 years did not use a computer at home. Likewise, 87% of people aged 65–74 years and 91% of those aged over 75 years did not access the Internet. This trend is worse for older women in Australia, with 88% of women aged 65 years and over not using a computer and 91% not having used the Internet.

Indigenous residents are also much less likely to be online or using home computers than the average Australian. Nearly 80% of Indigenous people did not use a personal computer or the Internet in the week prior to the census.

Persons in lower income families are significantly less likely to be using computers or the Internet than other income groups. Three-quarters of persons in families earning between $300–$399 per week did not use a personal computer at home and over 80% did not access the Internet in the week prior to the census.

Those with low levels of education were at greater risk of being unconnected — 94% of Australians who did not go to school did not use a home computer and 95% did not use the Internet. Australians who are not in the labour force are also significantly more likely to be amongst the unconnected. According to the 2001 census, 71% of this group did not use a computer and 75% did not access the Internet in the week prior to the census. Likewise 69% of people classified as labourers and related workers did not use a computer at home, and 74% did not access the Internet.

Rates of access among those who do not speak English well or at all are very low; about 95% of people who do not speak English at all did not use a home computer or the Internet. People born in Southern and Eastern Europe and North Africa and the Middle East also have usage rates well below the national average.

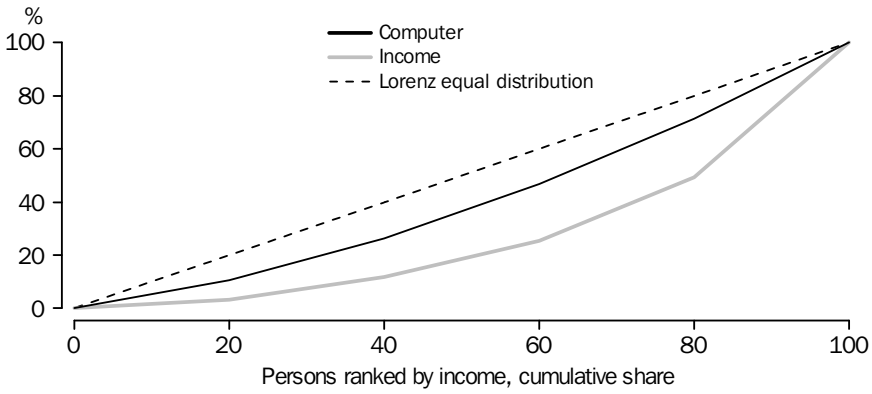
CHAPTER 6 LORENZ CURVE ANALYSIS FOR HOME COMPUTER AND INTERNET USE ....

In order to look at the distribution of computer and Internet use we have adopted a standard methodology for assessing inequality — the Lorenz curve. To measure income inequality, for example, people are ranked according to their individual income and a Lorenz curve is drawn (starting with the lowest incomes) to indicate the cumulative income received by the cumulative population up to that point. If the distribution of income is perfectly even, the Lorenz curve for income is a straight line. The more 'bowed' the curve, the more unequal the distribution. In graph 6.1 we can see the extent of income inequality in Australia, the bottom 40% of the population receives approximately 12% of the income, while the top 20% receives over 50%.

Using a similar method we can assess the degree of inequality of home computer and Internet use compared with income. The standard approach to measuring income inequality differs slightly to the one used here in that typically exact income is available for individuals. In this case we divide the population into five equally-sized groups (quintiles) by individual income and compute the numbers of computer or Internet users within each group. We then plot the cumulated number of people by income against the cumulated number of computer or Internet users. It is important to remember that this analysis does not capture intensity of use.

Looking at the Lorenz curve for home computer use in graph 6.1, we can see that the distribution of computer users amongst the Australian population ranked by income is more even than the distribution of income. While the bottom 40% of income earners hold 12% of total individual weekly earnings, the bottom 40% of income earners represent 26% of total computer users (the Lorenz curve for income 'bows out' much more than that for computer use).

6.1 LORENZ CURVE FOR HOME COMPUTER USE AND INCOME — 2001

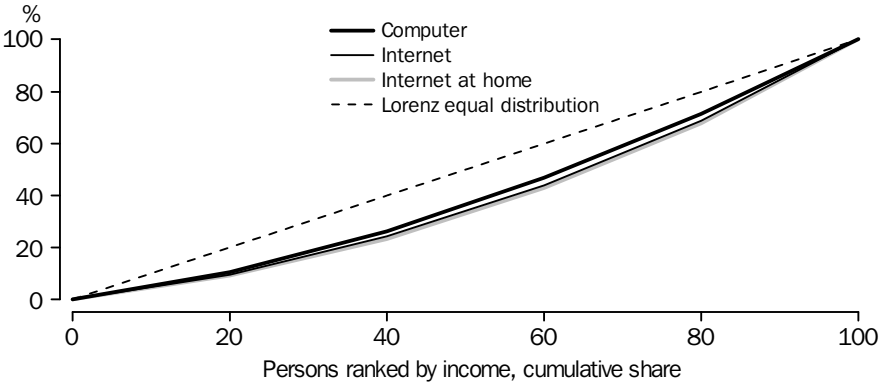


Source: 2001 Census of Population and Housing.

Although not directly comparable, the United States study showed a similar picture. It examined ownership of computers by household income and found that in 2001 the bottom 45% of households by income owned 27% of computers. It also showed that distribution of computers was more equal than income and that the distribution had become more equal since 1984 (US Department of Commerce 2002, p. 89).

Graph 6.2 shows the distribution of home computer, all Internet users and Internet users at home across the Australian population ranked by individual income. The distribution of computer users is marginally more equal than the distribution of people who use the Internet — people in the lower income quintiles account for a slightly higher share of computer users than Internet users. The distribution of Internet use and Internet use at home is again very similar, with the distribution of Internet use at home slightly more unequal than Internet use generally.

6.2 LORENZ CURVE FOR HOME COMPUTER USE, INTERNET USE AND INTERNET USE AT HOME — 2001



Source: 2001 Census of Population and Housing.

CHAPTER 7 SPATIAL DISTRIBUTION OF COMPUTER AND INTERNET USE .....

7.1 INTRODUCTION

Regional inequality has become very topical in Australia's policy arena — there is growing evidence that the economic and social circumstances of Australians vary significantly by region. Previous analysis has shown that rates of computer and Internet use in non-metropolitan areas have been significantly lower than those in metropolitan regions (Lloyd & Hellwig 2000). This pattern has been one of the aspects investigated by Besley in the Commonwealth's Telecommunications Service Inquiry (2000) and Estens in the Commonwealth's Regional Telecommunications Inquiry (2002).

Chapter 2 of this report showed that metropolitan regions continue to have rates of use of the Internet and home computers much higher than non-metropolitan regions. It also showed that there were significant differences in rates of home computer and Internet use even within non-metropolitan regions, with rural areas having rates of use significantly higher than other urban areas and bounded localities. Similarly, we might expect different rates of access within metropolitan regions.

This chapter uses the detailed regional information in the 2001 census to look at variation in Internet and home computer use between and within states and in metropolitan and non-metropolitan regions. Information in these chapters is based on usual residence data rather than as enumerated data.

7.2 STATE/TERRITORY

Table 7.1 shows variations in rates of home computer and Internet use across the states and territories of Australia. Rates of home computer and Internet use, at 57% and 55% respectively, are significantly higher in the Australian Capital Territory than in any other state or territory. This is likely to reflect the higher than average incomes, education levels, and proportion of students found in the territory. After the Australian Capital Territory, residents of Western Australia and Victoria have the highest usage rates of home computers and the Internet, followed by New South Wales, Queensland and South Australia.

7.1 HOME COMPUTER AND INTERNET USE BY STATE/TERRITORY — 2001

	Home computer use	*Internet use*	*Location of Internet use(a)*				*Median Individual Income(b)*	*Residents holding Bachelor degree*	*Median Age*
			At home	*At work*	*Elsewhere*	*In multiple locations*			
	%	%	%	%	%	%	$	%	years
NSW	41.2	36.4	76.1	35.2	14.8	24.6	300–399	10.7	35
Vic.	43.4	38.6	73.7	34.6	18.8	25.7	300–399	11.3	35
Qld	41.3	35.7	75.8	31	18.2	23.6	300–399	8.5	35
SA	40.7	35.4	72.5	32.1	20.8	24.2	300–399	8.6	37
WA	43.4	38.5	74.5	32.6	18.2	24	300–399	9.5	34
Tas.	37.6	33.8	66.3	33.1	25.4	23.6	300–399	7.7	36
NT	31.3	30.8	66.9	41.5	17.7	24.7	400–499	8.5	30
ACT	56.7	54.7	72.8	47.2	15.4	33.3	500–599	20.3	32
Aust.	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**	**300–399**	**10.2**	**35**

(a) As a proportion of all Internet users.
(b) Excludes people aged under 15 years
Note: Persons excluding overseas visitors.
Source: 2001 Census of Population and Housing.

Tasmania and the Northern Territory are well below the national average in terms of the proportion of residents using home computers and Internet — in the Northern Territory rates of home computer and Internet use are about 10 percentage points below those of the average Australian. This may be due to a high proportion of people on low incomes in the Northern Territory. Although the Northern Territory has a relatively high median income (table 7.1), it had a high proportion of people who responded that their individual income was in the range $160–$199 (ABS 2003). Another reason for low rates of use in the Northern Territory may be the high proportion of Indigenous people, who represent 26% of the Northern Territory population compared to between
1% and 9% in other states/territory (ABS 2003) and as we showed in Chapter 2 are typically much less likely to use the Internet or a home computer.

Of those who use the Internet, use at home is highest amongst residents of New South Wales, Queensland and Western Australia. A much lower proportion of Tasmanians and Northern Territorians use the Internet at home. Australian Capital Territory users are most likely to be using the Internet in their work-place, followed by Internet users in the Northern Territory. Over one-quarter of Tasmania's Internet users make use of services offered 'elsewhere' in such places as schools, public libraries and Internet cafes, as do one-fifth of South Australian Internet users. One-third of the Australian Capital Territory's residents used the Internet in one or more locations in the week prior to the census. In Australia's other states and territories the rate of use in multiple locations is very close to the national average of 25%.

7.3 POSTAL AREAS

The analysis below is undertaken on the basis of POAs. POAs are defined by the ABS and do not equate directly to Australia Post postcodes. While each POA code is the same as the corresponding postcode, POAs are created by allocating whole Collection Districts (CDs) to postcode areas and as a result boundary differences may occur and some postcodes may be excluded from POA classifications (ABS 2001b).

Tables 7.2 and 7.3 list the POAs with the lowest rates of home computer use and Internet use by state/territory (all well below 20%, with the exception of the Australian Capital Territory). Generally, these POAs are situated in outer regional and rural Australia. POA 0862 in the Northern Territory including the locality of Tennant Creek records the lowest rate of home computer use and Internet use in Australia — rates of 5% and 4% respectively. The lowest rate of home computer use in the Australian Capital Territory is almost twice as high as the lowest rate in New South Wales and six times the lowest rate in the Northern Territory. Likewise the POA with the lowest rate of Internet use in the Australian Capital Territory is still over two and a half times the lowest rate in New South Wales and six times that of the Northern Territory.

The lowest rate of Internet use is generally below the lowest rate of home computer use (as expected given the national figures), although in Western Australia rates of Internet use are marginally higher.

Chapter 2 found that use of home computers and the Internet tends to decrease with age and increase with income. Hence we would expect POAs with older and/or poorer populations to have lower than average rates of use. Tables 7.2 and 7.3 show the median family income and mean age for each of the POAs listed. Interestingly, the mean age for these POAs is not particularly high — only four POAs record a mean age of 40 years or over. Most of the POAs in tables 7.2 and 7.3, however, have a median family income of $650 per week or less, well below the national median family income of $800–$999 per week. We would expect this given the positive association between use of ICT and income. The exception is the POA 2609 in the Australian Capital Territory, broadly covering the suburbs of Symonston and Pialligo, which has a median income of $842 per week (although this is likely to reflect higher incomes found in the Australian Capital Territory generally, see table 7.1).

7.2 POSTAL AREAS WITH THE LOWEST RATES OF HOME COMPUTER USE, BY STATE/TERRITORY — 2001

State	Postal Area	Locality(a)	Home computer use	Median family income	Mean age
			%	$ per week	years
NSW	2879	Menindee	15.3	571	36
Vic.	3520	Korongvale	14.3	423	42
Qld	4876	Bamaga	7.3	595	25
SA	5732	Copley	12.6	628	37
WA	6770	Halls Creek	6.4	468	27
Tas.	7186	Slopen Main	18.1	650	38
NT	0862	Tennant Creek	4.6	528	26
ACT	2609	Symonston	28.0	842	40

(a) Only an approximation of the locality corresponding to a particular Postal Area.

Note: Postal Areas with a total population under 50 were excluded from this analysis.

Source: 2001 Census of Population and Housing.

7.3 POSTAL AREAS WITH THE LOWEST RATES OF INTERNET USE, BY STATE/TERRITORY — 2001

State	Postal Area	Locality(a)	Internet use	Median family income	Mean age
			%	$ per week	years
NSW	2807	Koorawatha	9.0	490	40
Vic.	3520	Korongvale	9.3	423	42
Qld	4876	Bamaga	7.7	595	25
SA	5601	Iron Knob	11.7	514	43
WA	6770	Halls Creek	7.7	468	27
Tas.	7182	Port Arthur	17.6	662	39
NT	0862	Tennant Creek	4.2	528	26
ACT	2609	Symonston	24.7	842	40

(a) Only an approximation of the locality corresponding to a particular Postal Area.

Note: Postal Areas with a total population under 50 were excluded from this analysis.

Source: 2001 Census of Population and Housing.

Tables 7.4 and 7.5 show the POAs with the highest rates of home computer and Internet use for each state/territory. These POAs are mostly in metropolitan areas and in some cases have a high concentration of students. For example POA 2006, which includes The University of Sydney records the highest rates of Internet and home computer use of any POA in New South Wales. POA 4229 (which includes Bond University) in Queensland, also records a very high rate of home computer and Internet use, 82% and 87% respectively. This is expected given universities usually provide very good access to ICT technologies and students are likely to be early adopters of new technology.

7.4 POSTAL AREAS WITH THE HIGHEST RATES OF HOME COMPUTER USE, BY STATE/TERRITORY — 2001

State	Postal Area	Locality(a)	Home computer use	Median family income	Mean age
			%	$ per week	years
NSW	2006	Sydney University	82.6	1,399	23
Vic.	3027	Williams, RAAF	75.7	1,193	27
Qld	4229	Bond University	82.0	1,750	22
SA	5136	Norton Summit	66.5	1,020	33
WA	6476	Gabbin	67.2	827	40
Tas.	7007	Mount Nelson	58.5	1,217	36
NT	0885	Alyangula	53.8	1,702	29
ACT	2904	Macarthur	65.7	1,588	32

(a) Only an approximation of the locality corresponding to a particular Postal Area.
Note: Postal Areas with a total population under 50 were excluded from this analysis.
Source: 2001 Census of Population and Housing.

7.5 POSTAL AREAS WITH THE HIGHEST RATES OF INTERNET USE, BY STATE/TERRITORY — 2001

State	Postal Area	Locality(a)	Internet use	Median family income	Mean age
			%	$ per week	years
NSW	2006	Sydney University	86.5	1,399	23
Vic.	3027	Williams, RAAF	76.8	1,193	27
Qld	4229	Bond University	87.2	1,750	22
SA	5006	North Adelaide	60.0	1,533	39
WA	6009	Nedlands	63.2	1,773	38
Tas.	7005	Sandy Bay	57.8	1,396	40
NT	0820	Darwin Mail Centre	44.6	1,352	33
ACT	2600	Barton	64.4	1,826	35

(a) Only an approximation of the locality corresponding to a particular Postal Area
Note: Postal Areas with a total population under 50 were excluded from this analysis.
Source: 2001 Census of Population and Housing.

Analysis in Chapter 2 would indicate that computer and Internet use is positively associated with income and negatively associated with age. Generally, POAs with the highest rates of information technology use tend to have either a low mean age (below the Australian median age of 35 years), or high median family incomes, or both. POA 6476 including locality of Gabbin, a remote town west of Albany in Western Australia, is the exception here, having a mean age of 40 years and a median weekly family income of only $827 per week. However, it has a low population (121 residents), which may account for high rates of Internet use found in the area. POAs with the highest rates of Internet use are associated with slightly higher median incomes than POAs where home computer use is highest.

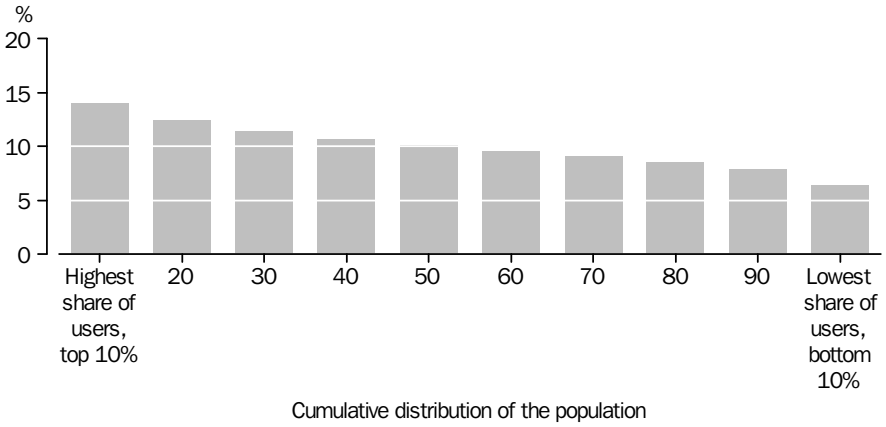
Looking at variation in rates of home computer and Internet use between POAs within states/territories, the most pronounced difference in rates exists in Queensland where there is a 75 percentage point difference in computer use and a 79 percentage point difference in Internet use between the highest and

lowest POAs. The smallest variations in rates of use are found in the Australian Capital Territory where there is a 38 percentage point difference in rates of home computer use and 40 percentage point difference in Internet use. For New South Wales, Victoria and Western Australia the difference between the highest and lowest POA is between 61–67 percentage points for computer use and between 55–78 percentage points for Internet use. South Australia exhibits less variation across its POAs than the other large states, with a 55 percentage point difference in home computer and 48 percentage point difference in Internet use. Tasmania and the Northern Territory have a gap of between 40–50 percentage points.

For New South Wales, Victoria and Queensland the gap between the highest and lowest POAs is generally greater for Internet use than for home computer use — in New South Wales the gap between highest and lowest is 10 percentage points higher for rates of Internet use than it is for rates of home computer use. Just as inequality of use was greater for Internet than home computer use for many of the socioeconomic variables examined in Chapter 2, the same pattern is evident on a regional basis.

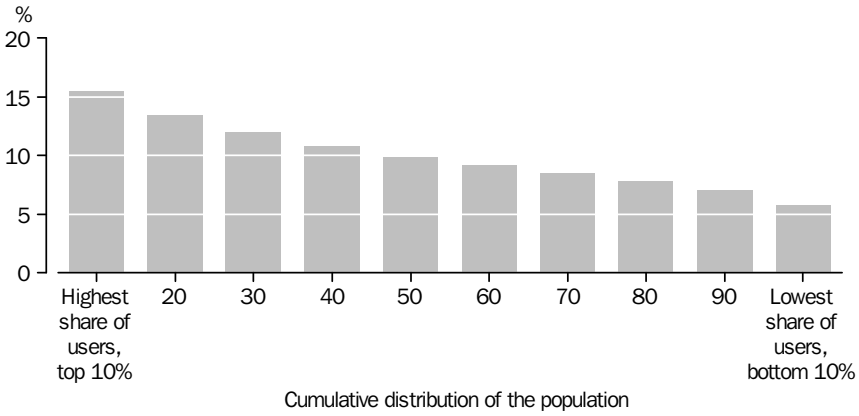
In graphs 7.6 and 7.7, we further examine regional inequalities in home computer and Internet use by taking account of differences in the population of POAs to examine how computer and Internet users are distributed across POAs in Australia. The horizontal axis gives the cumulative share of population after ranking POAs in descending order according to the percentage of people using home computers and the Internet. The first decile represents the 10% of the population in POAs with the highest rates of usage. Approximately 14% of computer users and 15% of Internet users live in these POAs. As we move from the decile of the Australian population living in POAs with the highest rates of technology use to the next decile and so forth, the relative flatness of the graph shows that Internet and computer users are not concentrated in a few POAs. Even the 10% of people in POAs with the lowest rates of technology use contain just over 6% of Australia's computer users and just under 6% of Australia's Internet users. Conversely, however, the top decile contains about 2.5 times as many home computer users as the bottom decile.

7.6 DISTRIBUTION OF HOME COMPUTER USERS ACROSS POSTAL AREAS — 2001



Note: Postal Areas with zero population or no home computer users were excluded from this analysis.
Source: 2001 Census of Population and Housing.

7.7 DISTRIBUTION OF INTERNET USERS ACROSS POSTAL AREAS — 2001



Note: Postal Areas with zero population or with no Internet users were excluded from this analysis.
Source: 2001 Census of Population and Housing.

Graphs 7.6 and 7.7 again illustrate that the spatial distribution of Internet users across the Australian population is less equal than the distribution of home computer users. For many of the socioeconomic variables examined in Chapter 2, inequality of Internet use was found to be greater than home computer use, the same pattern is evident on a regional basis at smaller geographical levels.

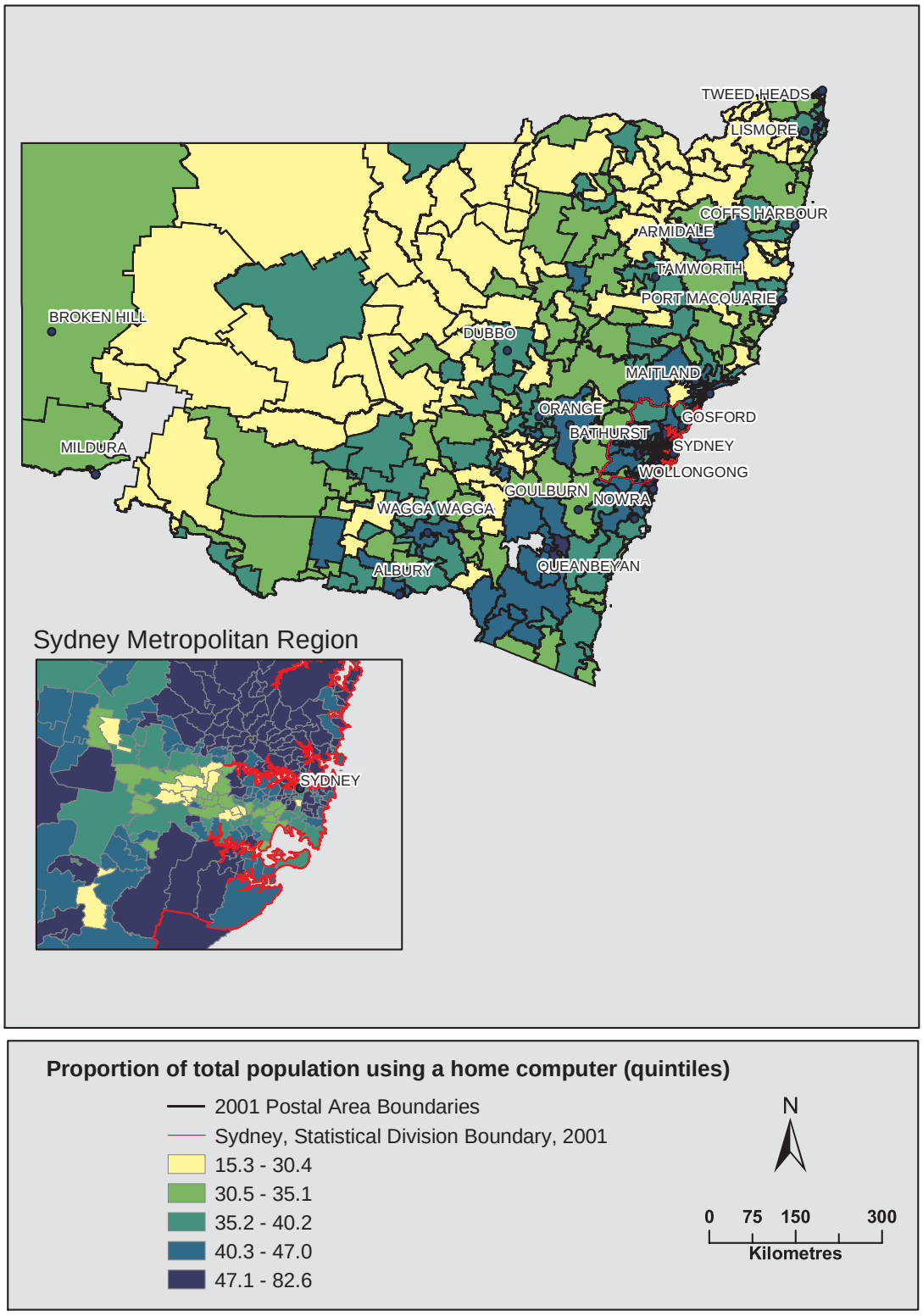
7.4 SPATIAL DISTRIBUTION OF COMPUTER AND INTERNET USE

Figures 7.8 to 7.23 are thematic maps showing the proportion of home computer users and Internet users in 2001 for POAs in each state and territory. The POAs have been ranked on the basis of the proportion of home computer and Internet users, and divided into five equal groups or quintiles, with equal numbers of POAs in each group. POAs plotted in yellow are in the bottom 20% of POAs for the state or territory, while those POAs ranked amongst the top 20% are shown in dark blue.

New South Wales

For New South Wales (maps 7.8 and 7.9) the pattern of home computer and Internet use is clear; rates are generally high in the metropolitan region and decrease as we move to the rural areas in the north and west of the state. POAs with the lowest concentration of computer and Internet users for the state have between 15% and 30% of residents using a home computer and between 9% and 23% using the Internet in the week prior to the census. POAs in and closely situated to major regional centres such as Newcastle, Wollongong, Bathurst, Gosford, Albury, Wagga Wagga and Armidale (as well as the upper Hunter and region surrounding the Australian Capital Territory), also record high rates of home computer and Internet use within the top two quintiles of the state. Looking at the inset, the majority of POAs in the Sydney metropolitan region fall within the top quintile, having between 47% and 83% of residents using home computers and between 44% and 87% using the Internet in the week prior to the census. However, even in the metropolitan region there are several POAs, particularly to the south-west and west of the city where rates of use are low — some even rank in the bottom quintile of POAs for the state. These are shown in yellow. POAs with high proportions of Internet users are more likely to be concentrated in the metropolitan areas than POAs with high proportions of home computer users.

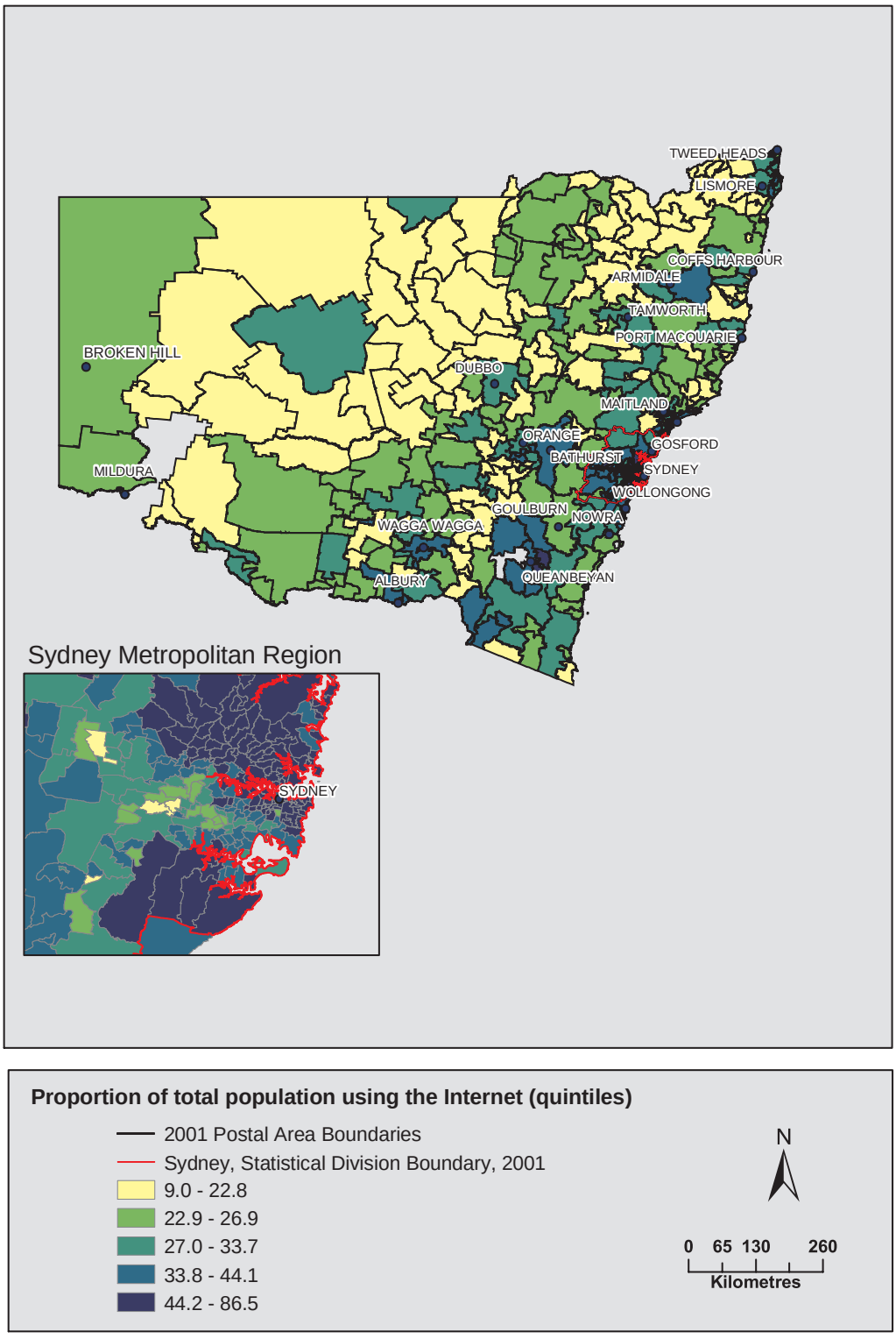
7.8 PERCENTAGE OF TOTAL POPULATION USING A HOME COMPUTER, BY POSTAL AREA, NEW SOUTH WALES



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.9 PERCENTAGE OF POPULATION USING INTERNET, BY POSTAL AREA, NEW SOUTH WALES



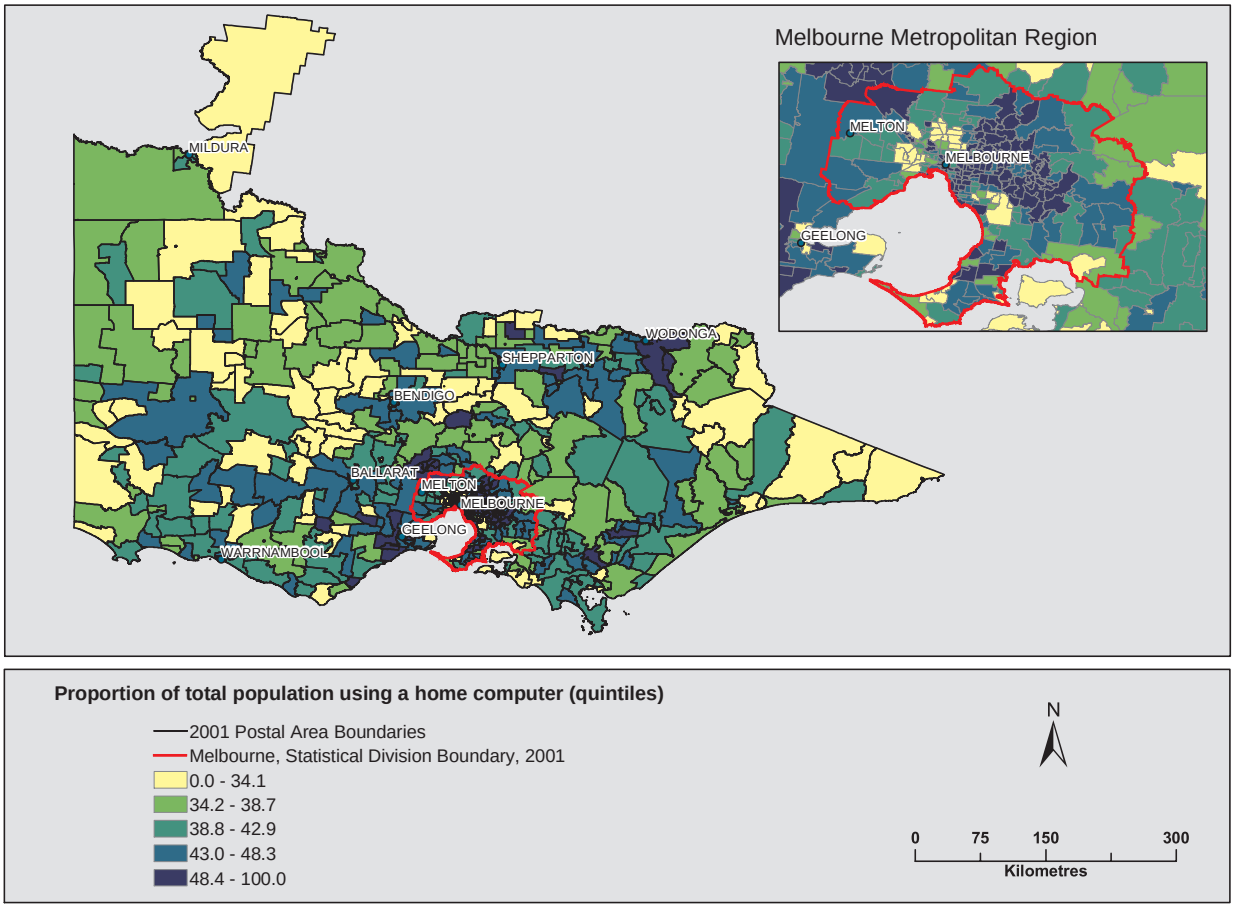
Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

Victoria

As illustrated in maps 7.10 and 7.11, in Victoria, POAs with the highest concentrations of home computer and Internet users are predominately located in the Melbourne metropolitan region. However, POAs in the top quintiles are scattered through the state, though mainly around major regional centres such as Geelong, Wodonga, Shepparton, Bendigo and Ballarat. Similarly, POAs with low concentrations of home computer and Internet users (shown in yellow) are spread widely through the rest of the state, but are slightly more likely in the areas most distant from Melbourne. The picture is much more scattered than in New South Wales. Within the metropolitan area, the inner Melbourne suburbs and those to the north and east of the city tend to have high proportions of users. However, POAs in the western part of the metropolitan region have low rates of home computer and Internet use, and some are in the lowest quintile for Victoria. As in New South Wales, POAs with high proportions of Internet users are more likely to be concentrated in the metropolitan areas than POAs with high proportions of home computer users.

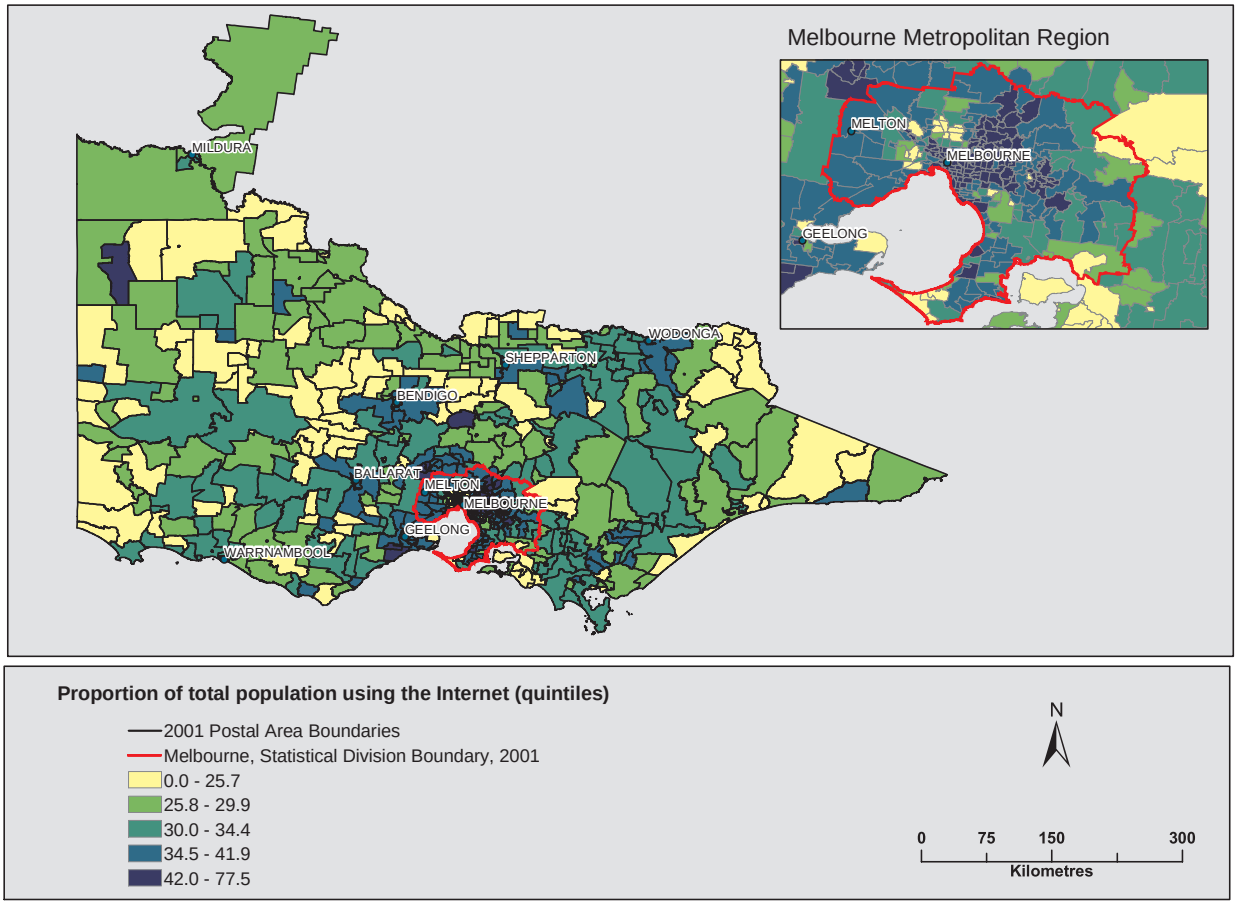
7.10 PERCENTAGE OF POPULATION USING A HOME COMPUTER, BY POSTAL AREA, VICTORIA



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.11 PERCENTAGE OF POPULATION USING INTERNET, BY POSTAL AREA, VICTORIA



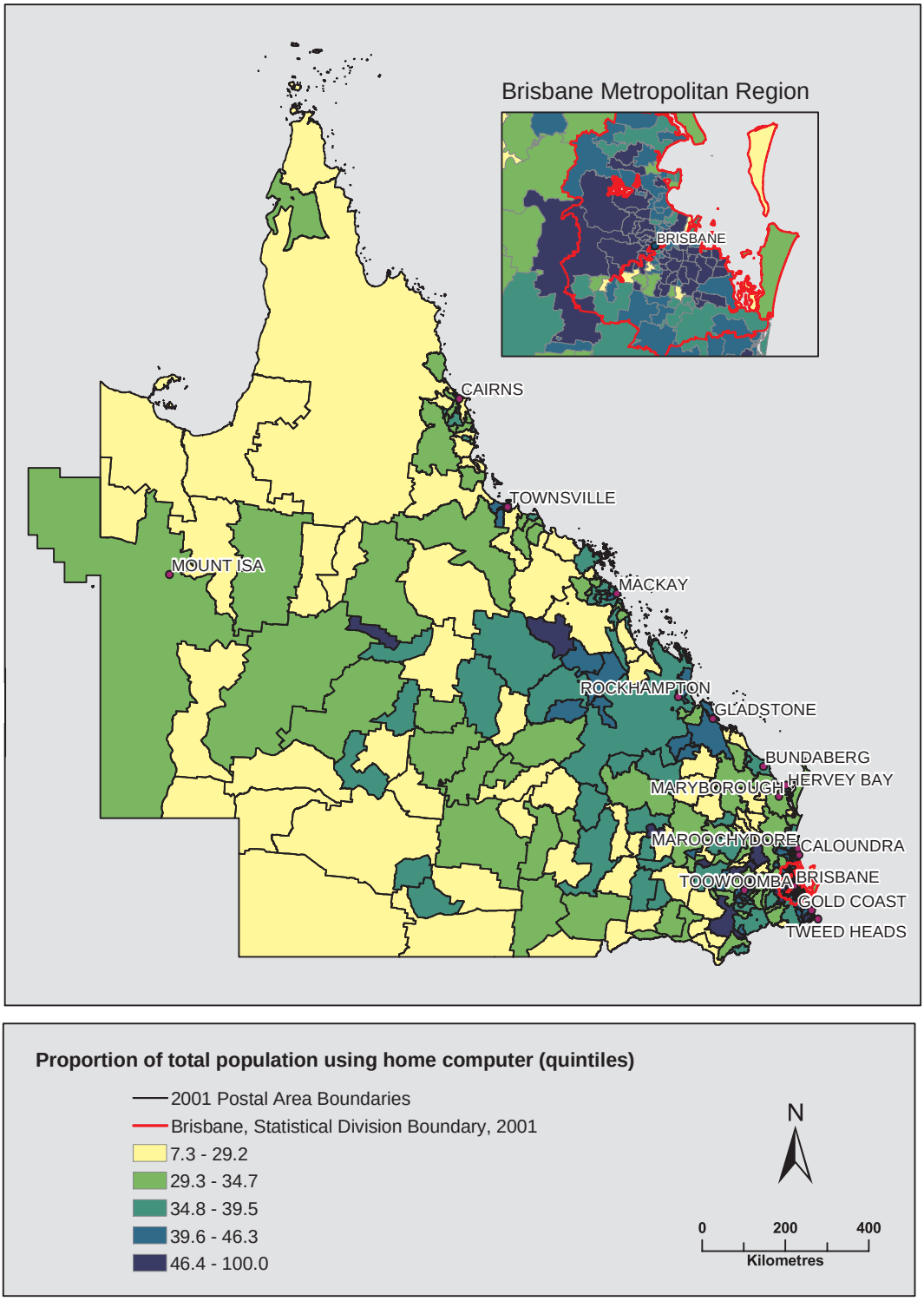
Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

Queensland

Looking at the distribution of home computer and Internet users across POAs in Queensland, shown in maps 7.12 and 7.13, the maps illustrate a clear difference between rates of use in rural and remote areas and the state's major towns and cities. The far north and west of the state have very low concentrations of home computer and Internet users, with the majority of POAs in these regions falling within the bottom two quintiles. The inset shows that most POAs in the Brisbane metropolitan region have a high proportion of residents using home computers and the Internet. However, even within the metropolitan region, there are POAs with low proportions of users, some even in the bottom quintile for the state. These are mostly located in the south western suburbs. POAs in major towns and cities, such as the Gold Coast, Toowoomba, Gladstone, Rockhampton, Mackay and Townsville also have rates of home computer and Internet use within the top two quintiles of the state. POAs west of Mackay, including the mining and industrial towns of Moranbah and Dysart, also record high rates of computer and Internet use (likely to be due to high incomes of these regions). Interestingly, while regions in the north west and central parts of the state rank in the bottom 20% of home computer users they are less likely to fall in the bottom quintile for Internet use. In the case of Queensland, Internet use has a more equal spatial distribution than home computer use.

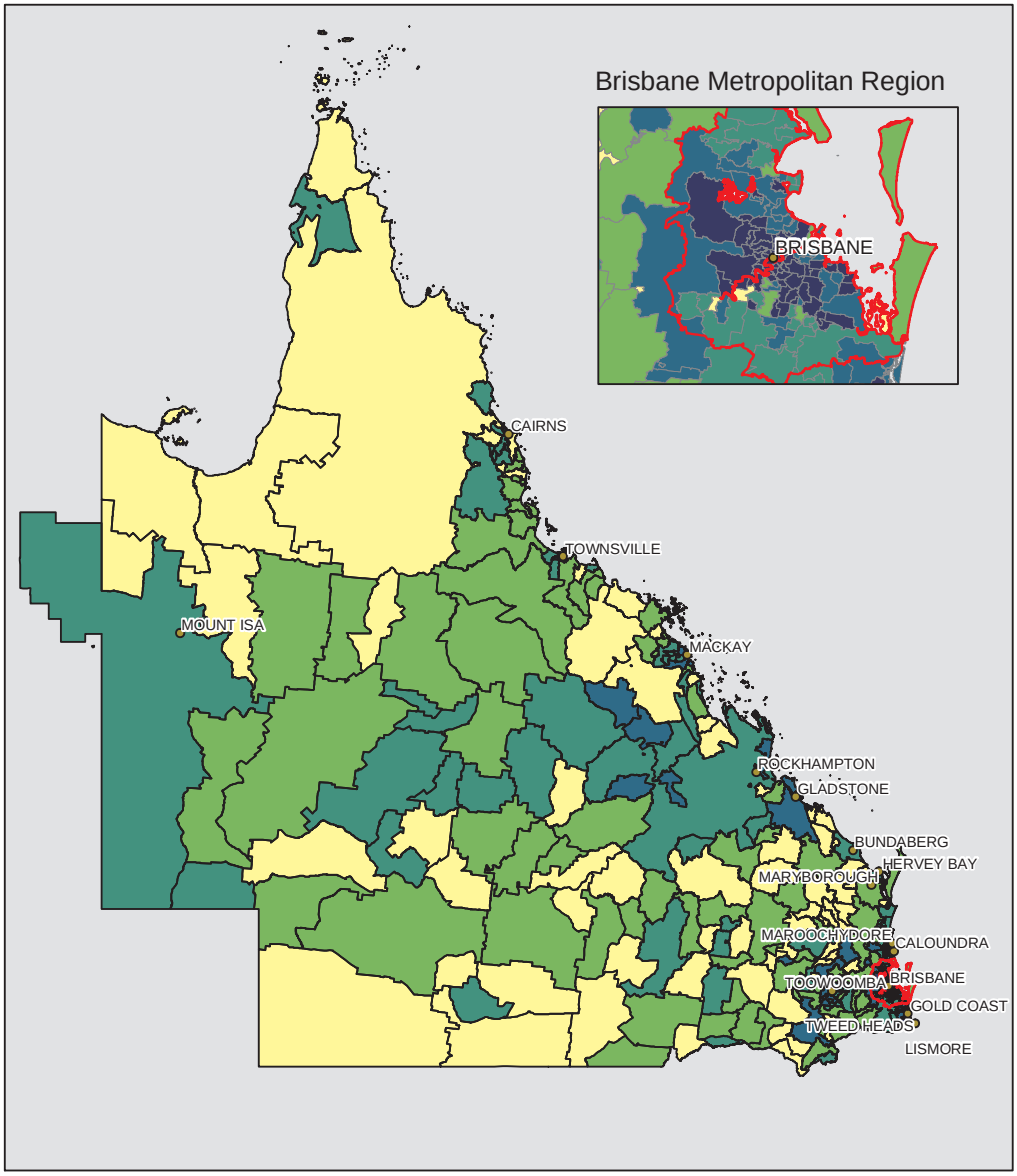
7.12 PERCENTAGE OF POPULATION USING A HOME COMPUTER, BY POSTAL AREA, QUEENSLAND



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.13 PERCENTAGE OF THE TOTAL POPULATION USING INTERNET, BY POSTAL AREA, QUEENSLAND



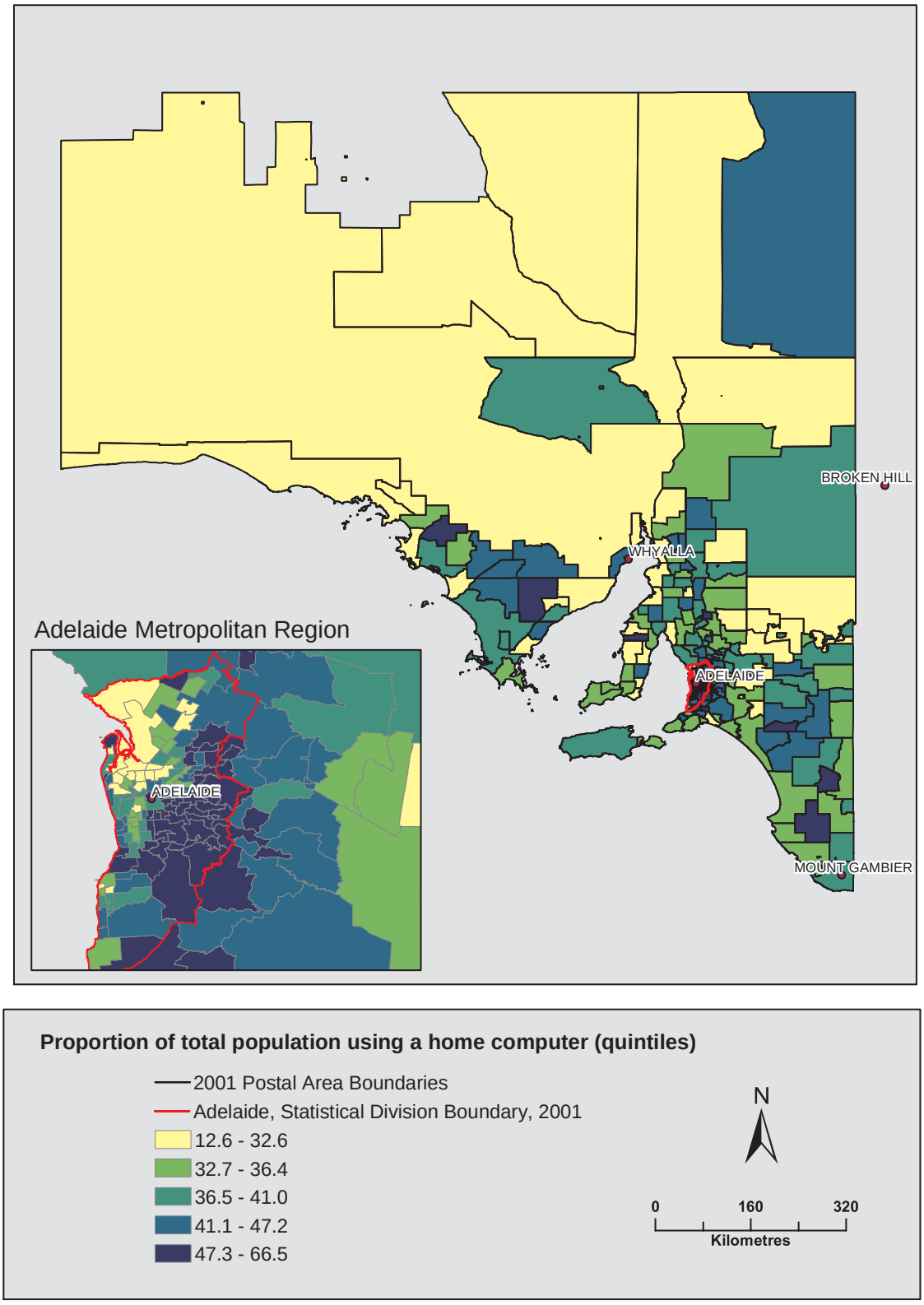
Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

South Australia

Maps 7.14 and 7.15 show that in South Australia, most of the POAs with the highest concentrations of home computer and Internet users are located in the metropolitan region. However, there are pockets of high use through the southern parts of the state. POAs in the northern regions (with the exception of Coober Pedy) tend to have the lowest rates of Internet and home computer usage. As in the other states, we see considerable diversity even within the metropolitan region. We see a cluster of POAs with high usage rates in the south east part of the metropolitan region, middle quintiles in the central part of the region and a cluster of POAs in the bottom quintile to the north west of the city. Internet use is slightly more highly concentrated in and near the metropolitan region than is home computer use.

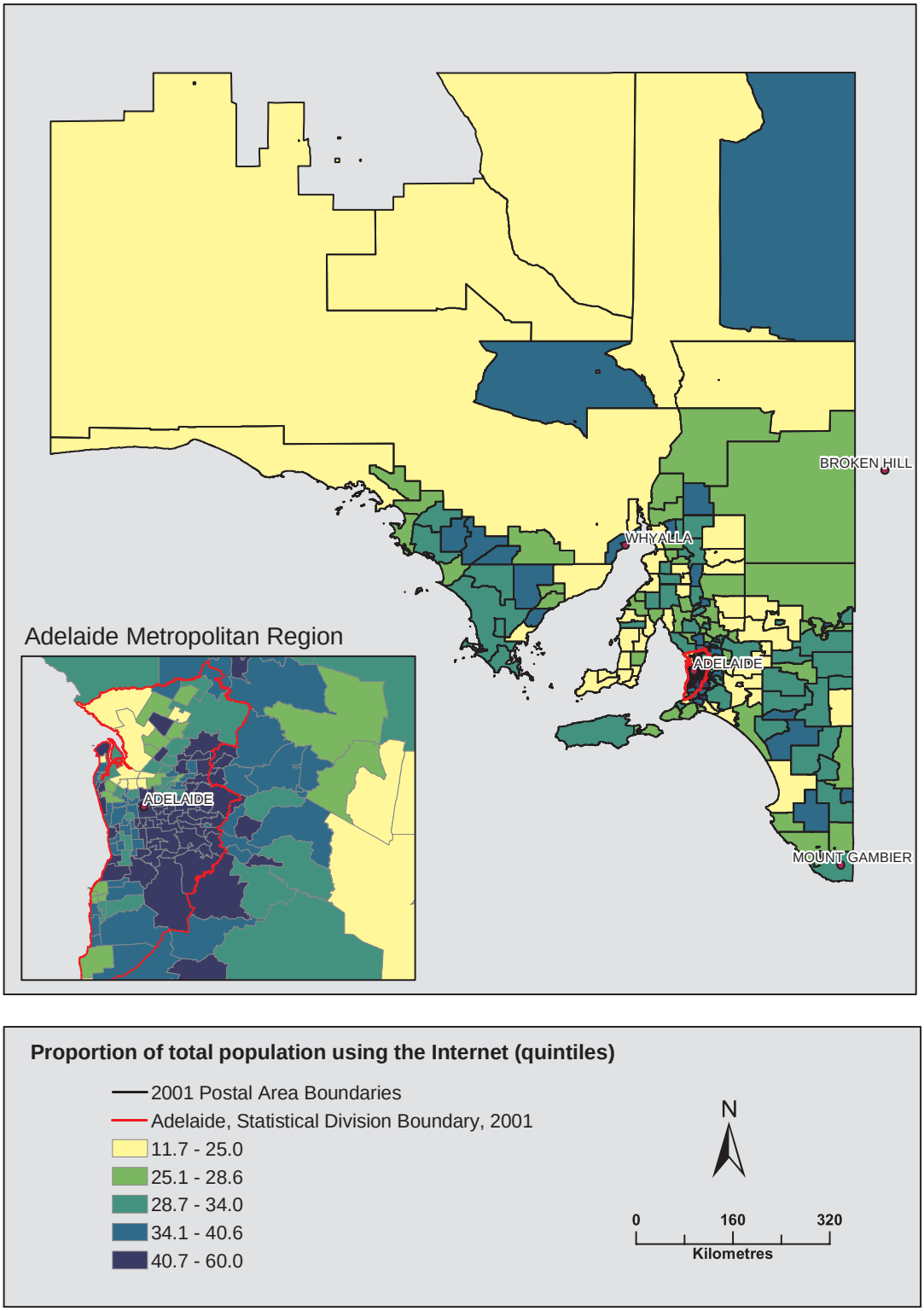
7.14 PERCENTAGE OF POPULATION USING HOME COMPUTER, BY POSTAL AREA, SOUTH AUSTRALIA



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.15 PERCENTAGE OF POPULATION USING THE INTERNET, BY POSTAL AREA, SOUTH AUSTRALIA



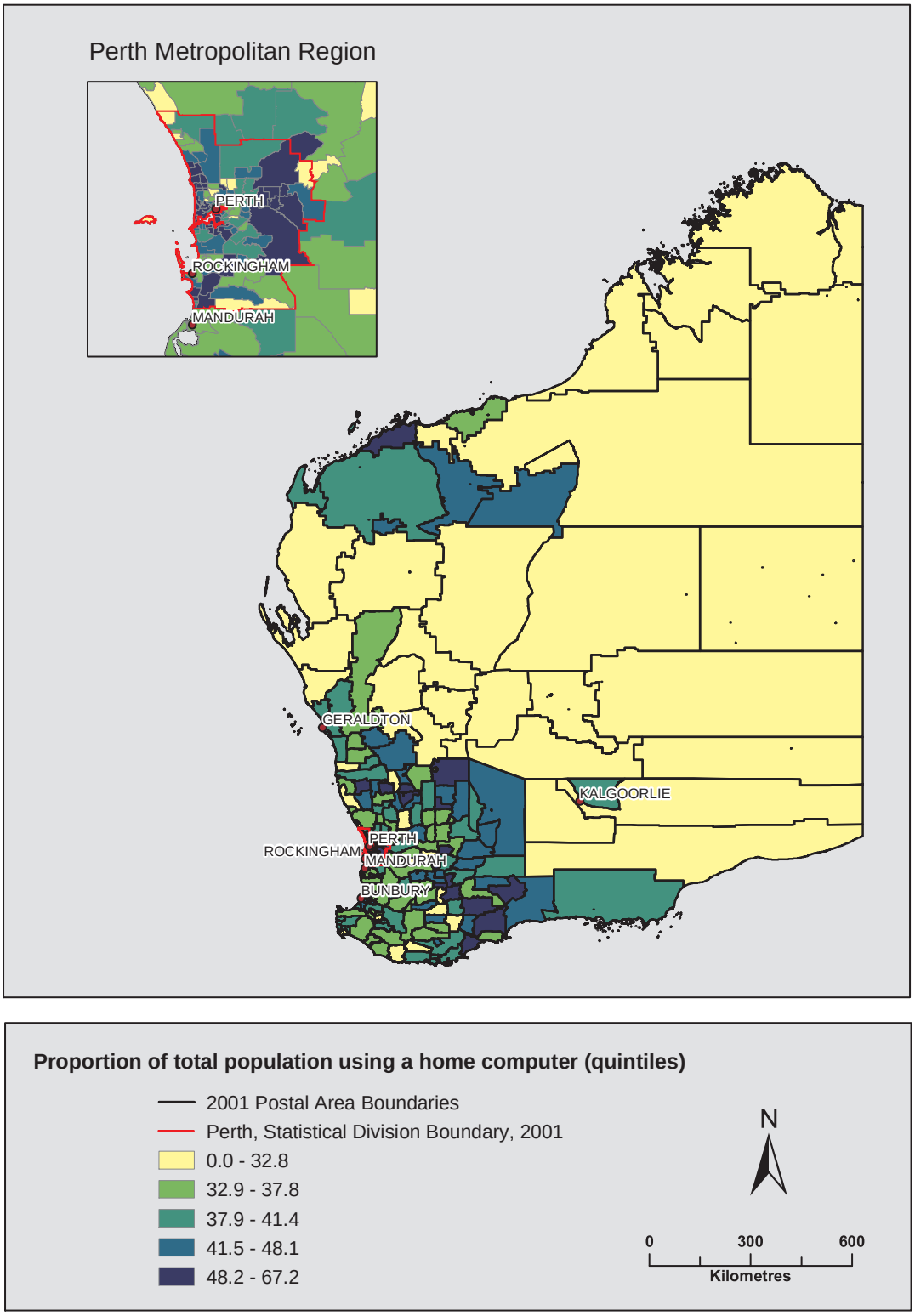
Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

Western Australia

As with the other Australian states/territories, residents of Western Australia using a home computer or the Internet are most highly concentrated in POAs in and around metropolitan regions (maps 7.16 and 7.17). However, there are pockets of high usage throughout the south-west corner, in Kalgoorlie and the Pilbara region. Many of these coincide with mining and agricultural areas. Rural and remote areas in the north, east and central parts of the state have the lowest rates of usage. However, again we see that POAs in the bottom quintile are spread throughout all regions, including the metropolitan area. An area with low rates of use may be located adjacent to areas with high rates of use. Internet use may be slightly more concentrated in the metropolitan regions than home computer use, but the difference is less pronounced than in other states/territories.

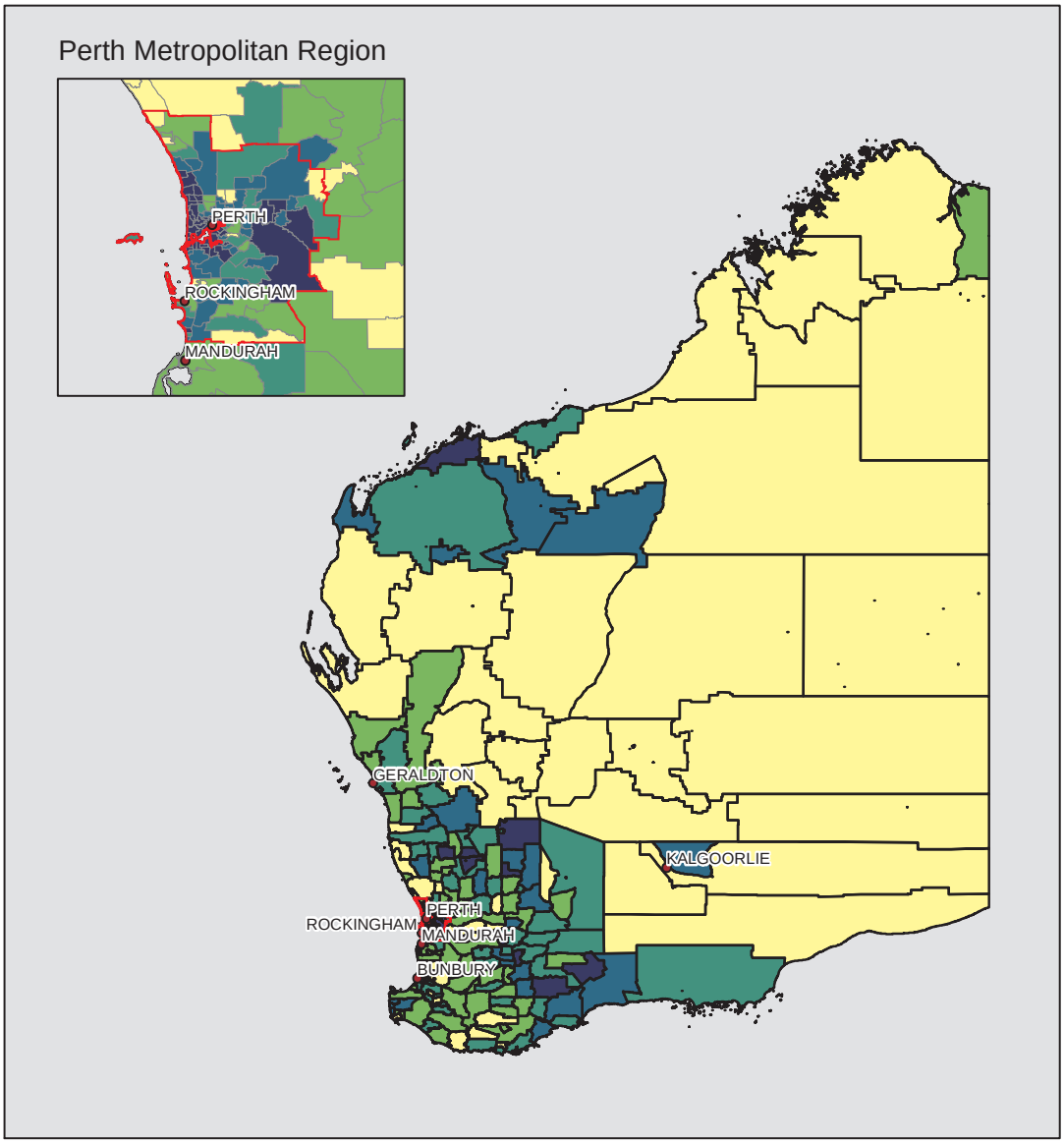
7.16 PERCENTAGE OF POPULATION USING HOME COMPUTER, BY POSTAL AREA, WESTERN AUSTRALIA



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.17 PERCENTAGE OF POPULATION USING INTERNET, BY POSTAL AREA, WESTERN AUSTRALIA



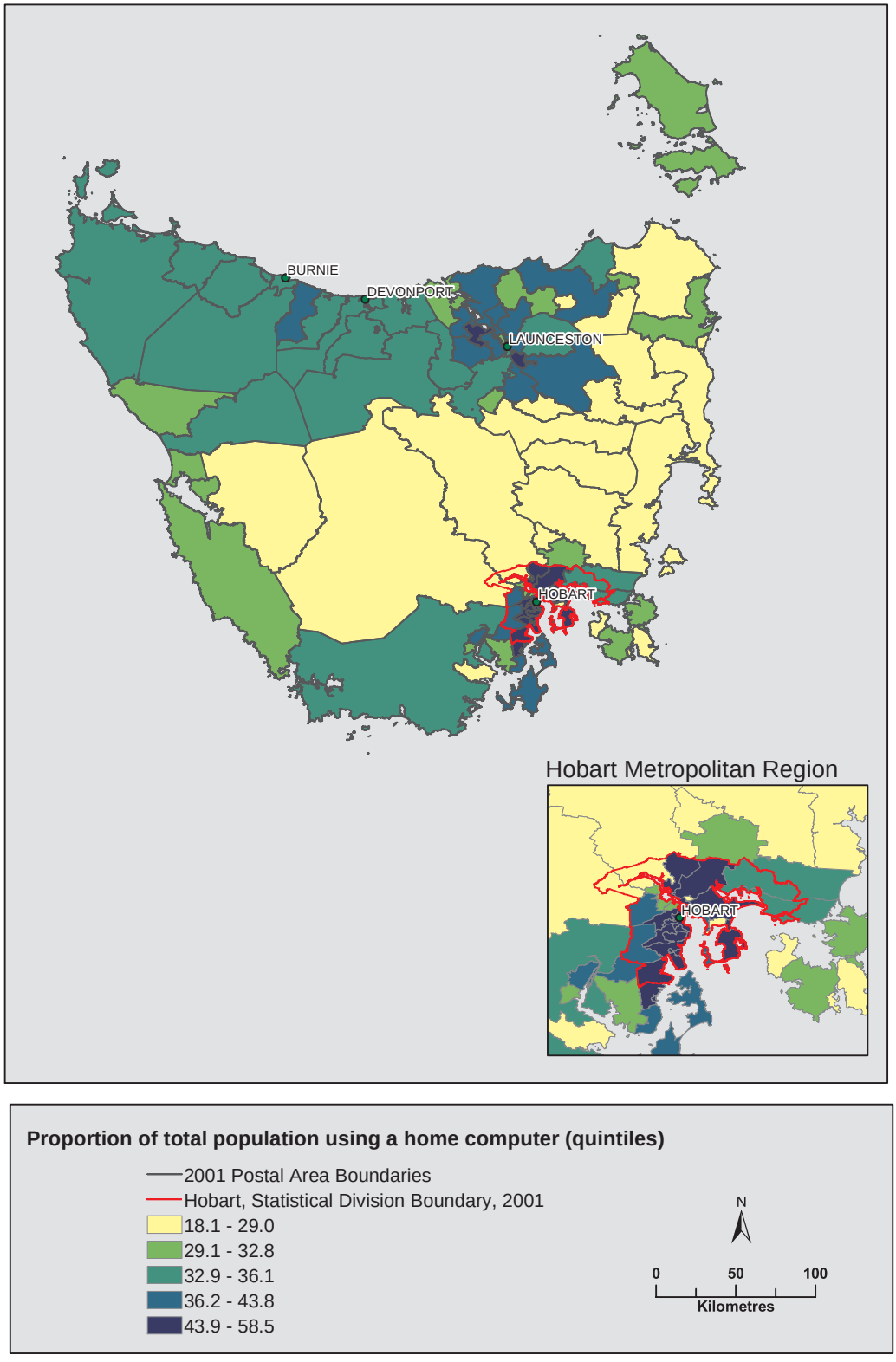
Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

Tasmania

Looking at the distribution of home computer and Internet users in Tasmania (maps 7.18 and 7.19), the highest concentrations of users are once again located near the major cities and towns, Hobart, Launceston and Burnie. Most POAs in the Hobart metropolitan area have high rates of use but as in other states/
territories there are exceptions. Interestingly, quintile bands ranking POAs are relatively narrow in Tasmania. In POAs in the top quintile, between 44% and 59% of residents used a home computer, and between 39% and 58% used the Internet in the week prior to the census. Even in those POAs that fall in the bottom 20% (largely located in central and north-eastern Tasmania), between 18% and 29% of residents used a home computer and between 18% and 23% used the Internet, in the week prior to the census. In other words, there is less variation between POAs with high and low rates of use than in other states and territories.

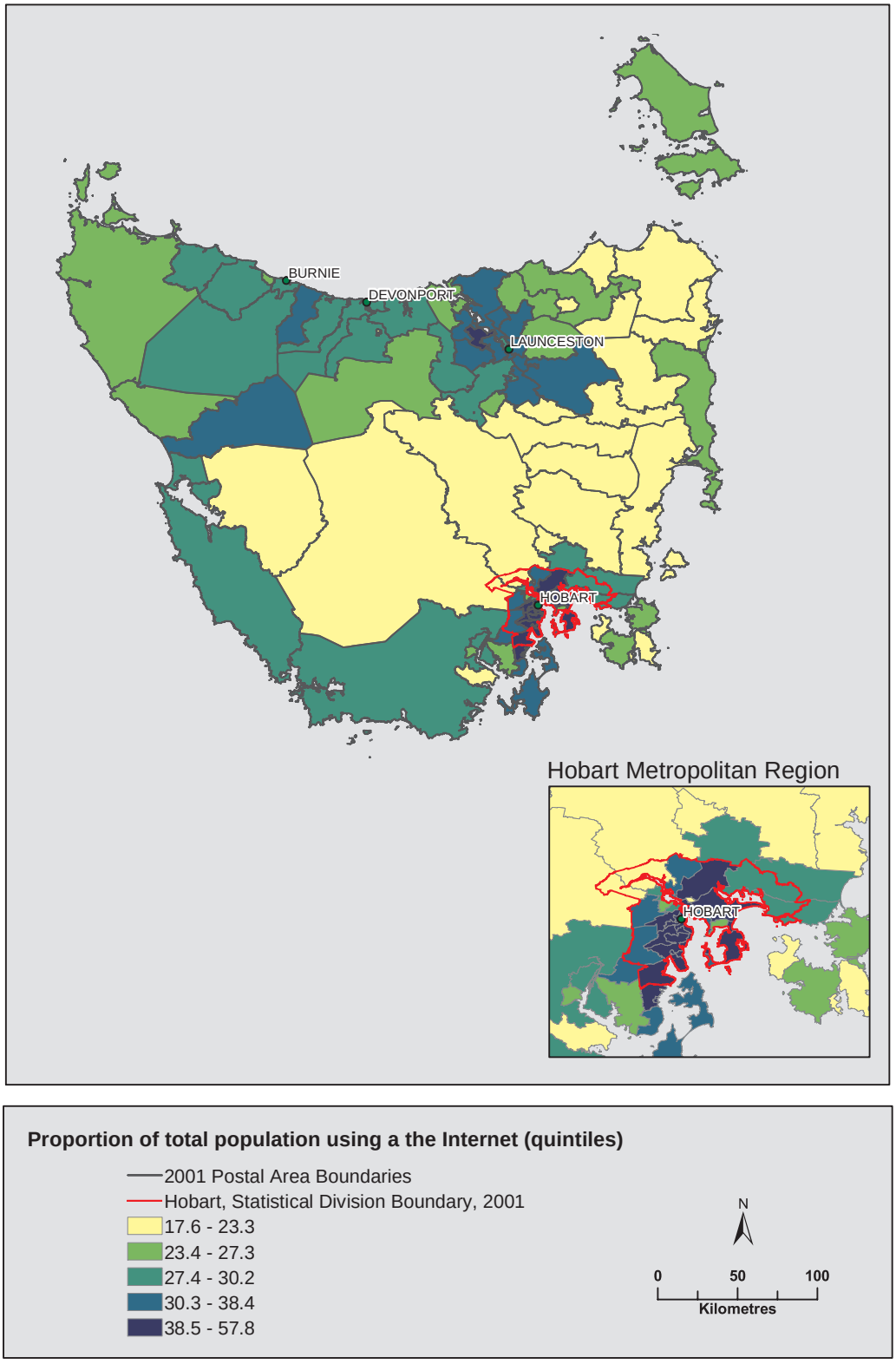
7.18 PERCENTAGE OF POPULATION USING A HOME COMPUTER, BY POSTAL AREA, TASMANIA



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.19 PERCENTAGE OF POPULATION USING THE INTERNET, BY POSTAL AREA, TASMANIA



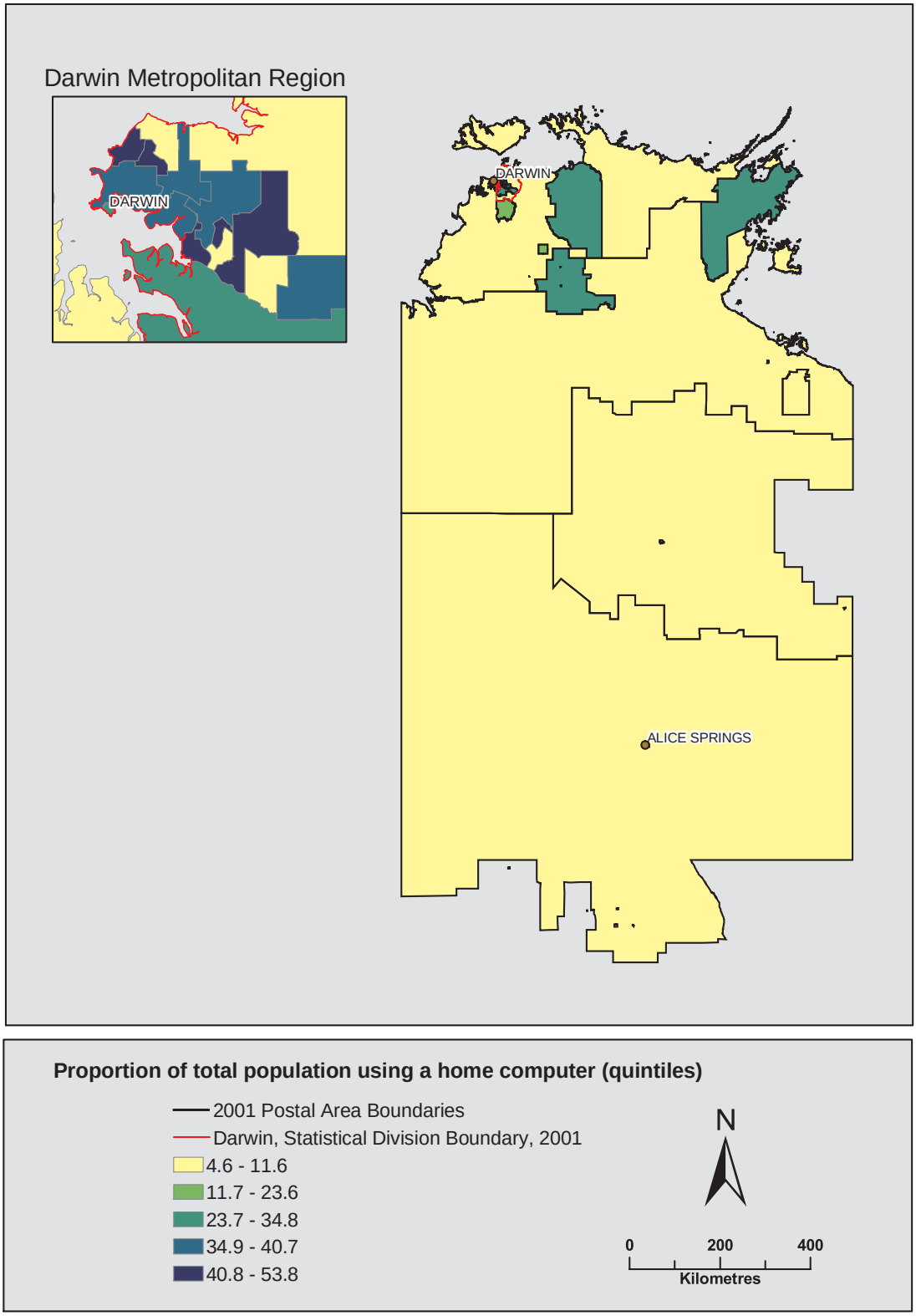
Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

Northern Territory

As might be expected, with the exception of POAs in the metropolitan area and a few other POAs in the northern part of the Northern Territory, rates of home computer and Internet use are very low, between 4% and 13% of the population using a home computer or the Internet (maps 7.20 and 7.21). The POAs with high rates of use are all in the metropolitan area. These are the only places where use is higher than the national average. Even within the metropolitan area there are POAs with very low rates of use.

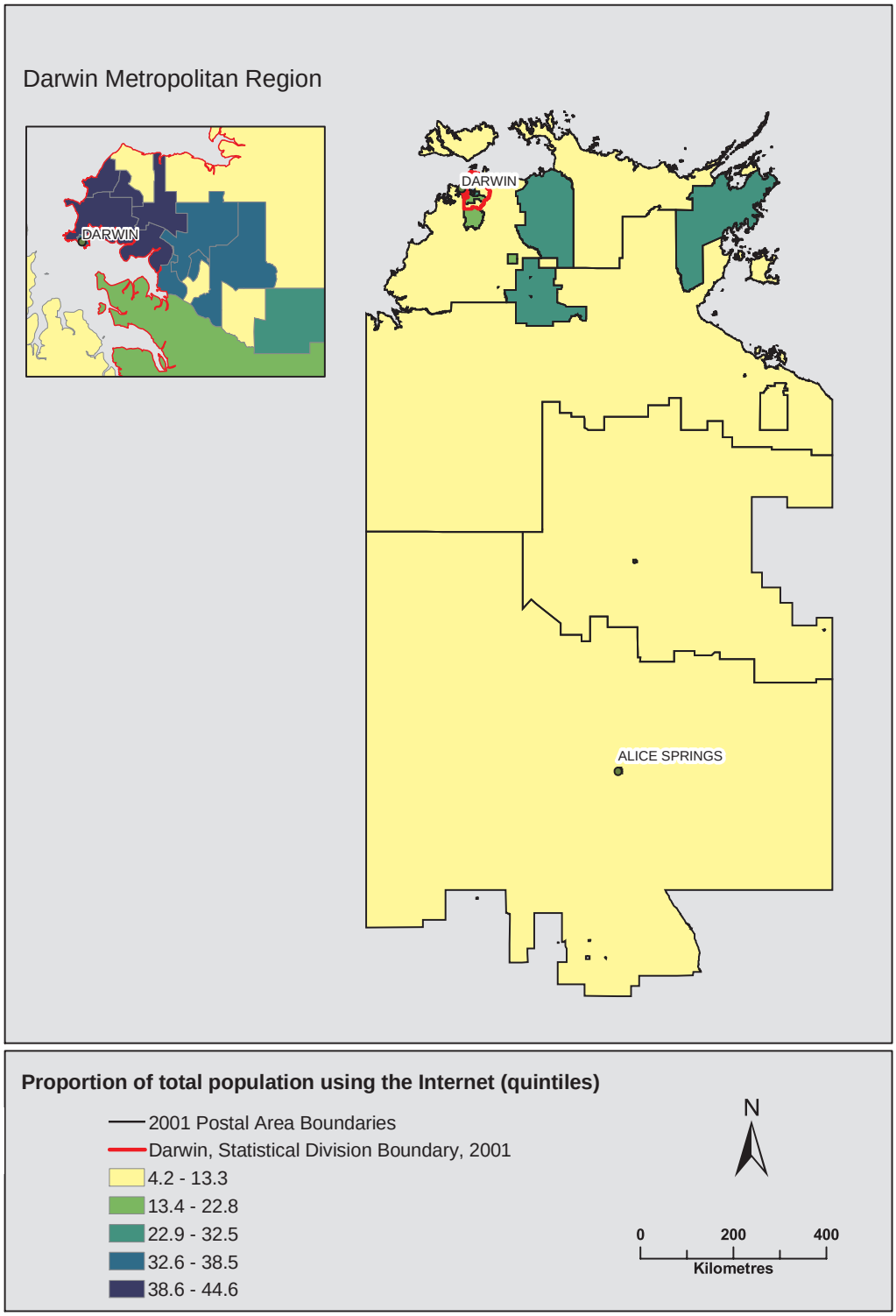
7.20 PERCENTAGE OF POPULATION USING A HOME COMPUTER, BY POSTAL AREA, NORTHERN TERRITORY



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.21 PERCENTAGE OF POPULATION USING THE INTERNET, BY POSTAL AREA, NORTHERN TERRITORY



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

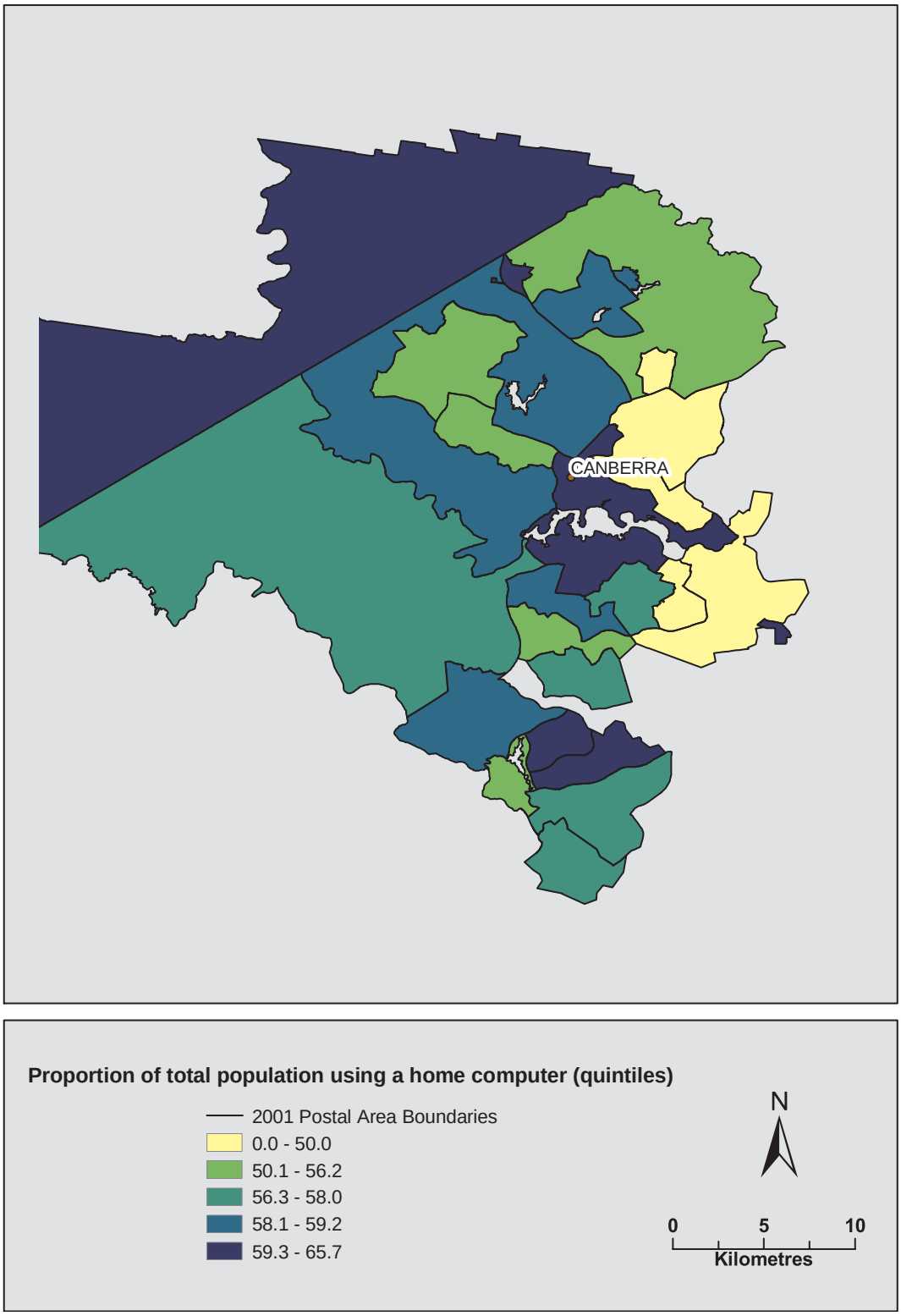
Source: 2001 Census of Population and Housing.

Australian Capital Territory

Maps 7.22 and 7.23 plot rates of home computer and Internet use in 2001 for POAs in the Australian Capital Territory. The quintile bands for the Australian Capital Territory are narrow and much higher than the rates recorded for other states/territory (the upper bounds of the bottom quintile for both home computer and Internet use are much higher than the national average — by comparison, in the Northern Territory, the lower bound of the top quintile is just on the national average). However, it should also be noted that the Australian Capital Territory has a fairly small number of POAs.

POAs with low rates of use are generally located in the outer suburbs, while inner city areas tend to have higher rates of use. However, POAs with low use are often located adjacent to POAs with high rates of use.

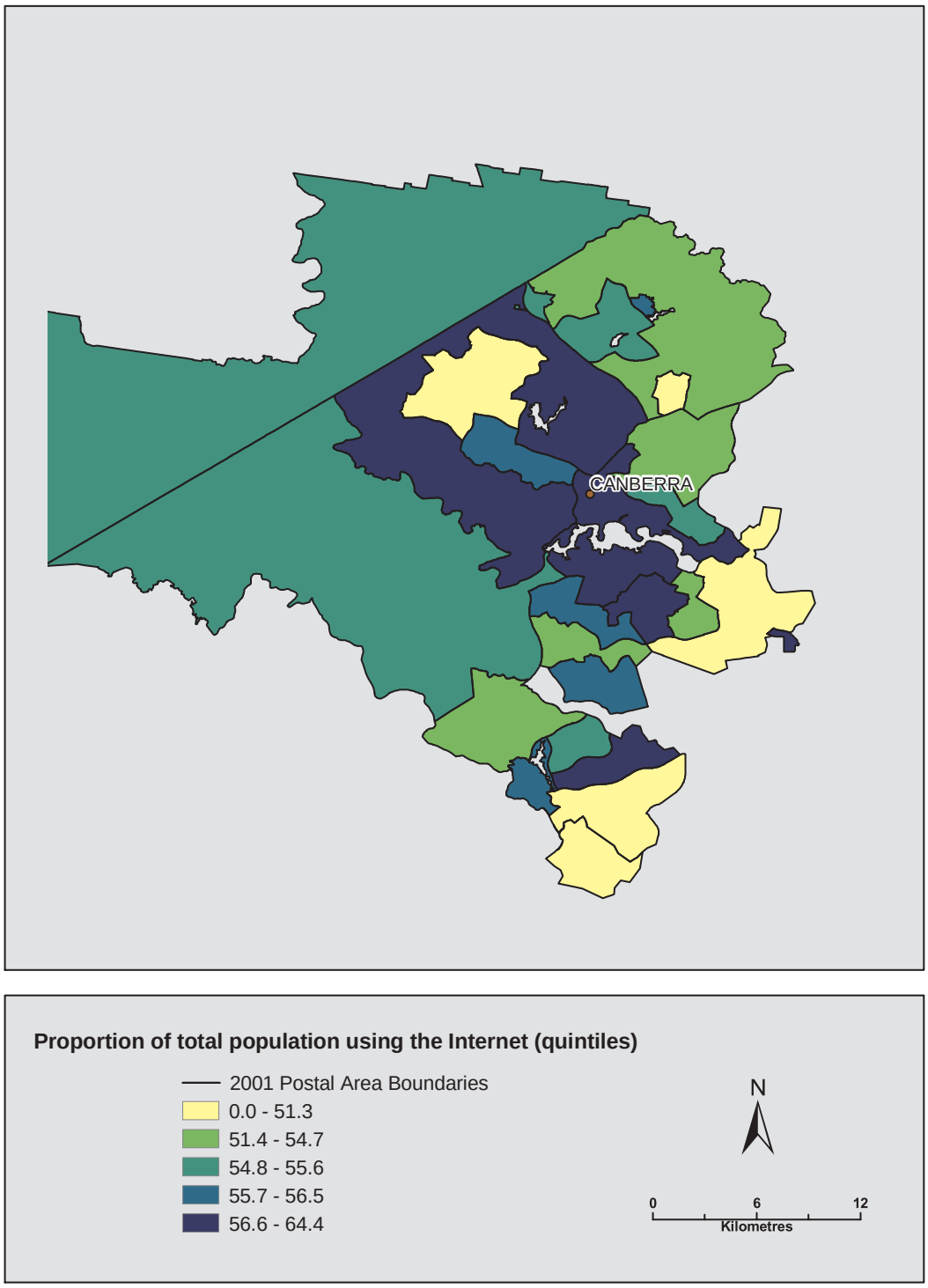
7.22 PERCENTAGE OF POPULATION USING A HOME COMPUTER, BY POSTAL AREA, AUSTRALIAN CAPITAL TERRITORY



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of home computer users.

Source: 2001 Census of Population and Housing.

7.23 PERCENTAGE OF POPULATION USING THE INTERNET, BY POSTAL AREA, AUSTRALIAN CAPITAL TERRITORY



Note: Postal Areas in the study are divided into five equal groups (quintiles) by the percentage of Internet users.

Source: 2001 Census of Population and Housing.

CHAPTER 8 CORRELATION BETWEEN HOME COMPUTER AND INTERNET USE, AND FAMILY INCOME AND AGE, 2001 ...

8.1 INTRODUCTION

Lloyd & Hellwig (2000) found that region in itself was not a factor that impacted on Internet use. They found socioeconomic differences between metropolitan and non-metropolitan regions explained the different rates of use. We would expect that regions with high incomes, high education levels or a young age profile would tend to have higher rates of computer and Internet use based on the patterns identified earlier in the report. However, there may be specific regional factors such as the cost and ease of access, and local business and education initiatives, that result in higher or lower rates of use than the socioeconomic profile would suggest.

This chapter examines the correlation between income, age and use of home computers and the Internet at the POA level to give some indication of regional impacts.

8.2 FAMILY INCOME AND AGE

As shown in Chapter 2, as family income increases, technology use tends to increase. Conversely, for adults at least, older people tend to use computers and the Internet less than young people. Hence, we would expect that POAs with high incomes and/or low age profiles to have high rates of use. Of course, as was demonstrated in Chapter 2, there are many other factors, such as educational qualification and Indigenous status, which impact on rates of use of home computers and the Internet. This chapter examines the correlation between the median incomes and average ages of POAs and rates of use of home computers and the Internet by examining the Pearson coefficient, a common measure of correlation, and by examining differences in quintile rankings by income and home computer use for each POA. It is the first stage in an analysis to examine the effect of regional factors.

Pearson's correlation coefficient expresses the degree of linear relationship (how well they fit to a straight line) between two variables. Pearson's correlation coefficient (**r**) can range between –1 and +1. A correlation coefficient of +1 signifies a perfect positive relationship, while –1 shows a perfect negative relationship. The smaller the absolute value of **r**, the weaker the linear relationship between the two variables.

As discussed in Chapter 2, family income and use of ICT would appear to be closely correlated. People in families with higher incomes tend to use both home computers and the Internet more than people in low income families. It also showed that Internet use was more strongly impacted by income than home computer use was. The Pearson coefficients reveal that the median family

income of a POA and rates of computer and Internet use are positively correlated — with an **r** value of 0.703 for computer use and a slightly higher **r** value of 0.801 for Internet use. In other words, the higher the median family income recorded for a POA the higher are the expected rates of home computer and Internet use. This also confirms the stronger relationship between income and Internet use than between income and home computer use. When interpreting the size of a correlation, it is common to square the **r** value — this provides a crude measure of how well the variability in one variable can be explained by variation in the other. About 49% of the variability in computer use and 64% of the variability in Internet use across POAs can be attributed to differences in median family income.

Based on the analysis of age in Chapter 2, we would expect that ICT use would be negatively related to age. The Pearson coefficient of correlation between the mean age and home computer use is –0.172 and –0.146 for Internet use, both weak negative relationships. This would suggest that the mean age of a POA is not as closely related to the use of these technologies as it is to family income (again this does not control for other factors). However, this alone does not necessarily mean that there is a poor relationship between age and ICT use. Such a weak association could be attributable to the problems of averaging age across a POA, the presence of other factors not held constant and because computer and Internet use do not exhibit a linear relationship with age, as shown in graphs 2.2 and 2.3.

The thematic maps for New South Wales, Victoria and Queensland (maps 8.1–8.3) examine the correlation between median family income and the proportion of home computer users for POAs, and in particular, the relative rankings in terms of income and home computer use. All POAs across Australia were firstly ranked nationally on the basis of the proportion of home computer users in the total population and divided into quintiles (given a score of one if in the bottom quintile and five if they were in the top). The same POAs were then ranked nationally on the basis of median family income and divided into quintiles (again given a score of one to five). The difference between the income score and the home computer use score is calculated, and mapped below. POAs with a final score of zero fall in exactly the same quintile for both median family income and home computer use and are mapped in white. POAs with a positive score (shown in shades of blue) are ranked higher in terms of income than for home computer use. Given that our national analysis showed that home computer use and median income of a POA were reasonably well correlated, for POAs in blue, the rate of home computer use is lower than the level of median income would suggest. The darker the shade of blue the greater the difference between the two rankings. Conversely, POAs with a negative score are plotted in shades of red, and are ranked more highly in terms of home computer use than their median income rank. This suggests that they have higher rates of home computer use than their median income would suggest. The darker the shade of red, the greater the difference between the two rankings.

For Australia as a whole, 49% of POAs exhibited no difference between income and computer use rankings and most POAs (80%) only changed by one rank. A very small number of POAs — 0.7% — changed ranking by four ranks when ranked by median income rather than home computer use. The situation for Internet use is very similar.

In New South Wales (map 8.1), POAs along the coast tend to have higher rates of computer use than their ranking for income would indicate and are plotted in red. Conversely, POAs in metropolitan regions and the central and western regions of the state tend to have a lower ranking for home computer use than income, and are plotted in blue.

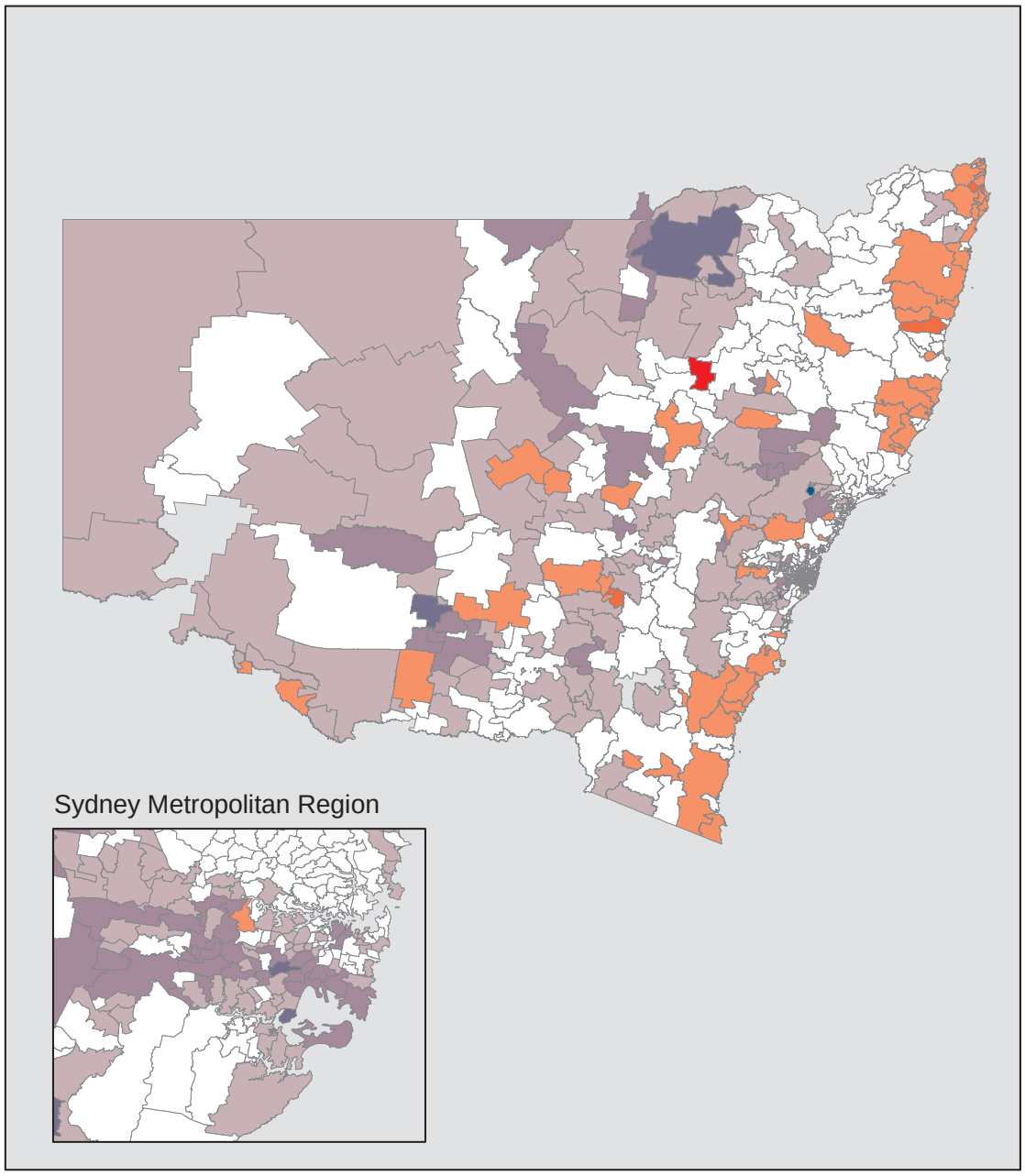
Looking at the map of Victoria (map 8.2), it has many more POAs with a negative score (and the difference is as much as four rankings), plotted in shades of red, suggesting that generally in Victoria rates of home computer use tend to be higher than median income would suggest. These POAs tend to be spread evenly throughout the non-metropolitan part of the state. In the metropolitan region, there are many POAs shaded blue, indicating lower rates of computer use compared to income.

The map of Queensland (map 8.3) shows that POAs in blue (where the ranking for income is above the associated rate of use) tend to be located in the far west and south west of the state — mostly rural and remote regions. POAs shown in red, where the computer use rank is higher than the income rank, are found in the more densely populated coastal areas. In the Brisbane metropolitan region, some POAs in the inner city have computer use lower than income would suggest, but in the outer suburbs there are several POAs where the home computer use ranking is greater than the income rank.

While this is a fairly simple analysis of the correlation between home computer use and median family income, we can conclude that in highly populated metropolitan areas, and areas where rates of Internet and home computer usage tend to be greatest (as shown in the maps in Chapter 7), rates of use are lower than income would suggest. Interestingly, the same is true for POAs in rural and remote Australia. Areas where computer use is higher than income would suggest, are located in outer suburbs or coastal regions, and widely in Victoria.

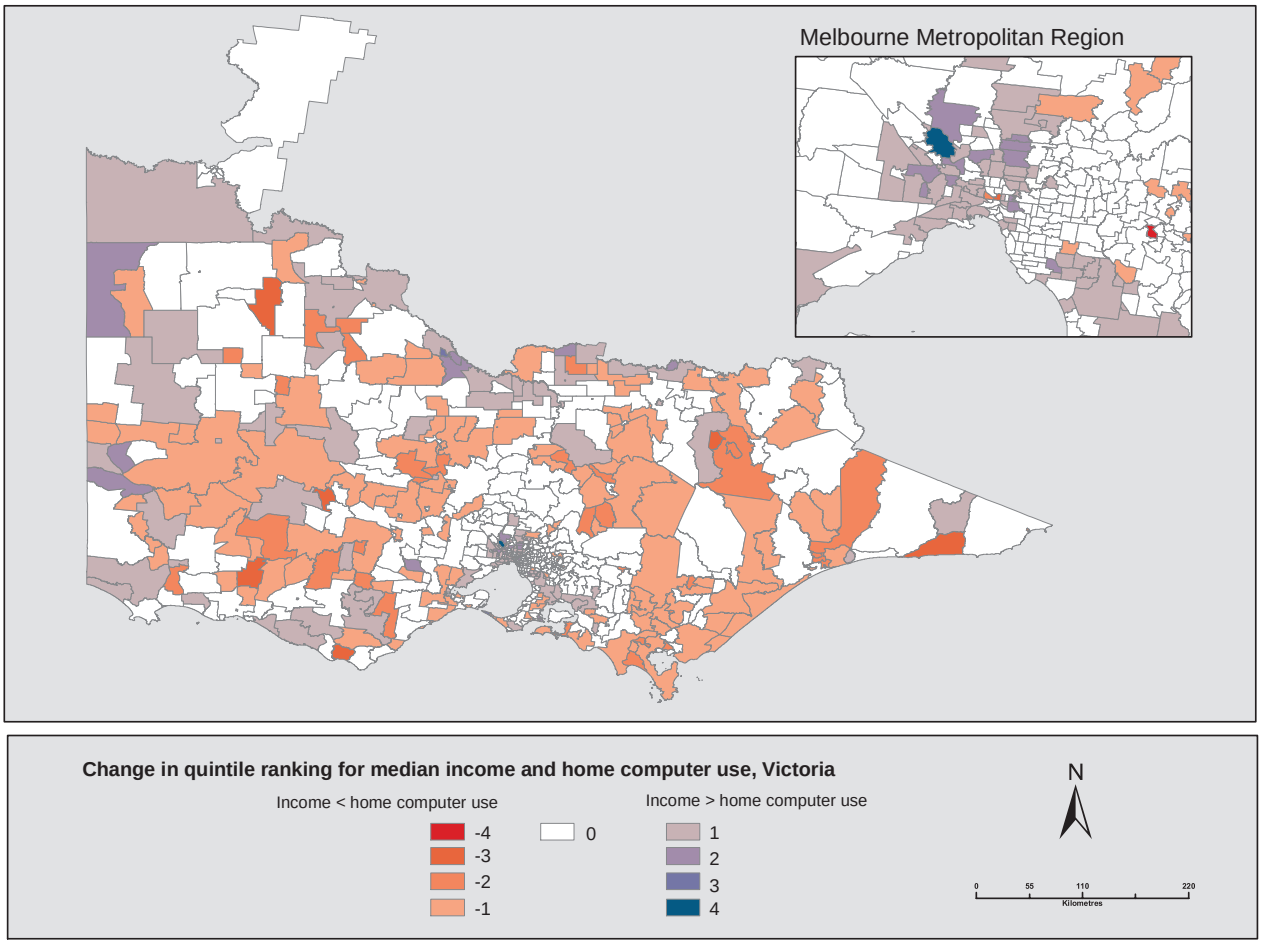
This is the first stage of this analysis. Further work might involve considering the impact of other socioeconomic factors in determining expected Internet and home computer use and comparing this with actual usage rates to identify POAs with particular regional impacts.

8.1 CHANGE IN QUINTILE RANKING FOR MEDIAN INCOME AND HOME COMPUTER USE, BY POSTAL AREA, NEW SOUTH WALES



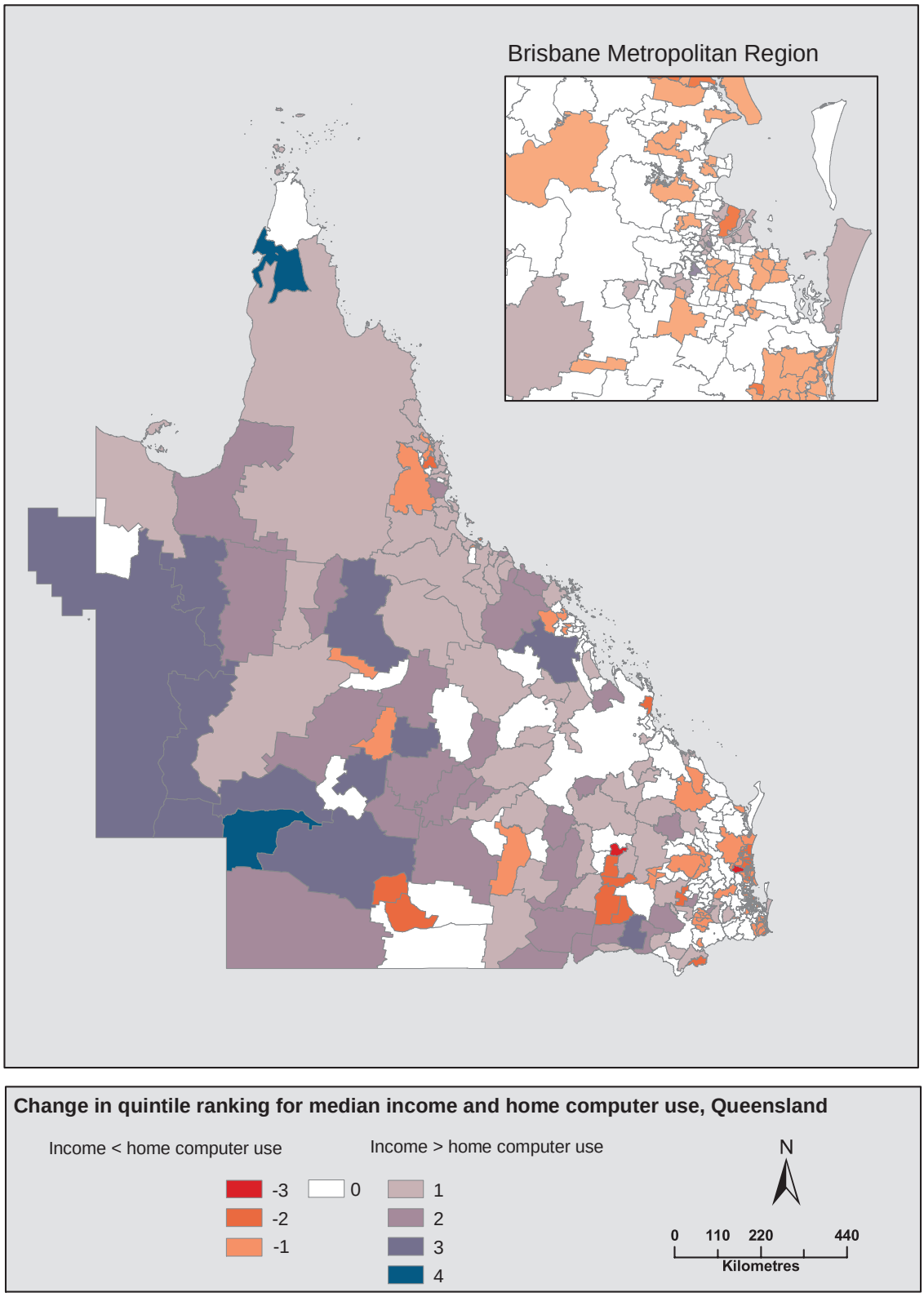
Source: 2001 Census of Population and Housing.

8.2 CHANGE IN QUINTILE RANKING FOR MEDIAN INCOME AND HOME COMPUTER USE, BY POSTAL AREA, VICTORIA



Source: 2001 Census of Population and Housing.

8.3 CHANGE IN QUINTILE RANKING MEDIAN INCOME AND HOME COMPUTER USE, BY POSTAL AREA, QUEENSLAND



Source: 2001 Census of Population and Housing.

CHAPTER 9 DEVELOPING A MODEL TO EXPLAIN USE OF COMPUTERS AND THE INTERNET

9.1 INTRODUCTION

This report provides extensive analysis of the socio-demographic characteristics of Internet and home computer users. While there are very clear relationships between such factors as age, income and education and rates of use, on the basis of such cross-tabular analysis, it is difficult to confidently isolate which factors are the key drivers in the use of home computers and the Internet. This is because the cross-tabulations do not control for the impact of other factors. For example, people with higher incomes tend to have higher levels of education. In looking at the relationship between income and computer use, it is difficult to determine whether income or underlying higher levels of education are causing increased rates of technology use amongst higher income families. Likewise, while people in regional areas of Australia report lower rates of computer and Internet access, cross-tabular analysis alone cannot tell us whether this is solely attributable to regional factors, or to the higher concentrations of families with lower education and income found in rural areas.

Multivariate regression attempts to get around these problems by disentangling the differing effects of multiple factors. It estimates the separate effects of particular variables on the dependent variable, in this case either home computer or Internet use, holding other factors constant. In this way, it allows us to identify what drives the use of new technology by controlling for correlation between the various drivers such as income, age and education.

This chapter outlines some of the issues taken into account in developing the regression model and presents the results.

9.2 AVAILABLE DATA

The ABS has produced a custom cross-tabulation which gives counts of Internet and home computer users for those characteristics likely to be key determinants in the use of home computers and the Internet. Because of ABS confidentialising processes, we were somewhat constrained in the number of variables we were able to use. Therefore, we chose those we felt were most relevant based on the analysis in earlier chapters. The cross-tabulation is a matrix of all possible combinations of the 10 characteristics (broken into fairly aggregated sub-categories), namely:

- age
- gender and marital status
- weekly household income
- educational attainment and study status

- labour force status and occupation
- Indigenous status
- English language proficiency
- number of dependents in family
- state of usual residence
- remoteness (major city, regional or remote area).

Most of the cross-tabular analysis by income in the earlier chapter was undertaken using weekly individual or family income. The family income variable in the census excludes non-family households, which by ABS definition includes lone persons and group households. If we had used the family income variable in the regression, these types of families would have been excluded completely from the analysis. For this reason, we have opted to use household income. However, it should be noted as a proxy for household economic resources, household income can be misleading in the case of group households, where there are likely to be several independent income units in one household.

The following were excluded from the data matrix:

- people under 15 years of age
- people in migratory CDs (see Australian Standard Geographical Classification (ASGC) SOS classification)
- overseas visitors
- people living in non-private dwellings, unoccupied private dwellings, and migratory and offshore dwellings
- people in households where household income was 'not stated' or was only partially stated or where members over 15 years were temporarily absent
- people who did not state their highest non-school qualification, highest level of schooling or study status
- people who did not state their Indigenous classification
- people who did not state their classification for labour force status
- people who did not state their classification for home computer or Internet use.

9.3 TYPE OF REGRESSION MODEL

In using regression equations to estimate the relationship between socio-demographic characteristics and home computer and Internet use, the dependent variables are dichotomous — either the individual is an Internet or home computer user (value set to one) or is not (value set to zero).

A linear probability model estimated using ordinary least squares may be used in regressions involving a dichotomous variable, and the interpretation of coefficients of a linear function is straight forward. However, in the case of a linear function, the value of the dependent variable does not necessarily lie between zero and one. Since we wish to estimate the probability that the dependent variable takes the value of one, values smaller than zero and larger than one become meaningless.

The problem is easily overcome by using a logit model estimated using maximum likelihood estimation. The logit model is able to achieve the objectives of relating the choice probability to the explanatory variables by keeping the choice probability in the [0, 1] interval. The drawback of the logit model is that the coefficients no longer indicate marginal impacts and interpretation is more difficult. The coefficient estimates represent the contribution in terms of magnitude of an explanatory variable (for detailed discussion on the logit model, see Griffiths, Hill & Judge (1993) and Greene (1997)).

9.4 DEPENDENT AND EXPLANATORY VARIABLES

The dependent variable in one model is use of home computer while in the other it is use of the Internet. Based on the information available from the census matrix and the cross-tabular analysis, the explanatory variables selected to explain the relationship with the probability of a person using a home computer and the Internet were as detailed in table 9.1. Note that all of these are categorical variables — the classes used are listed. Results are presented relative to a base class which is identified.

9.1 EXPLANATORY VARIABLES USED IN REGRESSION MODEL

Explanatory variable	*Classes*
Gender and marital status	Female and not married Male and not married Male and married (base class) Female and married
Age	15–24 years 25–44 years (base class) 45–64 years 65+ years
Educational qualifications and study status	Still at school Other still studying Bachelor degree or higher Advanced diploma, diploma or certificate No post-school qualifications (base class)
Labour force status and occupation	Employed as a tradesperson and labourer Employed in other occupations (base class) Unemployed Not in the labour force
Household income	Household income under $500 per week Household income between $500–$999 per week (base class) Household income between $1,000–$1,499 Household income over $1,500 per week)
Dependent children (in household)	Dependent children No dependents (& not applicable) (base class)
State/territory	New South Wales (base class) Victoria Queensland Australian Capital Territory Tasmania Western Australia South Australia Northern Territory and other territories
Indigenous status	Indigenous All others (base class)
Ability to speak English	Speaks English not well/not at all All others (including not applicable) (base class)
Remoteness (a)	Major city (base class) Regional Remote

(a) This classification of areas is based on the ABS remoteness structure, which aims to classify those CDs sharing common characteristics of remoteness into broad geographical regions called Remoteness Areas (RAs). The remoteness structure for states and territories is as follows: major cities of Australia, inner and outer regional, remote Australia, very remote Australia and migratory CDs. For our purposes we have collapsed inner and outer regional Australia into 'regional', and remote and very remote Australia into 'remote'.

CHAPTER 10 REGRESSION RESULTS

10.1 COEFFICIENT ESTIMATES

The results of the multiple regression analysis for home computer and Internet use are presented in tables 10.1 and 10.2. The emphasis of this analysis is on the sign and magnitude of the coefficients relative to others in the regression. The sign of the regression coefficients indicate positive and negative impacts of socio-demographic variables on home computer and Internet use relative to the base class variable. Positive coefficient values indicate that a person with that particular characteristic is more likely to use that type of information technology (holding everything else constant) compared with the base class, and negative coefficients mean that a person with that particular characteristic is less likely to use information technology (holding everything else constant) compared with the base class.

For example, the coefficient for the variable 'Dependent children' is positive in both models. This means that if all other factors are held constant, people who have a dependent child in the household are more likely to use a home computer and the Internet than those who do not have dependent children in the household.

The size of the coefficient estimate gives an indication of the ranking of the categorical variables within the class. For example, table 10.1 shows that people in remote areas use the Internet less than those in regional areas, who in turn use it less than those in urban areas, when all other variables are held constant. However, unlike in linear regression, it cannot be interpreted directly. In order to examine the effect that different socio-demographic characteristics have on home computer and Internet use, we have estimated and interpreted the odds ratios for each characteristic.

The 'odds' associated with a particular event is simply the probability in favour of that event occurring. An odds ratio is the ratio of probability of an event occurring versus the probability that it does not occur. In the case of a multivariate regression, odds ratios are calculated for the covariate. They are given by the ratios of the exponentiated parameter estimates produced by the logistic regression (SAS Institute Inc. 1995). Where variables are categorical (as all variables are in this regression) this is a ratio of odds for two classes of a particular variable, one of which is the variable set as the base case.

For example, the odds ratio for characteristic *A* compares the odds that a person with that characteristic will use the Internet compared with the odds that someone with the base case characteristic *B* will use the Internet, when all other variables are held constant. An odds ratio greater than one means that the

odds of a person with characteristic *A* using the Internet is greater than a person who has the base case characteristic *B*. Alternatively a value of less than one means that the odds that a person with characteristic *A* uses the Internet is less than a person with the base case characteristic *B*.

For example, table 10.2 shows that the odds ratio for a person with a degree or higher using the Internet is 4.076. This means that the odds of a person with a degree or higher uses the Internet are over four times the odds that a person who has no post-secondary qualifications (the base case) uses the Internet.

10.1 REGRESSION RESULTS FOR PEOPLE USING A HOME COMPUTER — 2001

	Coefficient estimate	*Odds ratio*
Intercept	–0.2474	
Male and not married	–0.3147	0.73
Female and not married	–0.5985	0.55
Male and married (base)		1
Female and married	–0.2083	0.812
15–24 years	0.1081	1.114
25–44 years (base)		1
45–64 years	–0.2534	0.776
65+ years	–1.135	0.321
Degree level	1.1063	3.023
Diploma/certificate	0.4886	1.63
No post-school (base)		1
Still at school	1.9358	6.93
Still studying other	1.7314	5.648
Employed as tradesperson or labourer	–0.8424	0.431
Employed in other occupation (base)		1
Unemployed	–0.3354	0.715
Not in the labour force	–0.6005	0.549
Indigenous	–1.1179	0.327
Non-Indigenous (base)		1
Household income under $500	–0.2456	0.782
$500–$999 (base)		1
$1,000–$1,499	0.2342	1.264
$1,500 or more	0.5092	1.664
Dependent children	0.4739	1.606
No dependent children (base)		1
Speaks English not well/not at all	–1.5517	0.212
English proficiency – others (base)		1
New South Wales (base)		1
Victoria	0.0507	1.052
Queensland	0.1674	1.182
South Australia	0.0737	1.076
Western Australia	0.1586	1.172
Tasmania	0.0221	1.022
Australian Capital Territory	0.2991	1.349
Northern Territory and other territories	0.0095	1.01
Major cities (base)		1
Regional	–0.1449	0.865
Remote	–0.4455	0.64

Source: 2001 Census of Population and Housing.

10.2 REGRESSION RESULTS FOR PEOPLE USING THE INTERNET — 2001

	Coefficient estimate	*Odds ratio*
Intercept	0.1974	
Male and not married	–0.2378	0.788
Female and not married	–0.4248	0.654
Male and married (base)		1
Female and married	–0.4583	0.632
15–24 years	0.1058	1.112
25–44 years (base)		1
45–64 years	–0.5616	0.57
65+ years	–1.6945	0.184
Degree level	1.4051	4.076
Diploma/certificate	0.5108	1.667
No post-school (base)		1
Still at school	1.9116	6.764
Still studying other	1.8564	6.401
Employed as tradesperson or labourer	–1.3231	0.266
Employed in other occupation (base)		1
Unemployed	–0.7248	0.484
Not in the labour force	–1.0161	0.362
Indigenous	–0.9332	0.393
Non-Indigenous (base)		1
Household income under $500	–0.3127	0.731
$500–$999 (base)		1
$1,000–$1,499	0.2805	1.324
$1,500 or more	0.6689	1.952
Dependent children	0.0265	1.027
No dependent children (base)		1
Speaks English not well/not at all	–1.3476	0.26
English proficiency – others (base)		1
New South Wales (base)		1
Victoria	0.0554	1.057
Queensland	0.167	1.182
South Australia	0.0408	1.042
Western Australia	0.1556	1.168
Tasmania	0.2272	1.255
Australian Capital Territory	0.4795	1.615
Northern Territory and other territories	0.2813	1.325
Major cities (base)		1
Regional	–0.3108	0.733
Remote	–0.5479	0.578

Source: 2001 Census of Population and Housing.

The results of the regression are as follows:

Sex and marital status

Men use the Internet more than women. Married men are more likely to use it than single men. However, single women are more likely to use the Internet than married women. For home computer use, marital status is more significant than gender with married people using a home computer more than single people. Men use a home computer more than women of the same marital status.

Age

As expected, both home computer and Internet use decrease clearly with age even when other factors are held constant. Compared to the base case (25–44 year olds), 15–24 year olds are more likely to use home computers and the Internet and as age increases the odds of using them decrease. The odds of a person aged 65 years or over using the Internet are 18% of the odds of a 25–44 year old using it. There is less distinction between the age groups for home computer use — the odds ratio for this group is 32%.

Study and education

Students have the greatest odds of using the Internet, over six times the odds that someone who has no-post school qualifications uses it. School students are slightly more likely to use the Internet than those who are studying elsewhere. For those who have finished school, the odds of use then decrease strongly with lower levels of education. The same rankings are evident for home computer use. However, school students have higher relative odds for using a home computer — seven times the odds for a person without post-school qualification — while the relative odds between the base case and all other classes is smaller for home computer use than Internet use.

Occupation and labour force status

Those employed in the professional, clerical and service occupations are much more likely to use the Internet than labourers and tradespeople (odds almost four times higher). While significantly less likely to use the Internet than white collar workers, the unemployed have greater odds of using it than those not in the labour force or blue collar workers. Again the same rankings are evident for home computer use. However, there is a smaller differential between the classes.

Income

The probability of both home computer and Internet use increases with income. The odds of the highest income group using the Internet are two and a half times those of the lowest income group using it. The odds ratio between the highest and lowest income groups for home computer use is just over two, so again we see less difference between the highest and lowest groups.

Dependents

Although having dependents in the family significantly increases a person's chances of using the Internet (see below), surprisingly it increases the odds only marginally, once other factors have been taken into account. Conversely, having dependent children greatly increases the odds of a person using a home computer — the odds ratio is about 1.6.

Indigenous

Indigenous people are much less likely to use a home computer and the Internet than non-Indigenous. The odds ratio for Internet use is less than 40%. For home computer use it is even worse, with the odds of an Indigenous

person using a home computer about one-third of those of a non-Indigenous person using one.

English proficiency

The odds of a person who speaks English not well or not at all using the Internet are about one-quarter the odds of a person who speaks English well or is born in Australia. The odds ratio for home computer use is even worse, at about 20%.

State

New South Wales is the base case. Compared to people living in New South Wales, the odds of someone in the Australian Capital Territory using the Internet are about 60% higher, even once differences in socioeconomic status captured by other variables are taken into account. People in other states and the Northern Territory also have odds of using the Internet higher than people in New South Wales. Once regional and other socioeconomic differences (such as Indigenous status) are accounted for, the Northern Territory has the highest odds of Internet use after the Australian Capital Territory. This is followed by Tasmania, Queensland and Western Australia. For home computer use, there is a smaller differential between the Australian Capital Territory and the states. People in Queensland and Western Australia have the highest odds of using a home computer of the other jurisdictions. People in New South Wales have the lowest odds of being a home computer user, once other factors have been adjusted for.

Remoteness

Even once socioeconomic differences have been accounted for, people living in regional and remote areas are less likely to use home computers and the Internet than those in major cities. The odds of someone in a remote region using the Internet are less than 60% of those in major cities, when all else is held equal. The odds of people in remote regions using a home computer are slightly higher, but of a similar magnitude. These findings are contrary to that in the previous Lloyd & Hellwig (2000) study.

10.2 GOODNESS OF FIT AND SIGNIFICANCE

Two measures were used to examine how well the models fit the data. The first is the Likelihood Ratio Test (produced by SAS). By comparing a model that includes only a constant to one that includes the specified set of explanatory variables, we are able to test the null hypothesis that the joint value of the coefficients is zero. This is essentially an F-test, or a test of whether the model's explanatory variables produce a better fit than just using the mean. Examination of the likelihood ratio chi-square value shows that both models are highly significant overall (the Likelihood Ratio is greater than the critical value at a $p<0.0001$ significance level).

Another way to measure the model's goodness of fit is to examine the predictive capability of the model by looking at the association of predicted and

observed responses. SAS provides a measure of the percentage of concordant observations. This is a measure of the proportion of observations where the predicted probability for an event is higher than the predicted probability for a non-event. In the model of Internet use 83.1% of pairs are concordant while in the model of home computer use 78.9% of pairs are concordant.

To test the effect of each explanatory variable in the model, the Wald statistic, which follows a chi-square distribution, is used. If a variable's Wald test statistic is greater than the critical value at the given significance level then that variable has a significant association with the dependent variable (compared to the base case). Because the census is such a large dataset (most regression analysis is conducted on samples from a population that are considerably smaller), all of the variables proved to be highly significant compared with the base case. In other words all explanatory variables included here had a statistically significant impact on the dependent variable when compared with the base case.

10.3 RELATIVE STRENGTH OF THE CATEGORIES

In order to test the relative strength of each of the groups of variables (that is, age, income etc.), two methods were used. The first was a stepwise selection process. Model selection is the process of adding or removing explanatory variables from a model until you find the model that is relatively the best fit for the data. At each stage of the process the significance levels of the variables are calculated and compared to specified significance and this is used to determine whether they should be added or removed from the model. Stepwise selection, the method used here, combines the backward elimination and forward selection methods to add variables or remove variables as they meet or fail to meet significance levels respectively. Variables are entered and removed from the model until all regressors in the model are significant and all regressors outside the model are insignificant in the presence of those in the model (SAS Institute Inc. 1995, p. 51). In our case, all variables were significant and selected in the model.

More useful to us is the order in which the variables were selected for entry into the model. The group of variables most strongly associated with the dependent variable (Internet use or computer use) are entered first. Subsequent variables enter the model based on their association with the dependent variable given the influence of variables previously selected.

The stepwise selection process indicated that educational qualification and study status had the strongest impact on Internet use. This was followed by occupation and labour force status, age, income, sex and marital status, English language proficiency, remoteness, Indigenous status, state and then dependents in the family.

The second test of the relative strength of the variables is a Type III Analysis of Effects. This gives a Wald chi-square value for each variable, calculated when all variables are included. The larger the Wald test statistic is, the greater is the

explanatory power of that group of variables in the presence of all other variables. Using this method gave exactly the same ordering as the stepwise process for Internet use.

For home computer use, again educational qualification and study status was the first group of variables entered into the model using the stepwise approach. This was followed by occupation and labour force, then dependents (a much higher ranking than for Internet use), income, age (a lower ranking than for Internet use), sex and marital status, English language proficiency, Indigenous status, remoteness and state. The Type III Analysis of Effects ranked age higher and dependents lower but otherwise gave similar results.

10.4 PROBABILITIES OF USING THE INTERNET AND HOME COMPUTERS

Here we use the output from the regression analysis to estimate the probability that people with certain characteristics use a home computer and the Internet. It allows us to test the effect on the probability of changing one variable while holding others constant. However, the results should be used with care as they are not marginal effects. The relative probabilities would change if a different base case were chosen. The probabilities are only correct for this specific set of characteristics. The odds ratios provide the only consistent method to measure the relative strength of categories within a variable.

The base case is a man who is married, aged 25–44 years, with no post-secondary education but not currently studying, employed in an occupation other than trades or labouring, with household income of $500–$999 per week, no dependent children, non-Indigenous, speaks English well and living in a major city in New South Wales. The probability that a person such as this used a home computer in the week before the census is 43.8% while the probability that they would have used the Internet is 54.9%.

The base case provides the means of comparison for the other scenarios. Probabilities are calculated under six scenarios (with other characteristics as in the base case) to reveal the effect on the probability of a change in one of the variables relative to the base scenario.

Scenario 1 — Age 65 years or over
Scenario 2 — Degree or higher
Scenario 3 — Unemployed
Scenario 4 — Indigenous
Scenario 5 — Speaks English not well or not at all
Scenario 6 — Lives in remote area

The probabilities of using home computers and the Internet for these six hypothetical people are presented in table 10.3.

10.3 PROBABILITY OF USING HOME COMPUTER AND INTERNET UNDER DIFFERENT SCENARIOS

Scenario	*Home computer use*	*Internet use*
	%	*%*
Base case	43.8	54.9
1. Age 65 years and over	20.1	18.3
2. Degree or higher	70.2	83.2
3. Unemployed	35.8	37.1
4. Indigenous	20.3	32.4
5. Speaks English not well or not at all	14.2	24.0
6. Lives in remote area	33.2	41.3

Source: 2001 Census of Population and Housing.

These results illustrate many of the patterns that have been discussed earlier. They are just a small subset of the many possible combinations of characteristics. They are designed to assist in the interpretation of the regression results rather than to examine trends for the population. Compared with a person having base case characteristics (including no post-school qualifications), having a degree increases the probability of home computer use by 26 percentage points and increases the probability of using the Internet by even more. In all of the other scenarios presented above, the change in variable decreases the probability of using both home computers and the Internet by a significant amount. With the exception of being Indigenous, all other scenarios affect the probability of Internet use more than they affect the probability of home computer use.

CHAPTER 11 CONCLUSIONS

The 2001 census shows that differences in the rates of technology use persist across a range of socioeconomic factors, with differences generally being more pronounced for Internet users. Rates of Internet and home computer use continue to vary significantly by income. Australians with high weekly family incomes are much more likely to access online technologies as those with lower incomes. Results from the census confirm that educational attainment is a key factor influencing computer and Internet use. Over 70% of Australians with a degree or higher qualification use a home computer and over three-quarters use the Internet. By contrast less than 6% of Australians who did not go to school reported having used a computer and less than 4% used the Internet.

Families with dependent children are significantly more likely to be using the Internet than families without children. Over half of Australian families with dependent children use a home computer and 42% used the Internet.

Differences in the use of online technology also persist depending on labour force status. Employed Australians are more likely than average to be online while people who are unemployed and looking for full-time work record below average rates of home computer and Internet use. Interestingly people classified as unemployed and looking for part-time work report the highest rates of home computer and Internet use. As might be expected, white-collar workers have higher rates of Internet and computer use than blue collar workers in Australia. People in occupations classified as 'professional' are twice as likely as the average Australian to be online.

Internet and computer use varies significantly by age. Older Australians have very low rates of Internet and computer take-up and the trend is worse for older Australian women. In contrast to the very low rates of technology use amongst the elderly, young people are by far the greatest users of online technology. In 2001 people under the age of 25 years were 20% more likely to be using a home computer and 10% more likely to be using the Internet than the average Australian. The high take-up rates of young people are also reflected in the rates of use of those still at school, which are almost twice the rate of the average Australian. International studies have identified that the 'generational difference in adaptation to new technologies is perhaps the most significant for the future diffusion of the Internet' (Norris 2001, Chapter 4, p. 9).

Other groups which remain particularly disadvantaged in use of these information and communication technologies include those Australians who do not speak English at all, who did not go to school or did not attend school

beyond Year 8, those born in Southern and Eastern Europe and Indigenous Australians.

Overall while there is a gap in Internet use between metropolitan and rural areas, rural residents are more likely to use the Internet and computers than those in small to medium sized towns. There is also greater inequality of Internet use by region than there is inequality of home computer use.

The home is the most common place for Australians to access the Internet, followed by work. While 18% of Australians make use of Internet services offered in locations other than the home or the office, use is particularly strong amongst youth, people on lower incomes, the unemployed and the Indigenous population, highlighting the importance of publicly provided services in levelling the gap in access to online technologies.

Exposure to a computer and the Internet in the workplace makes it substantially more likely for a computer and the Internet to be used at home — Australians using the Internet at work are 20 percentage points more likely to also be using the Internet at home than the average Australian.

The Lorenz curve analysis found that the distribution of home computer and Internet users was more equal than the distribution of income in 2001 and that computer use at home was more equal than Internet use which was in turn more equal than Internet use at home.

The regional analysis showed that rates of use varied considerably both between and within states and territories. The Australian Capital Territory had the highest rates of home computer and Internet use and there was little difference between the highest and lowest use POAs within the territory. Both Tasmania and the Northern Territory had rates of use well below the national average. In the Northern Territory, only those in the top 20% of POAs had rates of use above the national average. In some POAs, less than 5% of the population were using home computers and the Internet.

New South Wales, Queensland and Western Australia had high proportions of residents using the Internet at home. The Australian Capital Territory and the Northern Territory had the highest proportions of people using the Internet at work. Over one-quarter of Tasmania's Internet users made use of services in locations other than the home or workplace.

Rates of use of home computers and the Internet by POAs ranged from over 80% to less than 5%. POAs with high rates of use tended to be located in metropolitan areas, and either have high proportions of students, high median family incomes or low median age or some combination of these factors. Conversely, areas with the lowest rates of use tended to be located in non-metropolitan areas and had fairly low median family incomes. Variation within states and territories was greatest for Queensland and smallest in the Australian Capital Territory, Tasmania and the Northern Territory. The gap between the highest and lowest POAs was generally greater for Internet use than for home computer use. Just as inequality of Internet use was greater than

for home computer use based on socioeconomic characteristics, the same pattern was evident on a spatial basis. The top decile of POAs contains about 2.5 times as many home computer and Internet users as the bottom decile.

The thematic maps of rates of use by POA showed that POAs with high rates of use tended to be located in metropolitan areas and large regional towns. However, even within metropolitan areas, there were POAs that ranked in the bottom quintiles. Generally, remote areas had rates of use lower than in the metropolitan areas, but there were exceptions, and patterns varied between jurisdictions.

A preliminary analysis of the correlation between socioeconomic factors and technology use by POA showed that technology use and income were more strongly associated than technology use and age. The relationship was stronger for Internet use than for home computer use. Highly populated metropolitan areas and areas where rates of technology usage were greatest tended to have rates of home computer use lower than their income would suggest. The same was true for POAs in rural and remote areas. Areas where computer use was higher than income would suggest are located in outer suburbs, coastal regions and widely in Victoria.

The multivariate analysis using a logit model confirmed many of the findings from the cross-tabular analysis in the earlier chapters. Holding other factors constant, use of technology tends to increase with income and educational qualifications, and decrease with age. Men use home computers and the Internet more than women, and employees more than the unemployed and those not in the labour force. Students have particularly high odds of use while being Indigenous or having poor English skills reduced the odds of using these technologies significantly. Having dependent children did not increase the odds of using the Internet by a large amount, but was more influential on home computer use. Interestingly, even once accounting for other socioeconomic factors, the odds of using home computers and the Internet were lower for those living outside metropolitan areas. This finding was contrary to previous work.

In terms of the variables that impacted most strongly on technological use, study status and educational qualification was the most influential on both Internet and home computer use. This was followed by occupation and labour force status and income. Age was slightly more influential and dependents in the family slightly less influential on Internet use than on home computer use.

APPENDIX

A.1 HOME COMPUTER AND INTERNET USE, BY AGE AND GENDER — 2001

	Using a computer at home	*Using the Internet*
	%	%
Males		
0–9 years	33.4	12.9
10–14 years	68.5	56.0
15–19 years	66.3	61.8
20–24 years	49.8	53.0
25–34 years	46.6	50.9
35–44 years	51.3	49.1
45–54 years	46.0	43.5
55–64 years	31.8	28.2
65–74 years	17.4	12.3
75 years +	8.3	5.1
Females		
0–9 years	32.9	12.2
10–14 years	69.5	55.4
15–19 years	67.6	65.0
20–24 years	49.5	58.9
25–34 years	46.8	51.6
35–44 years	51.3	45.1
45–54 years	41.7	37.6
55–64 years	25.3	20.4
65–74 years	10.5	6.2
75 years +	3.0	1.6
Persons		
0–9 years	33.2	12.5
10–14 years	69.0	55.7
15–19 years	66.9	63.3
20–24 years	49.6	55.9
25–34 years	46.7	51.3
35–44 years	51.3	47.1
45–54 years	43.8	40.6
55–64 years	28.6	24.3
65–74 years	13.8	9.1
75 years +	5.0	3.0

Note: As a percentage of population.
Source: 2001 Census of Population and Housing.

A.2 INTERNET USE, BY LOCATION, BY AGE AND GENDER — 2001

	Using Internet at home	*Using Internet at work*	*Using Internet elsewhere*	*Multiple location*
	%	%	%	%
Males				
0–9 years	77.6	0.0	29.6	7.2
10–14 years	76.8	0.0	38.1	15.0
15–19 years	81.4	6.7	34.2	20.7
20–24 years	72.3	30.6	29.0	27.5
25–34 years	70.1	51.4	14.0	32.5
35–44 years	76.9	53.7	6.7	35.3
45–54 years	77.3	55.5	5.0	36.0
55–64 years	80.4	40.9	4.8	25.1
65–74 years	90.6	12.6	5.5	8.4
75 years +	91.5	8.1	6.8	5.9
Females				
0–9 years	76.8	0.0	30.3	7.1
10–14 years	76.9	0.0	37.9	14.8
15–19 years	76.8	8.1	36.7	20.5
20–24 years	61.6	37.8	28.4	25.3
25–34 years	65.6	48.7	11.5	24.6
35–44 years	76.7	43.1	5.8	24.8
45–54 years	74.6	48.1	4.6	26.5
55–64 years	78.3	33.3	5.6	16.7
65–74 years	88.3	8.6	8.5	5.2
75 years +	85.7	10.2	10.8	6.2
Persons				
0–9 years	77.2	0.0	30.0	7.2
10–14 years	76.9	0.0	38.0	14.0
15–19 years	79.1	7.4	35.5	20.6
20–24 years	66.7	34.3	28.7	26.4
25–34 years	67.8	50.0	12.7	28.5
35–44 years	76.8	48.5	6.3	30.1
45–54 years	76.0	52.0	4.8	31.6
55–64 years	79.5	37.7	5.1	21.6
65–74 years	89.8	11.2	6.6	7.3
75 years +	89.6	8.8	8.1	6.0

Note: As a percentage of Internet users.
Source: 2001 Census of Population and Housing.

A.3 COMPUTER AND INTERNET USE, BY WEEKLY FAMILY INCOME — 2001

Family Income	*Using computer at home* %	*Using Internet* %	*Using Internet at home* %	*Using Internet at work* %	*Using Internet elsewhere* %	*Multiple location* %
Not applicable	25.6	29.8	59.3	45.4	25.5	27.0
All incomes not stated	25.2	19.7	76.6	22.9	17.4	16.1
Partial incomes stated	50.5	43.0	80.8	26.4	17.1	23.2
Negative income	41.9	32.1	84.3	16.9	16.0	16.1
Nil income	44.1	39.0	84.5	7.7	22.0	13.4
$1–$39	43.4	34.6	85.5	10.0	21.8	16.0
$40–$79	47.5	38.0	83.3	7.8	23.9	14.2
$80–$119	42.0	34.2	81.2	8.4	26.0	14.5
$120–$159	30.4	24.1	76.9	8.3	28.3	12.3
$160–$199	28.8	22.3	72.6	5.9	33.4	11.2
$200–$299	30.3	23.6	71.0	7.2	33.8	11.4
$300–$399	21.4	15.3	74.4	6.4	29.2	9.5
$400–$499	29.5	21.6	75.6	9.9	26.7	11.5
$500–$599	35.2	26.6	75.0	13.4	25.4	13.1
$600–$699	35.4	26.6	77.0	16.6	21.0	13.9
$700–$799	39.5	30.5	76.0	19.7	20.4	15.3
$800–$999	43.5	34.0	76.8	24.3	17.3	17.6
$1,000–$1,199	49.3	40.3	77.3	29.3	15.3	21.0
$1,200–$1,499	53.4	45.3	76.8	34.5	13.7	23.9
$1,500–$1,999	60.7	54.7	78.0	41.3	11.8	29.9
$2,000 or more	68.0	65.2	79.2	49.3	11.0	37.8
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

Note: Using a computer at home and using Internet are as a percentage of whole population; location data is a percentage of Internet users.

Source: 2001 Census of Population and Housing.

A.4 HOME COMPUTER AND INTERNET USE, BY INDIVIDUAL INCOME — 2001

Individual Income	*Using computer at home* %	*Using Internet* %	*Using Internet at home* %	*Using Internet at work* %	*Using Internet elsewhere* %	*Multiple location* %
Negative income	46.7	40.7	81.8	14.3	21.4	16.0
Nil income	58.4	52.9	83.7	5.5	28.5	16.7
$1–$39	66.2	58.8	85.9	5.4	30.3	20.3
$40–$79	60.0	53.1	82.9	5.1	30.5	17.3
$80–$119	52.0	45.6	82.7	7.7	29.7	18.5
$120–$159	31.2	26.7	78.1	9.0	30.8	16.2
$160–$199	21.3	17.3	78.5	9.6	27.4	14.0
$200–$299	26.0	21.5	79.2	16.9	21.8	16.2
$300–$399	34.6	29.9	77.5	26.1	15.6	17.6
$400–$499	37.6	34.5	74.4	34.9	11.5	19.5
$500–$599	41.6	41.3	70.7	44.1	9.2	22.6
$600–$699	46.3	49.1	67.7	53.2	7.6	27.0
$700–$799	50.6	54.9	67.1	58.2	6.6	30.3
$800–$999	56.5	61.8	67.5	63.7	5.5	35.0
$1,000–$1,499	64.9	70.8	69.6	70.8	4.7	43.1
$1,500 or more	71.6	79.0	73.3	77.7	5.5	53.0
Not stated	18.3	16.2	78.2	19.3	20.6	17.0
Not applicable	45.4	27.3	77.0	0.0	35.6	12.6
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users.

Source: 2001 Census of Population and Housing.

A.5 HOME COMPUTER AND INTERNET USE, BY LEVEL OF EDUCATION — 2001

Educational qualification	Using computer at home %	Using Internet %	Using Internet at home %	Using Internet at work %	Using Internet elsewhere %	Multiple location %
Postgraduate degree level	80.2	86.2	73.7	70.7	7.4	42.1
Graduate Diploma and Graduate Certificate level	72.7	76.4	72.4	65.3	6.7	32.3
Bachelor Degree level	68.4	74.3	70.4	61.1	9.4	28.7
Degree or higher	**70.5**	**76.2**	**71.2**	**63.1**	**8.8**	**30.9**
Advanced Diploma and Diploma level	60.1	60.1	73.4	49.5	10.0	18.7
Certificate level	42.3	39.3	75.1	37.9	10.3	8.6
Certificate or diploma	**47.2**	**45.0**	**74.4**	**42.1**	**10.2**	**11.4**
Year 12 or equivalent	51.5	52.7	73.4	35.1	20.0	13.8
Year 11	42.8	39.5	74.6	31.3	14.1	7.6
Year 10	32.1	27.0	76.6	29.7	10.3	4.3
Year 9	21.3	16.1	80.3	18.2	14.6	2.0
Year 8 or below	7.4	4.7	83.0	15.4	10.8	0.4
Did not go to school	4.3	3.1	73.7	17.6	19.4	0.3
No post-school qualifications	**33.8**	**31.3**	**75.0**	**31.7**	**16.2**	**6.7**
Still at school	78.3	73.7	79.2	3.8	38.8	15.3
Other (inadequately described, not stated)	7.6	6.1	78.0	19.7	17.8	0.9

Note: Using computer at home and using Internet are as a percentage of population aged 15 years and over; location data is as a percentage of Internet users.
Source: 2001 Census of Population and Housing.

A.6 HOME COMPUTER AND INTERNET USE, BY LABOUR FORCE STATUS — 2001

Labour force status	Using computer at home %	Using Internet %	Using Internet at home %	Using Internet at work %	Using Internet elsewhere %	Multiple location %
Employee	52.0	54.5	69.6	54.0	11.0	32.6
Employer	53.7	51.7	75.3	56.1	3.9	33.3
Own account worker	52.7	43.9	88.3	31.2	6.8	24.4
Contributing family worker	47.3	38.6	84.2	18.6	15.8	16.7
Unemployed looking for full-time work	37.7	34.4	75.2	5.9	28.8	8.9
Unemployed looking for part-time work	54.6	51.9	75.3	5.4	39.8	19.0
Not in the labour force	28.1	23.1	83.4	5.0	24.9	12.5
Not stated	2.7	2.0	78.0	20.8	13.7	11.6
Not applicable	45.4	27.3	77.0	0.0	35.6	12.6
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users.
Source: 2001 Census of Population and Housing.

A.7 HOME COMPUTER AND INTERNET USE BY OCCUPATION — 2001

Occupation	*Using computer at home* %	*Using Internet* %	*Using Internet at home* %	*Using Internet at work* %	*Using Internet elsewhere* %	*Multiple location* %
Managers and Administrators	59.5	62.9	70.8	71.6	5.0	44.6
Professionals	71.3	77.5	70.1	69.9	6.8	43.9
Associate Professionals	57.9	63.2	67.5	62.5	6.9	35.0
Tradespersons and Related Workers	39.0	34.0	81.1	26.4	10.0	16.2
Advanced Clerical and Service Workers	58.8	67.2	62.0	64.4	4.9	30.0
Intermediate Clerical, Sales and Service Workers	52.3	55.9	66.6	49.8	11.7	26.6
Intermediate Production and Transport Workers	33.4	27.7	83.2	14.7	14.0	11.2
Elementary Clerical, Sales and Service Workers	52.8	49.5	78.9	17.7	25.4	20.3
Labourers and Related Workers	30.7	24.7	82.1	8.7	21.3	11.4
Not stated	36.1	32.1	77.1	28.9	15.5	19.7
Not applicable	34.0	24.4	79.9	3.1	30.1	12.6
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users.

Source: 2001 Census of Population and Housing.

A.8 HOME COMPUTER AND INTERNET USE BY PROFICIENCY IN SPOKEN ENGLISH — 2001

English Proficiency	*Using computer at home* %	*Using Internet* %	*Using Internet at home* %	*Using Internet at work* %	*Using Internet elsewhere* %	*Multiple location* %
Very well	52.3	48.9	75.0	32.8	18.9	24.8
Well	29.1	26.0	74.7	20.5	22.5	16.4
Not well	12.1	10.1	74.9	10.0	25.0	8.9
Not at all	3.6	2.6	71.5	10.4	28.5	8.5
Not stated (both language (LANP)(a) and proficiency (ENGP)(b) not stated)	7.1	5.1	75.6	19.3	22.0	16.1
Not stated (language (LANP) stated, proficiency (ENGP) not stated)	20.5	18.1	73.0	26.1	20.4	17.7
Not applicable	44.7	39.3	74.6	35.0	17.1	25.3
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

(a) Language Spoken at Home

(b) Proficiency in Spoken English

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users.

Source: 2001 Census of Population and Housing.

A.9 HOME COMPUTER AND INTERNET USE, BY COUNTRY OF BIRTH — 2001

Country of Birth	Using computer at home %	Using Internet %	Using Internet at home %	Using Internet at work %	Using Internet elsewhere %	Multiple location %
Australia (incl. External Territories)	44.2	38.3	73.9	33.6	18.3	24.5
Other Main English Speaking Countries	47.7	45.8	77.5	41.6	11.3	28.8
Balance of Oceania & Antarctica	36.9	35.5	69.4	37.8	18.6	24.2
Balance of North West Europe	41.0	37.7	79.2	37.7	11.6	26.8
Southern and Eastern Europe	20.7	18.7	77.0	34.7	12.5	22.8
North Africa and the Middle East	31.3	28.5	76.5	29.7	16.7	21.4
South-East Asia	44.3	42.0	73.9	31.4	20.6	24.0
North-East Asia	55.7	54.6	78.0	26.4	20.9	23.1
Southern and Central Asia	56.1	55.1	77.7	36.1	16.6	28.5
Balance of Americas	48.0	47.6	76.6	28.8	18.4	22.2
Balance of Sub Saharan Africa	53.5	53.9	73.1	37.7	19.4	28.4
Not stated	14.5	11.0	75.3	19.0	22.4	15.8
Inadequately described, at sea, n.e.c.	39.1	37.7	74.4	33.9	19.5	25.1
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users. Other main English speaking countries are New Zealand, United Kingdom, Ireland, United States of America, Canada and South Africa.

Source: 2001 Census of Population and Housing.

A.10 HOME COMPUTER AND INTERNET USE, BY INDIGENOUS STATUS — 2001

Indigenous Status	Using computer at home %	Using Internet %	Using Internet at home %	Using Internet at work %	Using Internet elsewhere %	Multiple location %
Non-Indigenous	44.1	39.0	74.8	34.2	17.3	24.9
Aboriginal	18.0	15.9	54.7	25.6	36.0	15.2
Torres Strait Islander	17.6	16.5	50.0	26.2	37.5	12.7
Both Aboriginal and Torres Strait Islander	17.0	16.3	48.4	25.5	41.0	13.5
Total Indigenous	18.0	15.9	54.1	25.6	36.3	14.9
Not stated	6.1	5.1	72.4	24.9	23.3	19.1
Total	**42.0**	**37.1**	**74.6**	**34.1**	**17.5**	**24.8**

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users. Other main English speaking countries are New Zealand, United Kingdom, Ireland, United States of America, Canada and South Africa.

Source: 2001 Census of Population and Housing.

A.11 HOME COMPUTER AND INTERNET USE FOR UNDER 25 YEARS, BY GENDER — 2001

	Using computer at home	*Using Internet*	*Using Internet at home*	*Using Internet at work*	*Using Internet elsewhere*	*Multiple location*
	%	*%*	*%*	*%*	*%*	*%*
Males						
0–4 years	14.9	3.3	90.4	0.0	11.7	2.1
5–9 years	50.6	21.8	75.8	0.0	32.1	7.9
10–14 years	68.5	56.0	76.8	0.0	38.1	15.0
15–19 years	66.3	61.8	81.4	6.7	34.2	20.7
20–24 years	49.8	53.0	72.3	30.6	29.0	27.5
Females						
0–4 years	14.0	3.0	89.7	0.0	12.5	2.2
5–9 years	50.6	20.8	75.1	0.0	32.7	7.8
10–14 years	69.5	55.4	76.9	0.0	37.9	14.8
15–19 years	67.6	65.0	76.8	8.1	36.7	20.5
20–24 years	49.5	58.9	61.6	37.8	28.4	25.3
Persons						
0–4 years	14.5	3.1	90.1	0.0	12.0	2.1
5–9 years	50.6	21.3	75.4	0.0	32.4	7.9
10–14 years	69.0	55.7	76.9	0.0	38.0	14.9
15–19 years	66.9	63.3	79.1	7.4	35.5	17.3
20–24 years	49.6	55.9	66.7	34.3	28.7	12.2

Note: Using computer at home and using Internet are as a percentage of whole population; location data is as a percentage of Internet users.

Source: 2001 Census of Population and Housing.

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