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# Access to the Information Highway: Canadian Households

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by  
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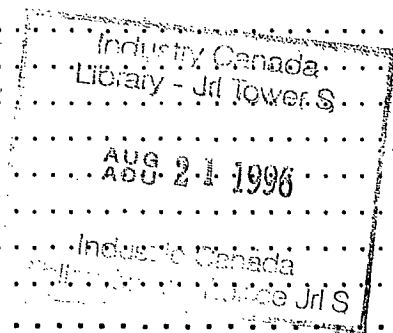
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# HIGHLIGHTS

## Changes in penetration rates over time

- Proportion of households with a telephone is extremely high - 99% in 1995
  - changed very little since 1986
- Cable penetration rates increased from 65% in 1986 to 73% in 1995
  - increases were particularly big in rural areas
- Computer penetration rates almost tripled between 1986 (10%) and 1995 (29%)
- Modem penetration rate in 1995 is 12% for all households and 42% for households with computers
- Even in the highest income quartile, less than one-quarter (22%) of all households have a modem, and less than one-half of households with computers have a modem (45%)

## Household income explains most of the variation in penetration rates

- Telephone penetration varies from 96% in lowest income quartile to over 99% in highest income quartile
- Cable penetration rates rise significantly with income - from 64% in lowest income quartile to 82% in highest
- Presence of a computer is clearly related to income - ranges from about 12% of households in the lowest income quartile to 50% in the highest income quartile

## Education makes significant difference

- Computer penetration rates increase from 9% for householders with less than grade 9, to 26% for high school graduates, and 56% for those with a university degree
- Widening gap - computer ownership for householders with less than grade 9 increased from 4% in 1986 to 9% in 1995, significantly less than the increase for householders with a university degree - from 20% to 56%

## Age seems to have an effect independent of income

- Telephone penetration for householders aged 65 and over is noticeably higher than for other age groups in all but the highest income quartiles - the telephone may be more of a necessity for seniors
- Senior citizens have higher cable penetration rates than other age groups in all income quartiles
- Big variation in computer penetration by age - only 10% for householders aged 65 and over, compared to about 40% for those aged 35 to 54
- Modem penetration rate among households with a computer is highest (46%) for households with heads aged less than 35, suggesting young people are more enthusiastic users of the Information Highway

## **Location also important**

- 80% of households in urban areas have cable but only 35% of households in rural areas - likely due to the differences in the availability of cable between urban and rural areas
- 30% of households in urban areas have computers compared with 22% in rural areas
- Households with computer and a modem is much lower in rural areas (29%) than in urban areas (44%). This difference may be due to the cost of long distance call from rural areas when using the modem to access the Internet, but without additional data this is only a hypothesis

## **Presence of children also has an influence**

- Presence of children under 18 has a big effect on computer penetration rate - 40% for single family households with children compared with only 28% of single family households without children
- Presence of children increases the cable penetration rate in the lowest income quartile - penetration rate for single family households with children (68%) exceeds that for single family households without children (63%)

## **Changing demographics of Canadian households from 1986 to 1995**

- Number of Canadian households increased by 19% between 1986 and 1995 - this affects the numbers with telephones, cable, computers and modems, in addition to the increases in penetration rates
- In 1995, urban households accounted for 85% and rural households for 15% of total households
- Households with heads under age 35 are still the largest proportion of all households, though they fell from 31% in 1986 to 25% in 1995. Households with heads aged at least 65 increased their share from 18% in 1986 to 20% in 1995
- Increasingly educated - Householders with a post-secondary certificate or diploma increased from 12% of all households in 1986 to 28% in 1995, while those with a university degree increased from 13% to 15%. The share of households in which the head had less than grade 9 fell from 22% of all households in 1986 to 15% in 1995

## **Penetration rates are higher in Canada than in the U. S.**

- 99% of Canadian households have telephones compared with 94% in the U. S.
- Noticeable difference in penetration rates at very low household incomes - less than 82% of U.S. households below US\$10,000 have a residential telephone, compared with more than 92% of Canadian households below C\$10,000
- For householders with less than 9 years of education, telephone penetration rate is almost 98% in Canada but less than 89% in the U. S.
- U.S. penetration rate for computers is lower than Canada's at low incomes but higher at high incomes. At incomes above C\$70,000, Canadian households have a penetration rate of 43% in rural areas and 55% in large cities, whereas in U.S. the penetration rates for households with income of at least US\$75,000 are 60% in rural areas and 64% in urban areas

## I: CONTEXT

The main purpose of this paper is to examine the availability of telephone, cable services, computers and modems which can be used by Canadian households to access the Information Highway. It is one of the steps necessary in developing a National Strategy for Universal Access to the Information Highway, pursuant to recommendations in *"The Challenge of the Information Highway: Final Report of the Information Highway Advisory Council"* (September 1995).

The report gives a summary comparison of penetration rates in Canada with those in the U.S., obtained from the U.S. Department of Commerce publication *"Falling Through The Net: A Survey of 'Have Nots' in Rural and Urban America"* (July 1995), and reviews other information related to penetration rates.

The Information Highway Advisory Council's ultimate objective is for Canadians to have universal access, at reasonable cost, to a "network of networks" in which computer networks can be linked equally to telephone networks, television networks and other networks. The breakthroughs that make an interoperable system technologically feasible have already occurred - digitization technology to convert text, sound and video images into a common format, fibre optic cables to transport the digitized information via broadband bidirectional channels, advanced high-speed switching to interconnect users and services, and advanced digital communications satellites.

Fully upgrading and interconnecting the networks in Canada will take time and will be expensive - according to the Council, some analysts estimate the cost of a universal broadband fibre optic network at \$30 billion. Until the systems are upgraded, bidirectional narrowband telephone lines will be unable to sustain the more advanced features of the Information Highway, such as high-speed interactive data and video-based applications, while unidirectional broadband television networks will send but not receive.

This project is part of the government's overall initiative to develop policies for affordable universal access to basic communications and information services. The project focuses specifically on households, but the larger effort must examine access to the Information Highway at points other than households - schools, libraries and other community centres, hospitals and other health care providers.

Section II summarizes the main findings of the study. Section III gives a detailed analysis of penetration rates in 1995. Section IV looks in detail at the changes in penetration rates from 1986 through 1991 to 1995, and changes in the most recent years (1993 to 1995). Section V reviews the U.S. study of penetration rates, to the extent that the breakdowns are relevant for Canada and can be compared with the findings in Section III. Section VI reviews other evidence on the incidence and use of computers and the Information Highway from home and on the job. Section VII suggests some other areas for analysis in the near future.

## II: SUMMARY

Access to the Information Highway, reflected in penetration rates, is to a large extent determined by people's choice of whether to subscribe to telephone and cable, and to purchase a computer and modem. For households who have this choice, income is an important determining factor, the effects of which can be seen directly in the relationships between income and penetration rates or indirectly in relationships between penetration rates and other household characteristics that affect or are affected by income.

The presence of young children in the family can affect priorities as to how income is spent, and a couple with children will find some goods and services less 'affordable' than a couple with the same income but no children. Senior citizens and families with young children will view some goods and services more as 'necessities' than will other types of family. Age and education affect spending preferences and priorities, as well as income.

Sometimes there is no choice: in 1994 about 95% of Canadian households were passed by cable television, so about 5% could not choose to subscribe to cable even if they wished to do so. Other times a choice exists in principle but not in practice. For example, the Internet can be accessed by almost anyone with telephone services, a computer and modem, but some households may not have sufficient income to purchase a computer. Others may be unable or unwilling to pay the higher telephone charges to reach an Internet host from rural or remote locations. Yet others may be sufficiently daunted by the prospect of learning to use a computer that they simply do not consider it a realistic option.

Penetration rates show many of the relationships between the choices people make and the income and demographic characteristics of the households to which they belong. Other relationships are not revealed directly, but the information may be used to draw reasonable inferences. Penetration rates also show where emphasis is needed if Canadians are to use today's technology and tomorrow's technological advances to their best advantage.

Penetration rates do not tell the whole story, however. The number of households in Canada has increased by about one-fifth over the last decade, so a higher penetration rate means that a larger share of more households is accessing the system. The number of households with telephones, for example, has increased by about one-fifth in the last decade even though the telephone penetration rate has barely changed.



### Penetration Rates and Income

There are powerful relationships between household income and all of the penetration rates examined here - telephone, cable, computers and modems. With a few exceptions, like the relationship between cable penetration rates and urban/rural location, income explains much and often most of the variation in penetration rates.

## Penetration Rates by Household Income, 1995

	\$	<u>Phone</u>	<u>Cable</u>	<u>Computer</u>	<u>Modem</u>	<u>Modem/Computer</u>
All Incomes		98.5%	73.4%	28.8%	12.0%	41.8%
Bottom Quartile	<21,398	96.0%	64.4%	12.3%	4.8%	39.0%
2nd Quartile	21,398-39,949	98.8%	70.3%	20.2%	7.3%	36.2%
3rd Quartile	39,949-63,034	99.5%	76.7%	32.5%	13.6%	42.0%
Top Quartile	>63,034	99.7%	82.2%	50.2%	22.4%	44.7%
<u>Within the Bottom Quartile</u>						
Bottom Octile	<13,886	94.3%	62.5%	11.5%	4.8%	41.9%
Top Octile	13,886-21,398	97.8%	66.3%	13.1%	4.8%	36.5%

Modem/Computer = Modem Penetration Rate of Households with Computers

Some relationships may appear as correlations between penetration rates and household characteristics when the real driving force behind people's choices is income. For example, a relationship between cable penetration rates and education may really be explained by the relationship between education and income.

Also, changes in the distribution of household characteristics may alter the relationships between penetration rates and income because of their effect on the income distribution. For example, low-income households headed by seniors have higher cable penetration rates but much lower computer penetration rates than low-income households headed by younger people, and the share of households headed by a senior has increased by about one-third in the last decade.

### Telephone Penetration Rates



The proportion of households with a telephone is extremely high - 98.5% in 1995. Almost all of the small variation in penetration rates is related to differences in income. The penetration rate rises from 96% in the lowest income quartile to over 99% in the highest income quartile.



The telephone penetration rate increased very little between 1986 (98.1%) and 1995 (98.5%), but the number of households with a telephone increased by almost one-fifth (19.5%), matching the increase in the total number of households (19%).

Because of the relationship between unemployment and household income, households in which the head is unemployed have a lower penetration rate (95.7%) than households in which the head is employed (99.2%) or out of the labour force (97.9%).



There is no relationship between telephone penetration rates and location of the household in urban and rural areas. The penetration rate is the same in both locations (98.5%), and equal to the national rate.

Penetration rates do vary by the province of residence, however. Newfoundland has the lowest penetration rate at 96.9%, while Quebec (98.9%) and Ontario (98.8%) have the highest penetration. The penetration rate rises with income in every province.



Age appears to have an effect on telephone penetration rates, increasing from 97% of households with heads aged less than 35 to 99.3% of households with heads aged 65 and over. The penetration rate for householders 65 and over is noticeably higher than for other age groups in all but the highest income quartile. Even in the lowest income quartile their penetration rate is 98.8%. Since 45% of senior households are in the lowest income quartile, it appears that age has an effect independent of income for seniors. The most likely explanation is that a telephone is more of a necessity for seniors than for other age groups. Also, income alone does not explain why householders under age 35 within each quartile have the lowest telephone penetration rate. For this group too, age appears to have an effect independent of income.



Single family households have a higher telephone penetration rate (99.1%) than other households (97.1%). Single family households without unmarried children under age 18 have a particularly high penetration rate (99.5%). In the lowest income quartile, the penetration rate is 94.8% for single family households with children, but 98.6% for single family households without children. Since the penetration rate for every family type rises with income, this difference at low incomes may be because families with children must support more people on the same income.

The penetration rate for other households - mainly one-person households - is noticeably lower than for single-family households in the bottom half of the lowest income quartile. The penetration rates by age suggest that this difference is due to one-person households in which the head is under age 35. Income remains the major explanatory factor, since the penetration rate for these other households jumps by four percentage points (from 94% to 98%) between the bottom half and the top half of the lowest income quartile, and 30% of these households are in the bottom half of this quartile.



Telephone penetration rates increase with the education of the household head, likely reflecting a relationship between income and education. Even within the lowest income quartile, however, the penetration rate is higher for households with post-secondary education than for those without.



#### Cable Penetration Rates

Almost three-quarters (73.4%) of all Canadian households subscribe to cable television in 1995, compared with less than two-thirds (65.4%) in 1986.

Cable penetration rates rise significantly with income: 82.2% of households in the highest income quartile subscribe to cable, compared to 64.4% in the lowest quartile.

Relationships between cable penetration rates and household characteristics generally mirror the effect of household income, although there are some significant exceptions.



Differences in cable penetration rates by employment and labour force status mainly reflect differences in income and residential location. Self-employed household heads have the lowest



cable penetration rate (60%), and it is less than for other groups throughout the income distribution. It is possible that this is explained by a relatively high proportion of self-employed households, like farmers and fishermen, living in rural areas not served by cable.

Two-thirds (66.4%) of households with unemployed heads have cable, the second-lowest cable penetration rate. The highest cable penetration rate is for households with employed heads (77%), followed by households with heads not in the labour force (72%) - but the latter actually have the higher penetration rates in all but the lowest-income quartile.



The difference in cable penetration rates by residential location is most striking. Cable subscribers are 80.2% of households in urban areas but only 34.5% of households in rural areas. This big difference persists throughout the income distribution, suggesting that the differences in penetration rates are due to the differences in the availability of cable between urban and rural areas.

Cable penetration rates have increased in both urban and rural areas, but the increase has been particularly big in rural areas. Between 1986 and 1995, the penetration rate among rural households nearly doubled between 1986 and 1995 (from 18.1% to 34.5%), while it increased by less than one-tenth among urban households (from 74.2% to 80.2%). The combination of higher penetration rates, more households and more areas wired for cable caused the number of rural households with cable to more than double (an increase of 113%), while the total number of households with cable (urban plus rural) increased by one-third (34%).

British Columbia has the highest cable penetration rate (85.4%), and Saskatchewan has the lowest (58.8%). Although the cable penetration rate rises with income in every province, even in the highest income quartile there is a big difference (25 percentage points) between the highest provincial penetration rate (96.6% in Newfoundland) and the lowest (70.5% in Saskatchewan). Again, differences in the availability of cable in rural areas may be the cause.

For the three provinces containing three-quarters (75.9%) of all households, the provincial cable penetration rate is above the national rate (73.4%) in British Columbia (85.4%) and Ontario (78.2%), but is substantially below the national rate in Quebec (64.2%).



Except for senior citizens, there is no relationship between age and cable penetration rates. Senior citizens, however, have a higher penetration rate than other age groups.



The cable penetration rate for single-family households (75.2%) is higher than for other households (69.3%), mainly one-person households. The presence of unmarried children under age 18 increases penetration rates at low incomes, but not at high incomes.



The penetration rate generally rises with level of education of the household head, likely reflecting a relationship between education and income. However, householders with less than grade 9 have a noticeably lower penetration rate, even at high incomes.



## Computer Penetration Rates

In 1995, almost three in every ten households (28.8%) have a computer in the home. The presence of a computer is clearly related to household income. About 12% of households in the lowest income quartile have a computer, but 50% of those in the highest income quartile.

Although income strongly affects the penetration rate, other factors are also having an influence - probably people's perceptions of their ability to use a computer and their need or desire to use one, reflected in the relationships with age and education, and the absence of children in the family.

The computer penetration rate almost tripled between 1986 (10.3%) and 1995 (28.8%). Since the total number of households also increased, the number of households with a computer in 1995 actually is more than three times (332%) the number in 1986. There should be further increases as computers become easier to use, as more people become more accustomed to them, and as the number and types of services offered on the Information Highway increase.



The computer penetration rate for employed household heads (37.7%) is much higher than the rate for unemployed heads (20.1%) and for heads who are out of the labour force (13.3%). Although penetration rates rise with income, differences by labour force status remain throughout the income distribution. In the highest income quartile more than half (52.4%) of employed heads have a computer, compared with 39.7% of unemployed heads and 34.4% of heads out of the labour force.



The computer penetration rate differs by residential location and the difference persists throughout the income distribution. In urban areas 30% of households have computers, compared with 22.1% in rural areas. Between 1986 and 1995, the urban penetration rate increased from 10.4% to 30% and the rural penetration rate increased from 9.6% to 22.1%. In the lowest income quartile, the penetration rate is 13.2% in urban households and 7.4% in rural areas, rising to 51.2% and 41.5% respectively in the highest income quartile.

Almost one-third of households have a computer in British Columbia (32.8%), Alberta (34.1%) and Ontario (32.5%), which are the only three provinces with a provincial penetration rate above the national rate (28.8%). In Quebec nearly one-quarter (23.5%) have a computer. Less than one in five households have a computer in Newfoundland (19.4%), P.E.I. (16.2%) and New Brunswick (19.9%).



The computer penetration rate varies by age. The penetration rate is particularly low (10%) for householders aged 65 years or more, which helps to explain the difference in penetration rates between householders in and out of the labour force. Householders aged 55 to 65 have the second lowest penetration rate (24.4%), followed by those aged under 35 (29.2%). The penetration rates are quite similar for householders aged 35 to 44 (37.8%) and 45 to 54 (39.8%). The penetration rate should rise automatically as the baby boomers, who have grown accustomed to computers, grow older and move into retirement.

Penetration rates rise with income for all age groups, but the age differences persist. For example, between the lowest and highest income quartiles, the penetration rate rises from 5.2% to 27.5% for householders aged 65 and over, and from 14.4% to 57.9% for householders aged 45 to 54.



The presence of children under age 18 has a big effect on the computer penetration rate. The rate for single family households with children is 40.4%, compared with only 28% for single family households without children. The presence of children has a significant effect on the computer penetration rate throughout the income distribution. This could be another reason why households with heads aged 35 to 54 have higher penetration rates than older and younger households.

Also, between 1986 and 1995, the computer penetration rate increased from 7% to 28% for single-family households without children under 18, and from 17.7% to 40.4% for single-family households with such children.

The penetration rate for other households - mainly one-person households - is half that for single-family households (16.8% versus 33.9%). This difference could well reflect the relationship between age and penetration rates, if a large proportion of one-person households are senior citizens.



Computer penetration rates increase markedly with the education of the household head, from 9.1% for householders with less than grade 9 to 26.1% for high school graduates and 55.6% for those with a university degree. Some of the differences can be explained by the income distribution - for example, only 10% of households in which the head has less than grade 9 are in the highest income quartile, compared with 23.6% of high school graduates, and 48.2% of householders with a university degree. Nevertheless, education seems to have an effect independent of income.

Furthermore, there seems to be a widening gap between computer ownership at high and low levels of education. The increase in the computer penetration for householders with less than grade 9, from 4.1% in 1986 to 9.1% in 1995, was significantly less than the increase for householders with a university degree, from 19.6% to 55.6%.

#### Modem Penetration Rates



The modem penetration rate is 12% of all households, and 41.8% of households with computers. Even in the highest income quartile, less than one-quarter (22.4%) of all households have a modem, and less than one-half of households with computers have a modem (44.7%).

There is a much weaker relationship between income and modem penetration rates among computer owners than between income and computer penetration rates. The proportion of computer owners with a modem is only 14.6% higher in the top income quartile than in the bottom quartile, while the computer penetration rate in the top quartile is more than four times that in the bottom quartile.

Although modem penetration rates are low, they are increasing rapidly. Even in the one year between 1994 and 1995, the proportion of all households with a modem increased from 8.4% to 12%. Particularly if internal modems more and more are sold as an integral part of the computer, data on modem usage will be more relevant than data on modem ownership.



Following the same pattern as computer penetration rates by labour force status of the head, modem penetration among all households is only 8.2% for unemployed heads, 5.2% for heads out of the labour force, but 16% for employed heads. Among households with computers,

however, modem penetration rates vary little by the employment and labour force status of the head - 39.1% for those outside the labour force and 42.3% for those in the labour force.



The proportion of households with computers that also have a modem is much lower in rural areas (29%) than in urban areas (43.5%). This difference strongly reinforces the locational difference in computer penetration rates, so that 13% of all urban households have a modem but only 6.5% of all rural households.

Even among computer owners in the highest income quartile, 45.8% of urban households have a modem, but only 33.5% of rural households. It is possible that the difference is due to the cost of long-distance calls from rural areas when using the modem to access the Internet, but without additional data this is only an hypothesis.

The rank ordering of modem penetration rates among households with computers among the smaller provinces differs somewhat from the rank ordering of computer penetration rates. For example, P.E.I. has the lowest computer penetration rate (16.2%) but the highest share of computer owners with a modem (49.7%). Among the four provinces containing 85% all households, however, both types of penetration rates are higher in Alberta, British Columbia and Ontario than in Quebec.



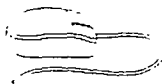
The modem penetration rate among computer households is highest (46%) for households with heads aged less than 35, suggesting that young people are enthusiastic users of the Information Highway. Seniors have the lowest modem penetration rate among households with computers (37.9%), so that less than four percent (3.8%) of all households headed by seniors have a modem.



The differences in modem penetration rates by family type among households with computers are very small, but are the reverse of the pattern seen for computer penetration rates. Among households with computers, the modem penetration rate is lowest for single-family households with children 40.7% and highest for households other than single-family households 44.1% - mainly one-person households.



Even among households with computers the modem penetration rate increases markedly with education, from 30.6% of households where the heads have less than grade 9 to almost half (48.5%) of those with a university degree. This strongly reinforces the relationship between education and computer penetration rates, so that the modem penetration rate for all heads with a university degree (27%) is almost ten times that for all heads with less than grade 9 (2.8%).



### Computer Usage

Projections from data reported by other sources indicate that, while 17% of persons (not households) aged 16 and over in Canada plus the United States have access to the Internet (in August 1995), only 11% actually used it in the previous 3 months. Furthermore, 66% of these users had last used the Internet at work, and 44% had last accessed it from home. The time spent on the Internet averaged 5 hours and 28 minutes per user per week, or 35 minutes per week per person for the whole population aged at least 16 - about the same as the total time spent playing rented video tapes. Again, strong relationships were seen between computer use and income and education. Although only 10% of the

U.S. plus Canadian population have household income in excess of \$80,000, 25% of World Wide Web users have this income. Although only 29% of the joint population have at least college degrees, they are 64% of World Wide Web users.

Although the earlier analysis showed that 24% of Canadian households in 1994 (and 28.8% in 1995) had a computer at home, projections from Canada's General Social Survey indicate that 48% of employed Canadians used a computer at work in 1994, up from 15% in 1985. A higher proportion of employed men (52%) than women (45%) used the computer at work, reflecting differences in occupational composition. The time spent using computers on the job also increased, from an average of 16 hours per week per user in 1985 to almost 18 hours in 1994.

### Demographic Changes Over Time

The number of Canadian households increased by 19% between 1986 and 1995. Because the total number of households increased, the increases in the number of households with telephones, cable and computers are more than implied by the increases in penetration rates. For example, between 1986 and 1995, the cable penetration rate increased by 12.3% but the total number of households also increased by almost 19%. The combined effect was that the number of households with cable actually increased by more than one third (33.6%).

The 19% increase in households between 1986 and 1995 consisted of a 38.7% increase in households with heads out of the labour force, a 30.6% increase in those with unemployed heads, a 9.3% increase in households with employed heads, and a 14% increase in those with self-employed heads. Because the number of households in each category changed at different rates, the distribution of households changed too. The proportion of households with heads out of the labour force increased from 27.6% of households in 1986 to 32.2% in 1995. The proportion of employed heads fell from 58.8% of all households in 1986 to 54% in 1995. Households with unemployed heads increased slightly, from 6% of all households in 1986 to 6.6% in 1995. The proportion of self employed householders fell slightly, from 7.6% in 1986 to 7.2% in 1995.

Between 1986 and 1995, the number of urban households increased by 20% and the number of rural households by 12%. In 1995, urban households were 85.1% of total households, and rural households were 14.9%.

Households with heads under age 35 are still the largest proportion of all households, though they fell from 31.4% in 1986 to 25.2% in 1996. During these nine years, the number of households with heads aged at least 65 increased their share from 17.7% in 1986 to 19.7% in 1995, and the share of households aged 45 to 54 also increased from 15% to 18.4%.

Between 1986 and 1995 the number of single family households without unmarried children under age 18 increased by 21%, while the number with children increased by only 7.3%. The number of single family households increased by 14.1%, and the number of other households (mainly one person households) increased by 32.4% over these nine years. Because of the different rates of growth, single family households fell from 73.3% of all households in 1986, to 70.2% in 1995. Conversely, other households increased their share from 26.7% to 29.8%.

Although the number of households increased by 19% between 1986 and 1995, the number of households with heads educated to no higher than grade 13 actually fell. Specifically, the share of householders in which

the head had less than grade 9 fell from 22.2% of all households in 1986 to 14.8% in 1995. Householders with a post-secondary certificate or diploma increased from 12% of all households in 1986 to 27.5% in 1995, while those with a university degree increased from 13.4% to 15.1%.

### A Comparison with the U.S.A.



Penetration rates for telephones and computers in the United States (November 1994) are lower than in Canada (April 1995), except for computers at the highest income levels. The U.S. study has no information on cable penetration rates.



A larger share of households have telephones in Canada (98.5%) than in the U.S. (93.5%). The penetration rates differ little between the U.S. and Canada at higher incomes, but there is a noticeable difference at very low household incomes. Less than 82% of U.S. households below US\$10,000 have a residential telephone, compared with more than 92% of Canadian households below C\$10,000.

There is no significant relationship between penetration rates and the urban or rural location of households in either country. The U.S. penetration rates are lower than Canadian rates in every age group - for example, fewer than 97% of householders 55 and older have a telephone in the U.S., compared with more than 99% in Canada.

The penetration rate rises with education in both the U.S. and Canada, but for householders with less than 9 years of education, the telephone penetration rate is 97.7% in Canada but less than 89% in the U.S.

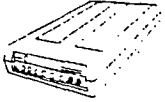


The proportion of households with computers in the home is higher in Canada (28.8%) than in the U.S. (25.5%). There is a strong relationship between income and computer penetration rates in both countries, and it is stronger in the U.S. than in Canada. The U.S. penetration rate is lower than Canada's at low incomes and higher at high incomes. In Canada, the lowest computer penetration rates are for households with income between C\$10,000 and C\$14,999, where penetration is 6.7% in rural areas and 11.9% in larger cities. In the U.S., the lowest computer penetration rates are for household income less than U.S.\$10,000, where penetration is 4.5% in rural areas and 8.1% in urban areas. At high incomes, above C\$70,000, Canadian households have a penetration rate of 42.9% in rural areas and 55.3% in large cities, whereas U.S. households with income of at least U.S.\$75,000, the penetration rates are 59.6% in rural areas and 64.4% in urban areas.

There is a strong relationship between computer penetration rates and education in both countries, but the Canadian penetration rate is higher at every comparable level of education, and particularly at the lower levels. For householders with less than 9 years of education, the Canadian penetration rate of 9.1% exceeds the U.S. rate of under 3%. Canadian householders with a university degree have a penetration rate of 55.6%, while U.S. householders with at least four years of college have penetration rates of about 51%.

A particularly interesting finding of the U.S. study is that many groups with the lowest computer and modem penetration rates - including computer households with low income, young household heads and less well-educated householders - actually are the most enthusiastic users of on-line computer services. This is consistent with Canadian data showing relatively high modem penetration rates in the bottom half of the lowest income quartile, and among householders under 35 years of age.

The basic pattern of relationships between penetration rates and other household characteristics is the same in both countries: there are strong relationships to the urban and rural location of the households, to the level of education of the household head, and to the age of household head. The Canadian penetration rates are higher than the U.S. rates at every comparable level of education and in every comparable age group.



Among households with computers, a larger share have modems in the U.S. (45.5%) than in Canada (41.8%). In both countries the proportion of computer households with a modem rises with income and with education. In both countries, differences by age in the modem penetration rate among computer households are much less than differences by age in the computer penetration rate.

Although the modem penetration rate among households with computers is higher in the U.S., the computer penetration rate is higher in Canada. Among all households, with and without computers, the modem penetration rate is slightly higher in Canada (12%) than in the U.S. (11.6%).

### Looking Ahead



This report improves our understanding of the current relationships between various household characteristics and the ability of Canadian households to access the Information Highway from their homes. It also examines how these relationships have evolved over time. These relationships are only part of the platform of understanding upon which policies affecting both the public and private sector will be designed and developed. Much more needs to be done to extend the platform's reach and improve its structural integrity. If policies are to guide rather than follow, and to facilitate rather than hinder the Highway's unstoppable progression into the lives of all Canadians, the list of what needs to be done in the near future should include at least the following items.

The platform should be extended to help illuminate the impact of the Information Highway on the provision of education, health care and community services generally. This step will help to improve the integrity of cost estimates associated with such developments as distance education and tele-medicine, and put the various policy options in perspective. The first step in this area is to extend the analysis for households to cover schools and other educational institutions, hospitals and clinics and health care facilities generally, and libraries and other community centres.

The structural integrity of the platform of understanding depends not only on the ability of households and other institutions to access the Information Highway, but also on the extent to which they transform their accessibility into actual use of the Highway. This requires moving on from an analysis of the infrastructure and its accessibility to an analysis of its actual and potential use by households and institutions. Although the report touches on this aspect, more is required for a thorough understanding.

The Information Highway transcends national boundaries, as do many of the policy issues associated with the Highway. This report compares household penetration rates in Canada with those in the United States, based on their own study. Similar comparisons should be done for as many countries as possible, but particularly for Canada's partners in the OECD and the G-7. Furthermore, the studies of other countries should be extended so that our platform of understanding includes how their various infrastructures have evolved, and covers the problems and issues that have arisen during the evolution of their networks. Not only is this understanding particularly important in an era when international cooperation is the norm, and in an area where international

cooperation is imperative, but also because the synergies found and the lessons learned can be exploited at the policy level in Canada.

The structural integrity of the platform of understanding depends not only on the information it provides about the present, but also on the extent to which this information can be used to identify issues that may arise in the future, so that policies can be developed to address these issues before they actually arise. This requires a critical review of the vast and increasing literature on the future of the Information Highway, not necessarily from a statistical perspective. The review will help to develop a coherent framework within which alternative policy options can be examined, and the policies that will best serve Canada's economic and social interests can be developed.



### III: CANADA'S PENETRATION RATES IN 1995

#### A: THE DATA

Canada's penetration rates are calculated from data provided by Statistics Canada. The data are from the May 1995 Survey of Consumer Finances, the April 1995 Labour Force Survey, and the April 1995 Household Facilities and Equipment Survey. The same data for other years are used later in this paper to examine changes in penetration rates over time. Parts of the data can be found in Statistic's Canada's publications "*Household Facilities by Income and Other Characteristics*" (Catalogue 13-218 Annual).

The unit for which penetration rates are calculated is the household. A household is a group of persons occupying one dwelling unit, and household income is the income of all members 15 years of age and over (excluding such items as gambling gains/losses, capital gains/losses, tax rebates, income-in-kind, and lump-sum receipts from sources like inheritances, loan repayments, insurance settlements and sale of personal property). The survey data exclude residents of the Yukon and Northwest Territories, Indian reserves and Crown land, and institutions.

Penetration rates are calculated for a number of household characteristics: the employment status of the household head, the urban/rural location of the household's residence, the age and education of the household head, the type and structure of families, and the province of residence. Each category is sub-divided by annual household income, with each household located in its relevant quartile of the entire Canadian household income distribution.

Households' demographic and labour force characteristics are as of the survey dates in 1995, while their income is that of the preceding calendar year (1994). This necessary difference in time periods, and the fact that surveys gather information at a point in time, means that some aspects of the relationship between penetration rates and household characteristics can not be accounted for in the data. The labour force status of the household head at the time of the survey may not be the same as in all or part of the preceding year, and some households will contain people with a different labour force status and employment status than the head. These factors weaken the link between labour force status and annual income.

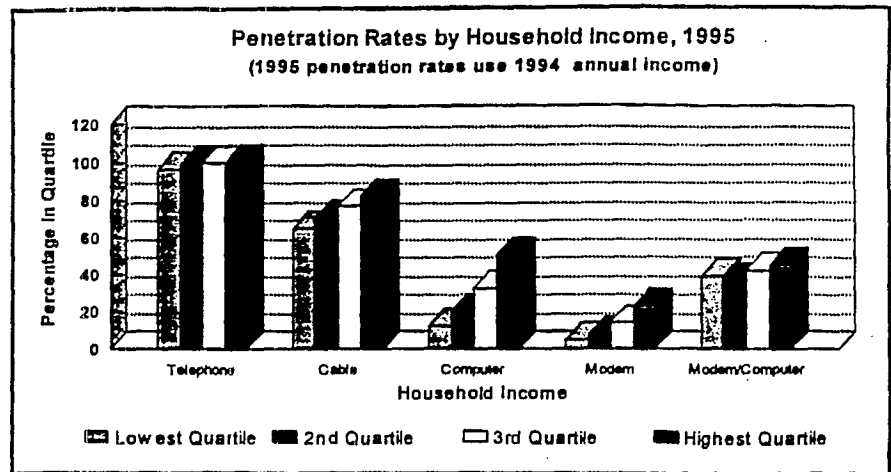
The employment or unemployment status at a point in time (the survey date) may have prevailed for a few weeks or for many months. The duration of unemployment can affect not only household income (through eligibility for unemployment insurance) but also the extent to which the household has drawn down on its liquid assets. The household's purchasing power, hence its ability to pay for cable television and computers, is affected by both assets and income. Household heads may be "out of the labour force" because they are retired, or because poor employment prospects have induced them to stop actively searching for jobs. Furthermore, computers and modems are durable goods that may have been purchased many months or years before the household heads attained their present labour force status.

These aspects of the data are unavoidable, but they likely apply to a relatively small share of all households. While these aspects must be recognized in principle, in practice they should not create serious biases when interpreting the data. The rest of this section examines the relationships between penetration rates in 1995 and household income, then investigates how penetration rates are related to other household characteristics.

## B: PENETRATION RATES AND HOUSEHOLD INCOME

Whether to purchase a particular good or service is a matter of choice for some people but not for others. For example, it has been estimated that some 95.6% of Canadian households were passed by television cable in 1994 (*Canadian Cable Television: Industry Overview, 1994*, Broadcasting Regulatory Policy, Canadian Heritage, September 1995). Consequently, 4.4% could not subscribe even if they wished to do so. The cable penetration rates for all households, reported here, will be a few percentage points below penetration rates for households actually passed by cable.

The Internet is accessible to anyone with a residential touch-tone telephone, but a relatively small proportion of the population have actually bought the necessary computer and modem. To a large extent, therefore, penetration rates are determined by people's choice of whether to subscribe to telephone and cable, and whether to purchase a computer and modem. The data confirm that income is a significant factor in this choice: the difference between penetration rates in the highest and lowest income quartiles show a strong relationship between penetration rates and household income (Table 1-95).

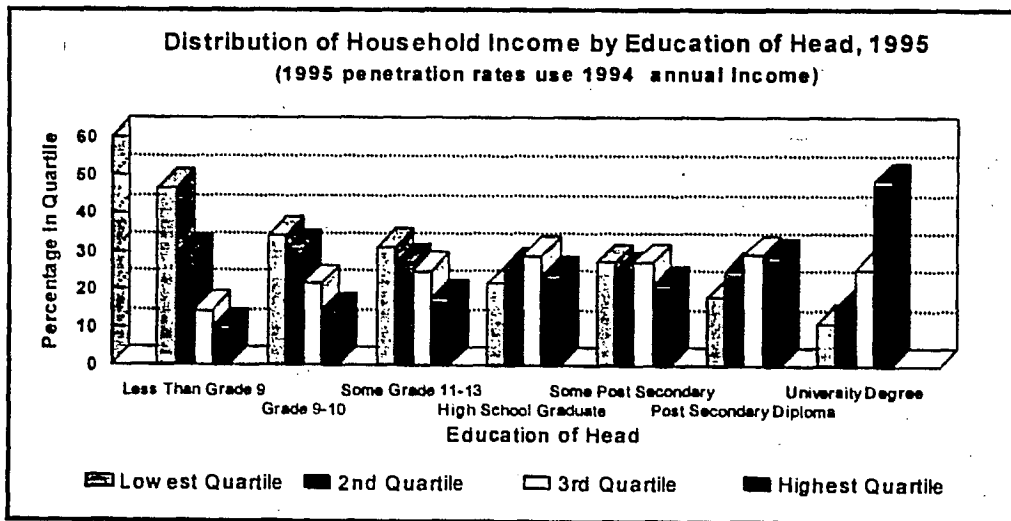
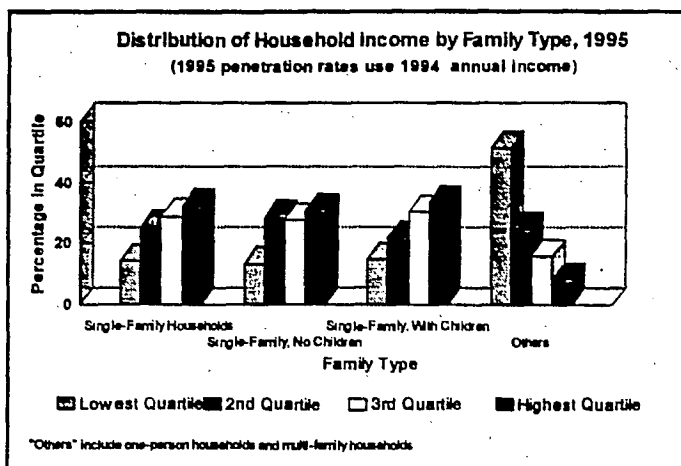
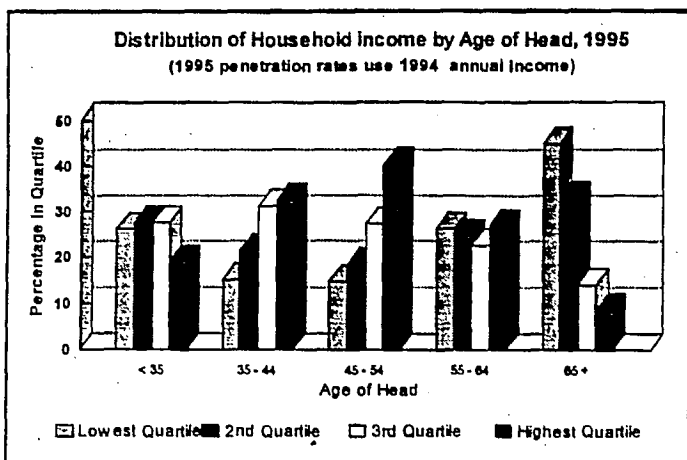
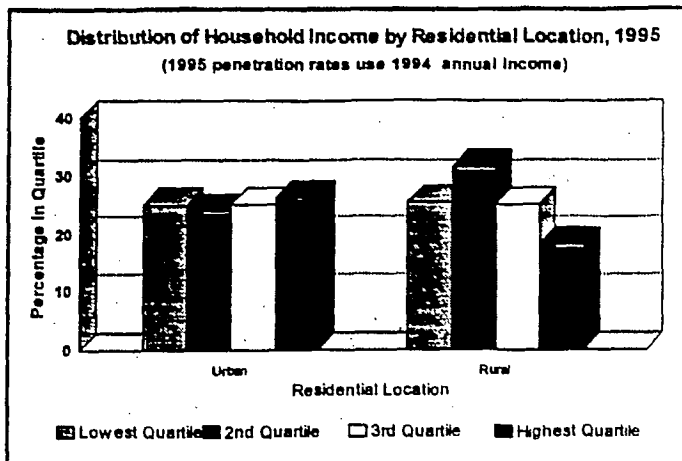
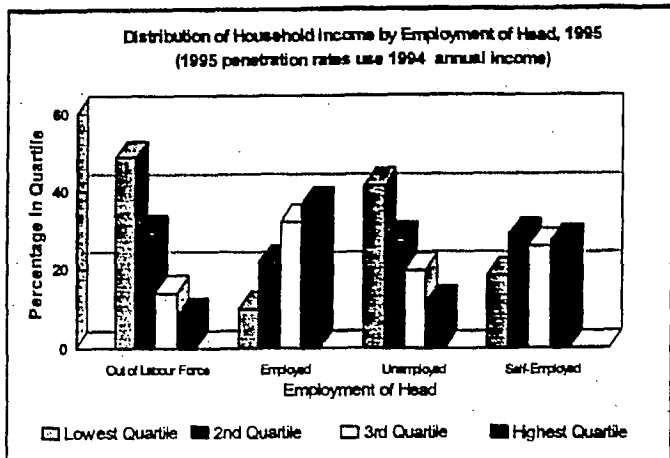


**Penetration Rates by Household Income, 1995**

	\$	<u>Phone</u>	<u>Cable</u>	<u>Computer</u>	<u>Modem</u>	<u>Modem/Computer</u>
All Incomes		98.5%	73.4%	28.8%	12.0%	41.8%
Lowest Quartile	<21,398	96.0%	64.4%	12.3%	4.8%	39.0%
2nd Quartile	21,398-39,949	98.8%	70.3%	20.2%	7.3%	36.2%
3rd Quartile	39,949-63,034	99.5%	76.7%	32.5%	13.6%	42.0%
Highest Quartile	>63,034	99.7%	82.2%	50.2%	22.4%	44.7%
Bottom Octile	<13,886	94.3%	62.5%	11.5%	4.8%	41.9%
Top Octile	13,886-21,398	97.8%	66.3%	13.1%	4.8%	36.5%

Modem/Computer = Modem Penetration Rate of Households with Computers

Because there are strong relationships between income and other characteristics of households, like labour force status and age, income explains a significant and often substantial part of the relationship between penetration rates and other household characteristics.





The telephone has a very high penetration rate in all income quartiles. The penetration rate rises from 96% in the lowest income quartile to 99.7% in the highest quartile, for an overall penetration rate of 98.5%.



Overall, 73.4% of households subscribe to cable television. The relationship to income is very visible, with the penetration rate rising steadily from 64.4% in the lowest income quartile to 82.2% in the highest quartile.



Overall, 28.8% of households have a computer, and the relationship between penetration rates and income is particularly striking. A little less than one-eighth (12.3%) of households in the lowest income quartile have a computer, compared with more than one-half (50.2%) of households in the highest quartile. That is, more than four times as many households have a computer in the highest quartile than in the lowest quartile.



Only 12% of all households have a modem (Table 1-95). The modem penetration rate for all households in the highest income quartile (22.5%) is more than four times the rate in the lowest quartile (4.8%).

Among only those households with a computer, 41.8% also have a modem (Table 8-95). The relationship between income and modem ownership is much less strong for computer households than for all households, suggesting that the influence of income on modem ownership is mainly felt through the effect of income on computer ownership. The modem penetration rate for computer households actually falls from 39% in the lowest income quartile to 36.2% in the second quartile, then rises to 42% in the third quartile and 47% in the highest income quartile.

With recent substantial reductions in prices of internal computer modems, and modems being sold as part of a package of computer hardware and software, the overall modem penetration rate should automatically increase over time to approach the computer penetration rate. Furthermore, new and much less costly devices designed specifically to access the Internet will soon be readily available in the market place. If these devices are classed as modems rather than computers, the modem penetration rate could exceed the computer penetration rate in the future.

### C: TELEPHONE PENETRATION RATES

The telephone penetration rate in Canada is extremely high: 98.5% of households have a telephone.



Most of the relationship between telephone penetration rates and the employment status of the household head is explained by income. In the highest quartile only households with unemployed heads have a telephone penetration rate less than 99.7%, and even the unemployed have a penetration rate of 99.1% in this quartile (Table 1-95).

The penetration rate for household heads in the labour force is 98.8%, rising from 95.5% in the lowest income quartile to 99.7% in the highest quartile. Only 13.8% of these households are in the lowest income quartile, but 33% are in the highest quartile (Table 1.N-95). Households with self-employed heads have a penetration rate of 99.3%, but they are only 7.2% of all households (and so have little effect on the overall penetration rate). Households with employed heads have a penetration rate of 99.2%, and they are 54% of all households. More than two-thirds (68.6%) are in the top half of the income distribution where they have penetration rates

exceeding 99.5%. Less than one-tenth (9.7%) are in the bottom quartile, where they have a penetration rate of 96.2%.

Unemployment pulls down the telephone penetration rate through its effect on household income. The penetration rate among unemployed householders is 95.7%, largely because 40% are in the lowest income quartile where they have a penetration rate of only 92.5%. The 11% in the highest quartile have a penetration rate of 99.1%.

Households with heads outside the labour force, including seniors in retirement, have a telephone penetration rate of 97.9%. This is less than the overall rate because 48.7% of these households in the lowest income quartile, where their penetration rate is 96.4%. The penetration rate rises to 99% in the second quartile, and reaches 100% for the 8.3% who are in the highest income quartile. Nevertheless, factors other than income are at work, since these households have the highest penetration rate in each income quartile. A likely explanation is that seniors view a telephone as more of a 'necessity' than do younger people.



The telephone penetration rate is unrelated to the urban and rural residential location of the household: it is 98.5% in each location, with only minimal differences between the urban and rural penetration rate within each income quartile (Table 2-94). Urban households are 85.1% of all households, and rural households are only 14.9%.

A previous analysis using a more detailed breakdown did show some differences between penetration rates in large and small urban communities, but concluded that the differences are almost entirely a reflection of differences in the income distributions of households in different locations (*Access to the Information Highway: Canadian Households in 1995 - Interim Report*, Industry Canada, February 1995).



The telephone penetration rate increases with the age of the household head, from 97% of household heads aged less than 35 to 99.3% of household heads aged 65 and older (Table 3-95). In 1995, one-quarter (25.2%) of household head are under age 35 and slightly less than a quarter (23.7%) are aged 35 to 44. Another 18.4% are aged 45 to 54, 13% are aged 55 to 64, and almost a fifth (19.7%) are 65 and older.

The penetration rate for householders 65 and over is noticeably higher than for other age groups in all but the highest income quartile, and approaches 100% in all but the lowest quartile. Even in the lowest quartile their penetration rate is 98.8% and exceeds 99% in the top half of this quartile. Since 44.9% of senior householders are in the lowest quartile and more than three-quarters (77.7%) are in the bottom half of the income distribution, income does not explain why senior householders have the highest telephone penetration rate. The most likely explanation is that a telephone is more of a necessity for seniors than for other age groups.

Conversely, income alone does not explain why householders under age 35 have the lowest telephone penetration rate, although it is an important variable: their penetration rate is 90.3% in the bottom half of the lowest quartile, jumping to 95.4% in the top half. Nevertheless, this age group has the lowest penetration rate within each quartile, and their income is not significantly biased to the bottom end of the distribution. Little more than a quarter (26%) of these households are in the bottom quartile and little more than a half (53.4%) are in the bottom half of the distribution. For this group too, therefore, age appears to have an effect independent of income.



By family type, single-family households have a higher telephone penetration rate (99.1%) than other households (97.1%). Single-family households are 70.2% of all households, and more than four-fifths (53.6%) of other households are one-person households.

Single-family households without unmarried children under age 18 have a particularly high penetration rate (99.5%), and it exceeds 99% in all but the lowest income quartile (98.6%). However, only 13.1% of these households are in the lowest quartile. Single-family households with such children have a lower penetration rate (98.7%), but only in the bottom half of the income distribution. In the top half of the distribution the telephone penetration is almost 100% for both types of single-family household. In the lowest income quartile the penetration rate is 94.8% for single-family households with children, but 98.6% for single-family households without children. There is a sense in which even the difference within this quartile may reflect income, if the same income per household is a lower income per person for single-family households with children than for single-family households without children. Earlier work showed that one-parent single-family households have the lowest penetration rate (96.1%), but are only 5.2% of all households.

The lower penetration rate among other households (97.1%) is largely the result of their particularly low rate (93.9%) in the bottom half of the lowest income quartile (it jumps to 98% in the top half of this quartile, for a 95.6% penetration rate in the quartile) and their particularly high concentration in the lowest quartile. Some 30.3% of these households are in the bottom half of the lowest quartile, and more than half (51.3%) are in this quartile. These other households have slightly higher penetration rates than single-family households with children in the bottom two income quartiles, and slightly lower rates in the top two quartiles. A comparison with penetration rates by age and income suggests that the low penetration rate for other households in the lowest income quartile is probably attributable to one-person households under age 35.



There is some difference in telephone penetration rates between the highest and lowest levels of education of the household head, but there is no consistent relationship with education overall.

The penetration rate for those with less than grade 9 (14.8% of all households) is 97.7%, falling to 97.6% for those with grade 9 to 10 (11.8% of households), and falling further to 97.5% for those with some grade 11 to 13 who did not graduate from high school (5.3% of households). The rate then rises to 98.6% for high school graduates with no other education (18.1% of households), but falls again to 97.9% for those with some post-secondary education but no post-secondary certificate or diploma (7.4% of households). Thereafter the penetration rate rises to 99.1% for heads with a post-secondary certificate or diploma (27.5% of households), and to 99.7% for those with a university degree (15.1% of households).

A more consistent relationship between penetration rates and education can be seen if minor differences are ignored and households are divided into three broader groups (Table 5.1-95). Households with heads who did not graduate from high school (31.9% of all households) have a penetration rate of 97.6%, those who graduated but obtained no other certificate, diploma or degree (25.5% of households) have a penetration rate of 98.4%, and those with a post-secondary certificate, diploma or university degree (42.6% of households) have a penetration rate of 99.3%.

The difference between the two lowest education groups in this broader classification all but disappears in each income quartile. The lowest education group has a lower overall penetration rate because a high proportion of them (39.3%) is in the lowest quartile (with a penetration rate of 95.5%) and a low proportion (12.8%) is in the highest quartile (with a penetration rate of 99.5%). Those who graduated high school but have no other certificate or diploma, on the other hand, have a smaller proportion (23%) in the lowest quartile (with a

penetration rate of 95.6%) and a larger proportion (22.9%) in the highest quartile (with a penetration rate of 99.6%). To all intents and purposes, therefore, the difference in penetration rates between these two groups is related to the income distribution. This conclusion is reinforced when the lowest quartile is split in two: for each group the penetration rate rises from less than 94% in the bottom half to more than 97% in the top half.

The higher penetration rate for the group with a post-secondary certificate, diploma or degree can be explained largely, but not entirely by income. The penetration rate rises from 97.5% in the lowest quartile to over 99% in each of the other three quartiles. Even in the first quartile, the penetration rate rises from 96.3% in the bottom half to 98.6% in the top half. Even so, the penetration rate in the lowest quartile (97.5%) is two percentage points higher than for the other education groups, and three percentage points higher in the bottom half of the first quartile.

On balance, therefore, it appears that the relationship between telephone penetration rates and education of the household head reflects a relationship between education and income, except that the highest education groups do have a higher penetration rate even at low levels of income.



Across provinces, telephone penetration rates marginally above the national average (98.5%) are found in Quebec (98.9%) and Ontario (98.8%). Alberta is at the national average (98.5%), while Manitoba (98.3%) British Columbia (98.1%) are marginally below the national average. New Brunswick is next (97.9%), followed by Saskatchewan (97.7%), P.E.I. (97.5%), Nova Scotia (97.4%) and Newfoundland (96.9%). More than three-fifths (62.9%) of all households live in Quebec (26.1%) and Ontario (36.8%), and adding British Columbia (13%) brings the total in the three provinces to more than three-quarters (75.9%) of all households.

Once more the differences all but disappear in the highest income quartile, with each province having a telephone penetration rate in excess of 99% - and P.E.I. and Quebec reaching 100%. Interestingly, Quebec has the highest overall penetration rate despite the fact that it is not one of the three 'richest' provinces (Ontario, Alberta and British Columbia). British Columbia's 98.1% penetration rate is below the national rate, because 21.3% of its households are in the lowest income quartile with a penetration rate of 94.1% - and 11.4% are in the bottom half of that quartile, with a penetration rate of only 92%.

The relationship between the penetration rate and income within provinces is more apparent when the lowest income quartile is split into two halves. The penetration rate jumps from 94.3% in the bottom half to 97.8% in the top half. The increase in the penetration rate moving from the bottom half to the top half is often significantly more than, and, with one exception (British Columbia), is never less than the increase moving from the top half of the lowest income quartile to the highest income quartile.

#### D: CABLE PENETRATION RATES

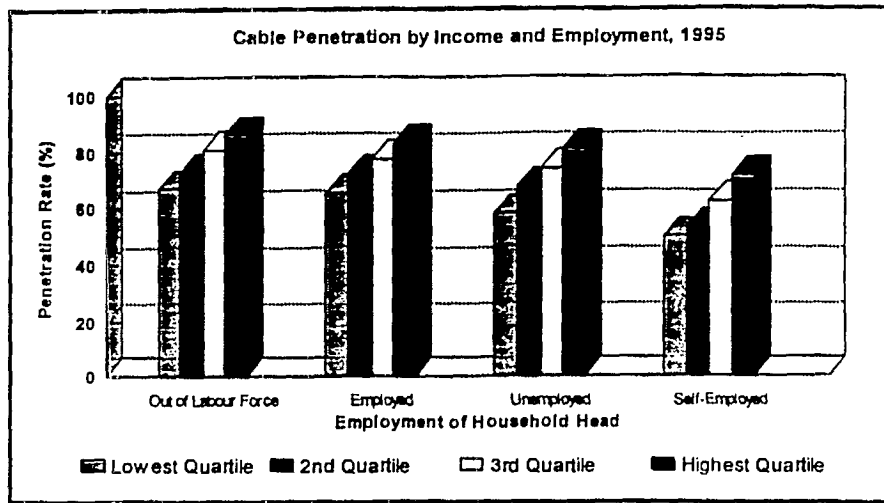
Almost three-quarters (73.4%) of Canadian households subscribe to cable television. The penetration rate is 64.4% in the lowest income quartile - the average of 62.5% and 66.3% in the two halves - rising to 70.3% in the second quartile, 76.7% in the third quartile and 82.2% in the highest income quartile (Table 1-95).



When households are classified by the employment status of the household head, the lowest cable penetration rate is among self-employed householders (59.7%). Since these households are only 7.2% of all households, they will not have a big effect on the national penetration

rate. Also, their penetration rate could be pulled down if even a relatively small absolute number of self-employed people, like farmers and fishermen, lived in rural areas not passed by cable.

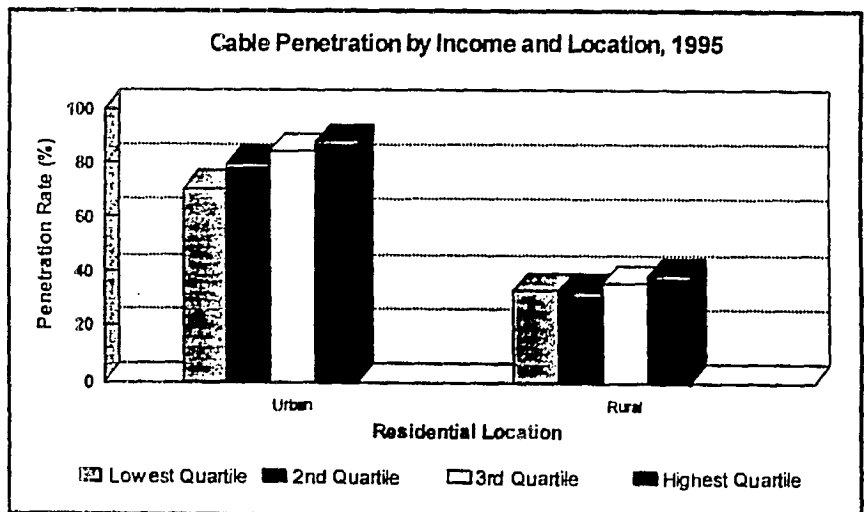
The unemployed have the second-lowest penetration rate (66.4%), but are only 6.6% of all households and 9.7% of households in the labour force. The penetration rate then jumps to 71.9% for households with heads out of the labour force, which are almost one-third (32.2%) of all households. Households with an employed head have the highest penetration rate (77%) and are 54% of all households and 79.6% of households in the labour force.



The cable penetration rate increases substantially and consistently with income in all the labour force categories considered here. Between the lowest and highest income quartiles the penetration rate rises from 49.5% to 71.4% for the self-employed (a 44% increase), from 58% to 81% for the unemployed (a 39.7% increase), from 66.6% to 86% for those out of the labour force (a 29% increase) and from 64.9% to 82.8% for the employed (a 27.6% increase). Some 40% of unemployed household heads and 48.7% of households with heads out of the labour force are in the lowest income quartile.



The difference in cable penetration rates by residential location is most striking, and is not related to income. Cable subscribers are 80.2% of households in urban areas but only 34.5% of households in rural areas (Table 2-95). Between the lowest and highest income quartiles, the penetration rises from 70% to 87.4% in urban areas, but from only 32.9% to 38.5% in rural areas. Even in the bottom half of the lowest quartile, the urban penetration rate is 67.4% while the rural rate is 33.5%. The big difference between urban and rural areas does not have as big an effect on the overall penetration rate as might be expected, since about one in seven (14.9%) of all households live in rural areas (Table 2.N-95). The low rural penetration rate for all households could result if there is a different distribution of income in rural areas than in urban areas, and if rural areas are less likely to be wired for cable. Heritage Canada, using a different data set, reports that 4.6% of all Canadian households (including those in the Yukon and Northwest Territories), are not wired for cable in 1994 (*Canadian Cable television: Industry Overview, 1994*, based on data from *Cable Television, 1994*, Statistics Canada, 56-205). It also reports that the penetration rate in areas wired for cable is 3.4 percentage points higher than the overall penetration rate in all Canada.

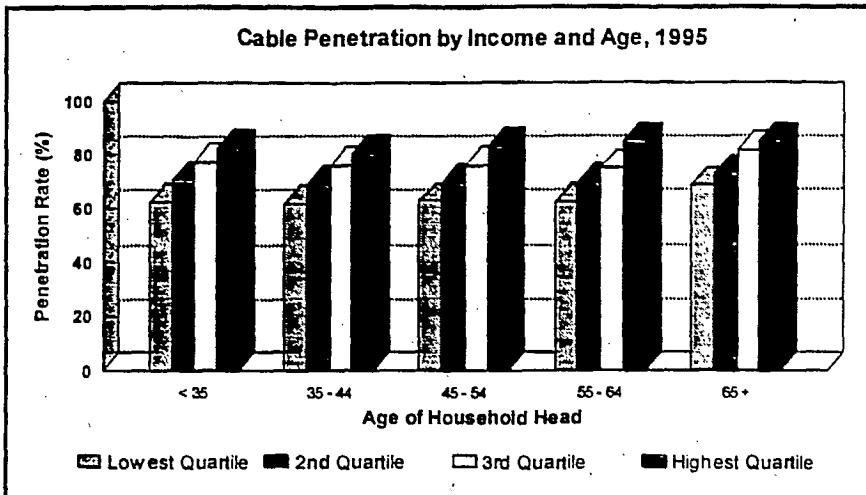






There is little variability in the cable penetration rate by age of the household head, from a low of 72.4% among households with heads under 35 years to a high of 75.6% among households with heads aged 45 to 54 (Table 3-95). The penetration rate within each age group rises with income, but, with one exception, the minimal difference between age groups in each income quartile indicates that age is not a significant factor.

That exception is households headed by people aged at least 65, who have the highest penetration rate in all income quartiles. Even in the bottom half of the lowest income quartile, this age group has a penetration rate of 68.7% while the next-highest is 60.8% and the lowest is 58.8%. Therefore there is a relationship between retirement age and cable penetration rates, which will become an increasingly important relationship as the baby boom enters retirement.

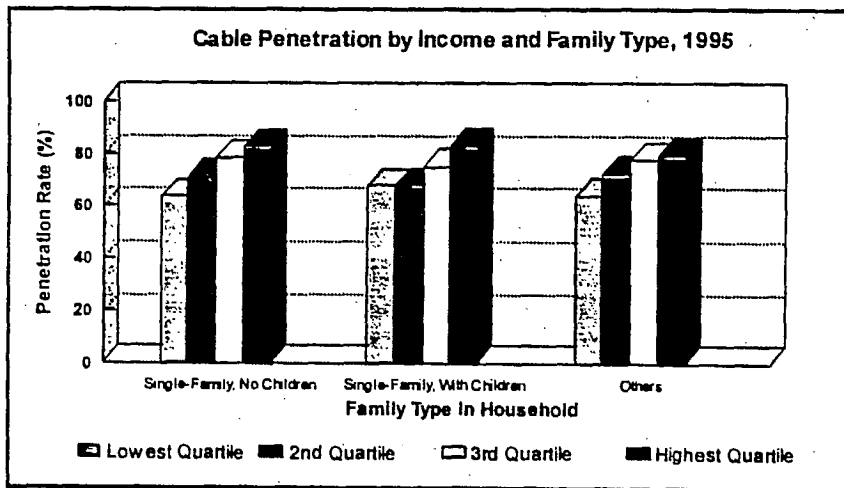


The relationship between retirement age and the penetration rate partly counteracts the relationship between income and the penetration rate, since 44.9% of senior householders are in the lowest income quartile, and are 35.4% of that quartile. In the top income quartile, the highest penetration rate is among householders aged at least 55 (84.6%), who are 32.7% of all households, but only 5.2% of households in this quartile.



There is less than one percentage point difference between the cable penetration rates of single-family households with unmarried children under age 18 (74.8%), and single-family households without such children (75.5%). Single-family households with and without children are 33.2% and 37%, respectively, of all households.

The presence of children does seem to counter the effect of low income to some extent. In the lowest income quartile, the penetration rate for single-family households with children actually exceeds that for single-family households without children (67.5% versus 63.3%). In the second quartile the penetration rate of single-family households without children rises from 63.3% to 70.8%, but that of single-family households with children remains unchanged at 67.5%. By the highest income quartile, the difference has all but disappeared (82.6% versus 82.4%).



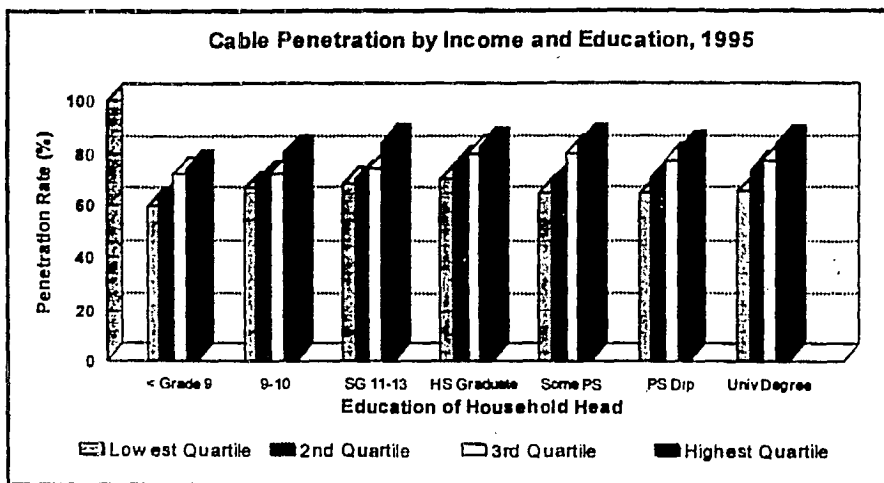
About thirty percent (29.8%) of households are **not single-family households**. The cable penetration rate for these households (69.3%) is lower than for single-family households (75.2%). Even in the highest income quartile their penetration rate (79.2%) is less than that for single-family households with children (82.6%) and without children (82.4%), so there is some relationship between penetration rates and family type. However, these other households are only 7.8% of all households in the top income quartile.

Earlier work shows that multi-family households have little effect on the overall penetration rate, since they are only 4.8% of all households and have a cable penetration rate (75%) close to the national rate (73.4%). One-person households, however, have a cable penetration rate of only 68.2% and account for one-quarter (24.9%) of all households.



There is a significant difference in cable penetration rates between households with the lowest and the highest levels of **education of the household head**. The rate for those with less than grade 9 is 63.7%, rising to 78.4% for those with a university degree. There are significant differences between these education groups in all income quartiles, indicating that differences in income can not fully explain the difference in cable penetration rates between the lowest and highest levels of education.

The biggest jump in the cable penetration rate is from 63.7% for household heads with less than grade 9, to 70.6% for those with grade 9 to 10. A similar jump is seen within all income quartiles. After grade 10 there are some differences by education, but there is no consistent relationship between education and penetration rate in any quartile. Households headed by high school graduates with no other education have the highest penetration rates in the first three quartiles, but not in the fourth. Also



in the first three quartiles, householders with grades 9 to 13 have higher penetration rates than householders with further education after high school.

Householders with less than grade 9 have the lowest penetration rate in all income quartiles, and even in the highest quartile their penetration rate (74.4%) is almost six percentage points less than that of householders with grade 9 to 10 (80.3%). If there is a major effect of education on cable penetration rates that is not related to income, it appears to be between households with less than grade 9 and other households. The only obvious reason why this could be so is if a high proportion of those with less than grade 9 live in rural areas not served by cable. There are no data to test this hypothesis.



The highest provincial cable penetration rates are in British Columbia (85.4%), one of the 'richer' provinces, and Newfoundland (81.9%), one of the 'poorer' provinces (Table 6-95). Two more are above the national average penetration rate (73.4%) - Ontario (78.2%), one of the 'richer' provinces, and Nova Scotia (75.5%). There are four more provinces in which at least two-thirds of households subscribe to cable - Alberta (70.6%), the third of the three

'richest' provinces, New Brunswick (69.3%), P.E.I. (68.4%) and Manitoba (66.9%). Last come Quebec (64.2%) and Saskatchewan (58.8%).

The cable penetration rate is positively related to income within each province. Newfoundland moves from fourth-highest in the bottom income quartile (67.7%) to highest in the top quartile (96.6%). British Columbia moves from the highest in the bottom quartile (81%) to second-highest in the top quartile (90.8%). Saskatchewan is second-lowest in the bottom quartile (52.1%) and lowest in the top quartile (70.5%). In Ontario the penetration rate rises from 74.1% in the bottom quartile to 83% in the top quartile, while the rate in Quebec increases from 51.7% to 78%.

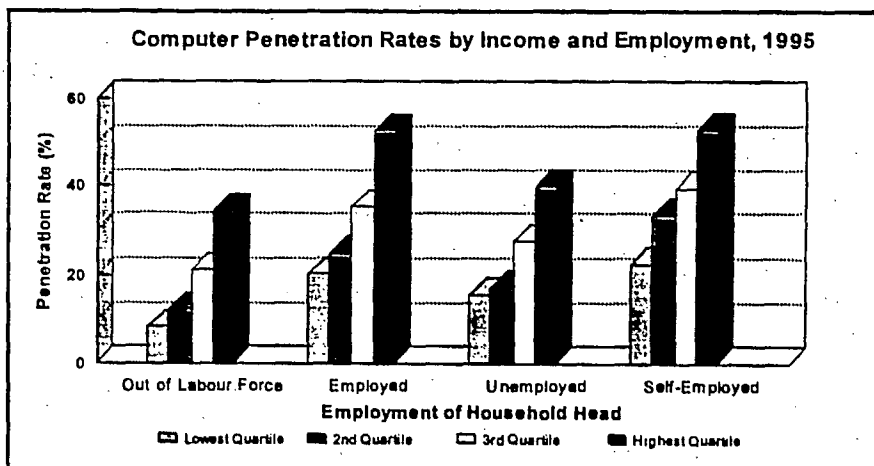
Differences in income may account for some of the difference in penetration rates across provinces, but certainly not for all of it. Even in the highest income quartile, where affordability should not be an issue, differences between provinces remain quite high. For example, the cable penetration rate in the highest quartile is 96.6% in Newfoundland (one of the 'poorer' provinces) but only 76.8% in Alberta (one of the 'richer' provinces). Also in the highest quartile, the penetration rate in Nova Scotia (87.8%) is higher than in Ontario (83%), and the rates in P.E.I. (78.8%), Nova Scotia (87.7%), New Brunswick (80.8%) and Quebec (78%) are higher than the rate in Alberta (76.8%). These differences can not be explained by average incomes. Some differences among provincial penetration rates may be explained by differences in the proportion of households passed by cable - perhaps reflected by differences in the urban/rural distributions.

**E: COMPUTER PENETRATION RATES**

In 1995, 28.8% of all households have a computer in the home. Many more have access to a computer at work, but this aspect is not investigated here. The presence of a computer in the home is clearly related to household income, although the low overall penetration rate indicates that factors other than income must be working to hold the rate down. The penetration rate is 12.3% in the lowest income quartile and rises to 20.2% in the second quartile, 32.5% in the third quartile and 50.2% in the highest quartile (Table 1-95).



The computer penetration rate is higher for householders in the labour force (36.1%) than for householders outside the labour force (13.3%). This is not solely a function of income, since the 48.7% of households with heads outside the labour force in the lowest income quartile have a penetration rate of only 8.2%, while the 13.8% of households with heads in the labour force who are in the lowest quartile have a penetration rate of 19.2%. The difference exists in the highest income quartile too, where the computer penetration rate is 34.4% for householders outside the labour force, but 52% for those in the labour force.

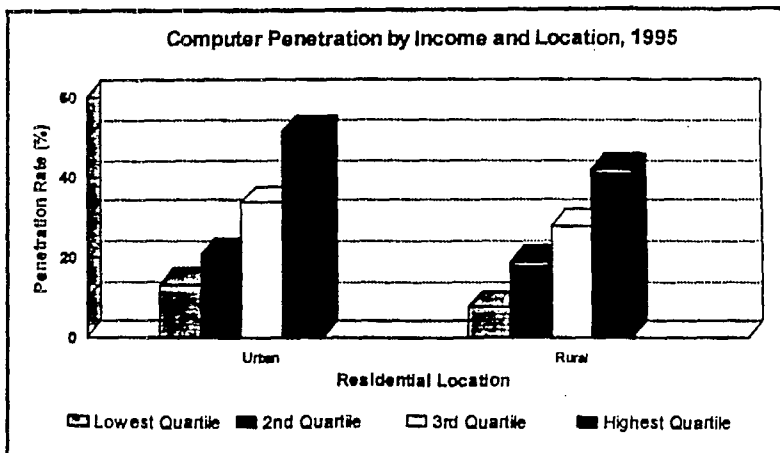


Within the labour force there is little difference in penetration rates between the employed (37.7%) and the self-employed (38.1%), but the rate for the unemployed is lower (21%). Some 41.4% of the unemployed heads are in the lowest income quartile, where their penetration rate is only 15.6%.

Penetration increases with income, but the differences and similarities persist. Between the lowest and highest income quartiles, the penetration rate rises from 8.2% to 34.4% for those outside the labour force, from 15.6% to 39.7% for the unemployed, from 20.3% to 52.4% for the employed, and from 22.5% to 52.6% for the self-employed.



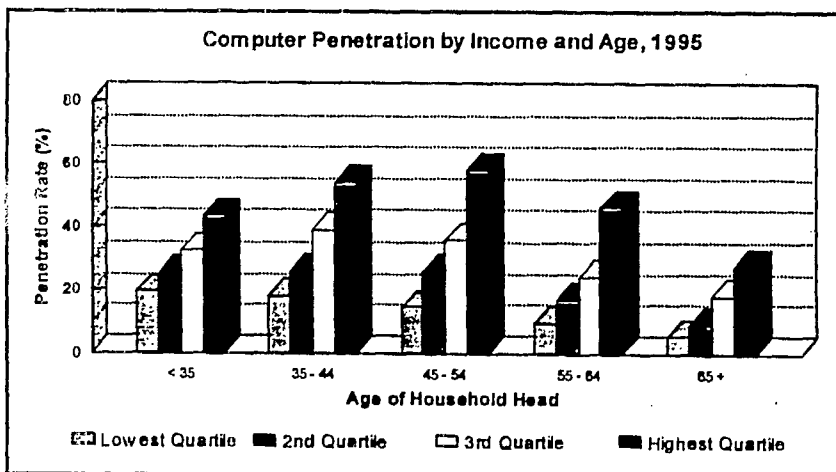
The computer penetration rate differs by residential location, and the difference persists throughout the income distribution. In urban areas 30% of households have computers, compared with 22.1% in rural areas (Table 2-95). In the lowest quartile the penetration rate is 13.2% in urban areas and 7.4% in rural areas, rising to 51.2% and 41.5% respectively in the highest income quartile. Obviously these differences can not be explained by income.



Computer penetration rates first fall as the age of the householder increases, then rise, then fall again. The penetration rate for households with the age of head 65 years or more is particularly low (10.1%), which helps to explain the difference in computer penetration rates between householders in and out of the labour force (Table 3-95). Householders aged 55 to 64 have the second-lowest penetration rate (24.4%), followed by those aged under 35 (29.2%). The penetration rates are quite similar for householders aged 35 to 44 (37.8%), and 45 to 54 (39.8%).

The penetration rate will increase automatically as the baby boom ages and moves into retirement. Householders aged 55 and over, who have the lowest penetration rates, will be replaced by members of the baby boom who have grown accustomed to computers.

Penetration rates rise with income for all age groups, but the differences persist. Between the lowest and highest income quartiles, the penetration rate rises from 5.2% to 27.5% for householders aged 65 and over, from 9.5% to 46% for those aged 55 to 64, and from 19.4% to 43.3% for those aged under 35. Also, the similarity between those aged 35 to 44 and those aged 45 to 54 persists: between the highest and

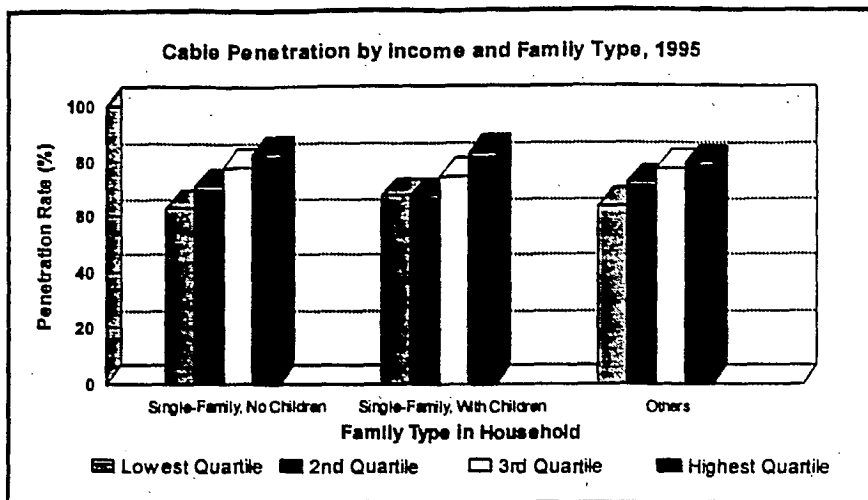


lowest quartiles, the penetration rate increases from 18% to 53.8% for householders aged 35 to 44, and from 14.4% to 57.9% for householders aged 45 to 54. Consequently, there are relationships between age and penetration rates that can not be explained by relationships between age and income.



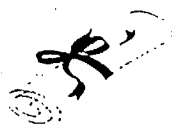
Differences by age are also a likely explanation for differences in computer penetration rates by **family type** (Table 4-95). Single-family households have a much higher penetration rate (33.9%) than other households (16.8%).

Earlier work showed that one-person households are more than 80% of other households, and 24.9% of all households. Households headed by seniors are 19.7% of all households, and single seniors are a large proportion of all senior families. Consequently, the 10.1% computer penetration rate among households headed by someone aged at least 65 could explain much of the low 16.8% computer penetration rate among other households.



Among single-family households, the presence of unmarried children under age 18 has a big effect on computer penetration rates. The rate for single-family households with these children is 40.4%, compared with only 28% of single-family households without these children.

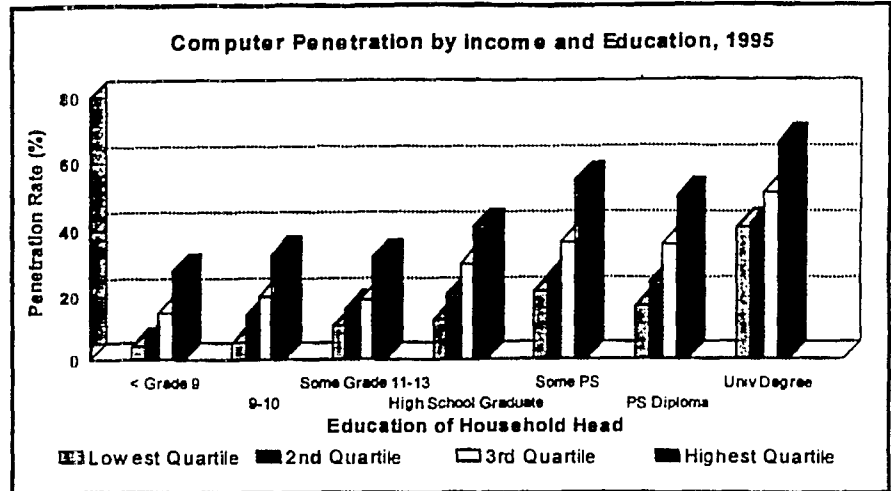
The differences in computer penetration rates persist as income rises. Between the lowest and highest income quartiles, the penetration rate rises from 16.1% to 51.3% for single-family households, but from 9.9% to 39.9% for other households (mainly one-person households). The penetration rate rises from 18% to 58% for single-family households with unmarried children under 18, and from 14.4% to 44.8% for single-family households without such children. Although income has an important effect on the computer penetration rate, therefore, the presence of children also has an important effect independent of income.



There is a strong relationship between computer penetration rates and the **education of the household head**. The penetration rate increases from 9.1% for householders with less than grade 9, to 14.9% for those with grade 9 or 10, through 26.1% for high school graduates with no other education, to 33.3% for those with a post-secondary certificate or diploma and 55.6% for those with a university degree.

With minor exceptions, the differences persist as incomes increase. Between the lowest and highest income quartiles, the computer penetration rate rises from 4.5% to 27.8% for householders with less than grade 9, from 12.1% to 40.9% for high-school graduates with no post-secondary education, from 16.3% to 49.9% for those with a post-secondary certificate or diploma, and from 40.7% to 65.8% for those with a university degree.

Some of the relationship between education and computer penetration rates can be explained by the income distribution - for example, only 10% of households in which the head has less than grade 9 are in the highest income quartile, compared with 23.6% of high-school graduates with no post-secondary education, and 48.2% of householders with a university degree (Table 5.N-95). Nevertheless, there are differences by education in every quartile, so education must have an effect that is independent of income.



Among provinces, the computer penetration rate exceeds the national rate only in Alberta (34.1%), British Columbia (32.8%) and Ontario (32.5%) - the three 'richer' provinces. The three lowest penetration rates are in P.E.I. (16.2%), Newfoundland (19.4%) and New Brunswick (19.9%). The penetration rates are quite similar among other provinces - 22.4% in Nova Scotia, 23.5% in Quebec and Saskatchewan, and 24.7% in Manitoba.

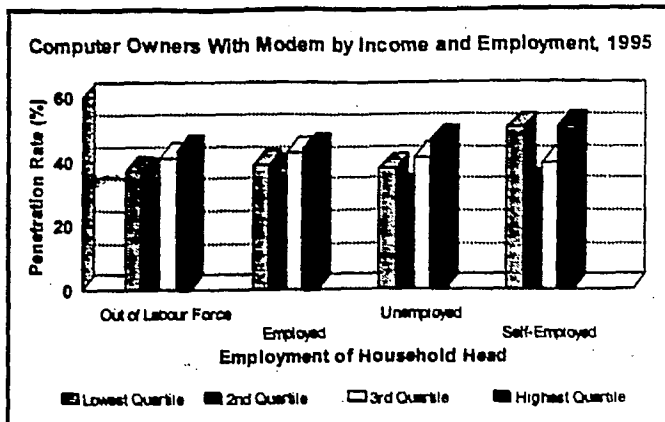
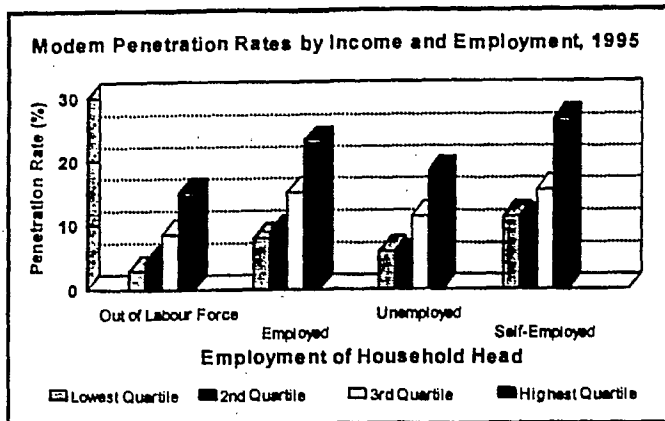
The computer penetration rate rises markedly with income in every province. The penetration rates in the lowest quartile are less than 10% in five provinces, and range from 10.8% to 16.3% in the other five. In the highest quartile the penetration rates exceed 50% in the three 'richer' provinces - 52% in Ontario, 52.4% in British Columbia and 54.7% in Alberta. Among all other provinces the differences are quite small in the highest quartile, from a low of 41% in New Brunswick to a high of 45.8% in Quebec.

## F: MODEM PENETRATION RATES

The modem penetration rate is 12% of all households, and 41.8% of households with computers. The relationship between income and modem penetration rates among households with computers is much weaker than the relationship between income and computer penetration rates. Indeed, this modem penetration rate first falls from 39% in the lowest quartile to 36.2% in the second quartile, then rises with income to reach 44.7% in the highest quartile. Because of the strong relationship between income and computer penetration rates, however, the modem penetration rate for all households, with and without computers, rises consistently with income, from 4.8% in the lowest quartile to 22.4% in the highest quartile.



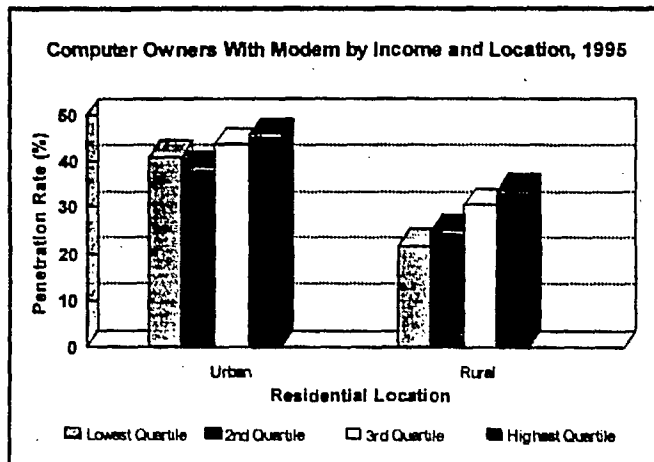
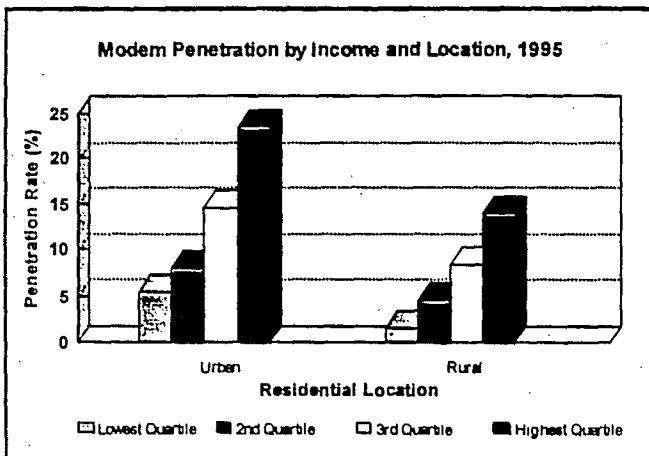
Following the same pattern as computer penetration rates by labour force status of the head, modem penetration is only 5.2% of all householders outside the labour force, but 15.3% of those in the labour force (Table 1-95). Among those with computers, however, modem penetration is 39.1% of those outside the labour force and 42.3% of those in the labour force (Table 8-95).



Similarly, 8.2% of all households with unemployed heads have a modem, but 38.8% of the unemployed with a computer also have a modem. There is little difference in modem penetration rates between the employed and self-employed (16% and 16.4% respectively), and between the employed and self-employed with a computer (42.5% and 42.9%).

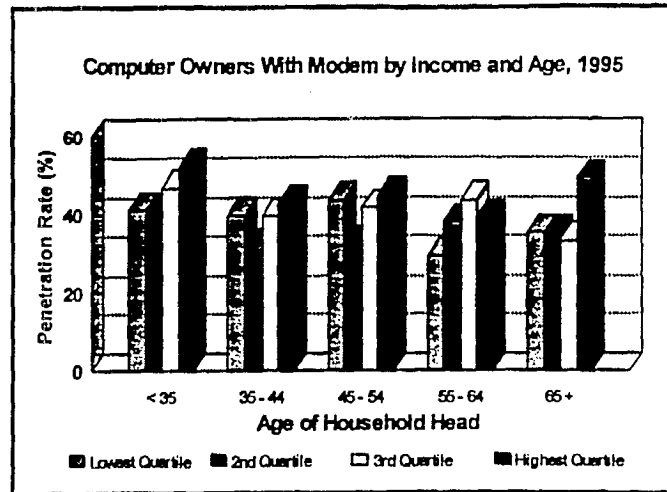
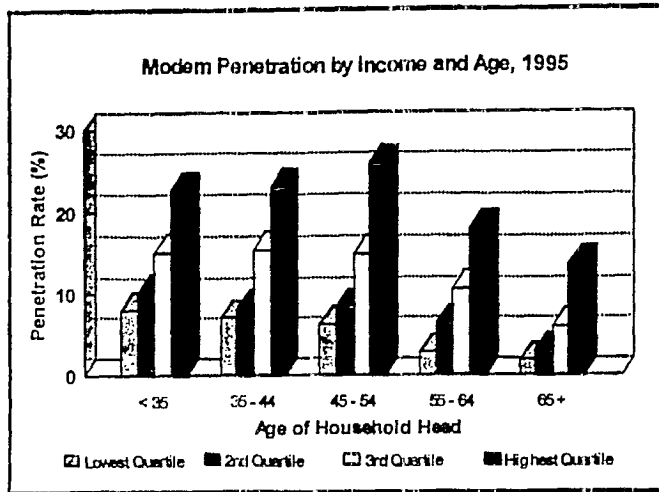


The modem penetration rate by residential location is significantly different between urban and rural households with a computer (43.5% and 29.2%). This reinforces the locational difference in the computer penetration rate, so that 13.3% of all urban households have a modem but only 6.5% of all rural households (Tables 2-95 and 8-95). Even among computer owners in the highest income quartile, 45.8% of urban households have a modem but only 33.5% of rural households. It is possible that the difference is due to the cost of long-distance calls from rural areas when using the modem to access the Internet, but without additional data this is only an hypothesis.



The pattern of modem penetration rates by age of household head is broadly similar to that of computer penetration rates (Table 3-95), but there are some significant features. The modem penetration rate for households with computers (Table 8-95) is lowest among householders aged 65 and over (37.9%) and aged 55 to 64 (38.9%), which reinforces their

low computer penetration rates (10.1% and 24.2%) so that only 3.8% of all senior householders have a modem, and 9.5% of all householders aged 55 to 64.

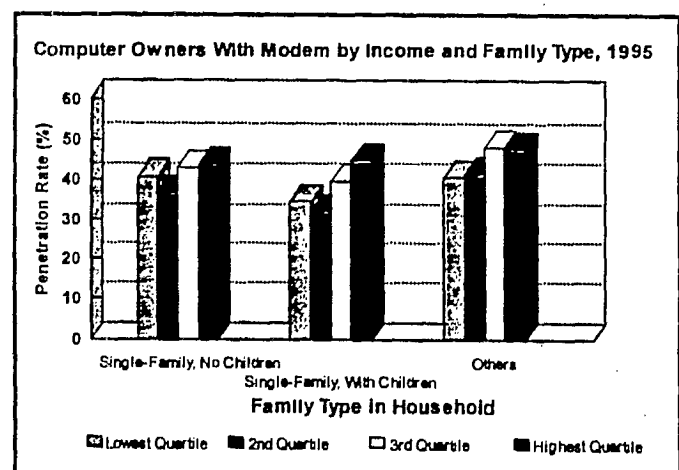
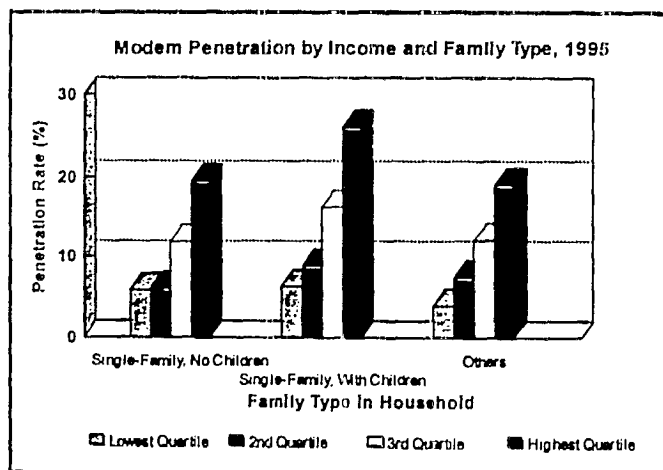


Conversely, the modem penetration rate among computer owners is highest for householders aged under 35 (46%), which reduces the difference between this age group's overall modem penetration rate (13.4%) and that of householders aged 45 to 54 (16.9%). The latter group has the highest modem penetration rate because it has the highest computer penetration rate (29.8%), and the second-highest modem penetration rate among computer owners (42.3%).

Householders aged 35 to 44 have the second highest modem penetration rate (15.1%), since 37.8% are computer owners and 39.9% of computer owners have a modem. Only 9.5% of householders aged 55 to 64 have a modem, since 38.9% of computer owners have a modem but only 24.4% own a computer.



Across different family types, there are not substantial differences in modem penetration rates among households with computers: 41.4% of single-family households with computers have a modem, and 44.1% of other households (one-person plus multi-family households). Among single-family households with computers, the modem penetration rate is 42.2% for those without children and 40.7% for those with children.



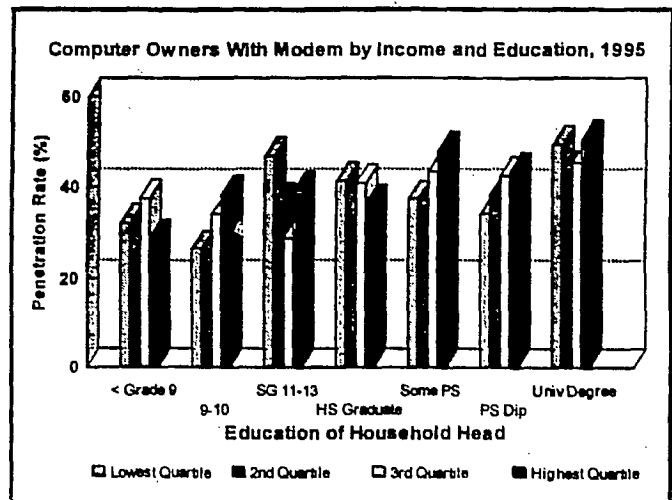
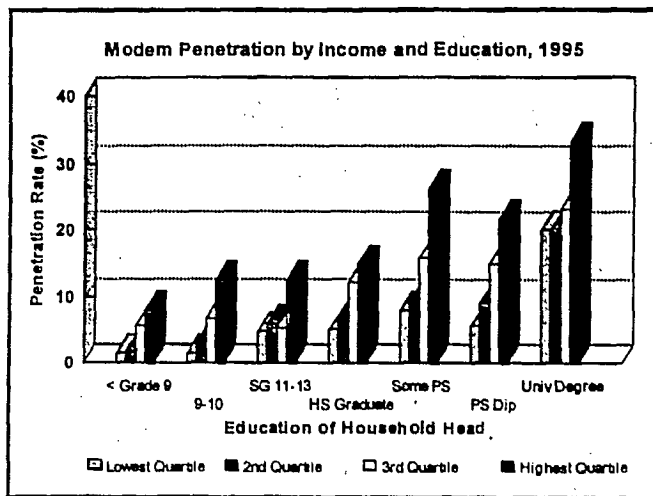


Because there are quite small differences in the modem penetration rates among households with computers, the modem penetration rate for all households, with and without computers, follows the same pattern as computer penetration rates, although the modem penetration rates are much lower (Table 4-95). The modem penetration rate is 14% for all single-family households, but only 7.4% for all other households. Among single-family households with computers, there is little difference in the modem penetration rates between those with unmarried children under age 18 (40.7%) and those without (42.2%). Because of the difference in computer penetration rates, therefore, the modem penetration rate among all single-family households with such children (16.5%) is higher than among those without (11.8%).



Modem penetration rates by **education of the household head** have the same pattern among all households as computer penetration rates (Table 5-95), but again the modem penetration rates are lower because not all computer owners have a modem (Table 8-95).

The modem penetration rate for households with computers rises with education, from 30.6% of householders with less than Grade 9 to 48.5% of those with a university degree. Among all households, with and without computers, the modem penetration rate is 2.8% for those with less than Grade 9, rising to 13.8% for those with a post-secondary certificate or diploma, then jumping to 27% for those with a university degree.

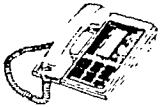


The provincial modem penetration for households with computers is below the national rate (41.8%) in Newfoundland (36.3%), Nova Scotia (40.8%), Quebec (35.6%), Manitoba (36%) and Saskatchewan (32.9%). The rate is higher than the national rate in P.E.I. (49.7%), New Brunswick (44.3%), Ontario (44.8%), Alberta (45.9%) and British Columbia (42.8%).

Among all households, with and without computers, the modem penetration rate is very low in every province, as is the national rate (12%). Even in Alberta, the province with the highest computer penetration rate (34.1%) and the second-highest modem penetration rate for households with computers (45.9%), only 15.7% of all households have a modem. At the other extreme, only 7% of all households in Newfoundland have a modem.

## G: A CLOSER LOOK AT QUEBEC

Quebec has a little more than a quarter (26.1%) of all households, of which 30.5% are in the lowest income quartile, 26.4% are in the second quartile, 24% are in the third quartile, and 19.2% are in the highest income quartile. Quebec households make up 31.8% of all households in the lowest income quartile, 27.5% of the second quartile, 25% of the third quartile, and 20% of the highest quartile.



Quebec's telephone penetration rate is 98.9%, which not only is higher than the national rate of 98.5% but also is the highest rate of any province. Quebec has the highest penetration rate in all four income quartiles, rising from 97% in the lowest quartile to 99.6% in the second quartile, 99.7% in the third quartile (along with Nova Scotia, Manitoba and Saskatchewan), and 100% in the highest quartile (along with P.E.I. and Saskatchewan).



Quebec's cable penetration rate of 64.2% is lower than the 73.4% rate nationally, and is the second-lowest of all provinces (after Saskatchewan). The most noticeable difference is in the lowest income quartile, which contains 30.5% of Quebec households. Here the national cable penetration rate is 64.4%, but Quebec has the lowest of all provinces, at 51.7%. Quebec's penetration rate rises to 62.3% in the second quartile, which is lower than the 70.3% national rate and higher only than the 56.4% in Saskatchewan.

In the third quartile Quebec's 71.1% penetration rate is lower than the 76.7% national rate, and lower than the rates in all other provinces except Saskatchewan (61.1%) and P.E.I. (66.2%). It is quite close to the rates in New Brunswick (71.2%), Manitoba (72%) and Alberta (73.6%), but significantly lower than in Ontario (79.3%), British Columbia (86.4%) and Newfoundland (91.1%). In the highest quartile Quebec's 78% penetration rate is below the 82.2% national rate, but higher than the penetration rates in P.E.I. and the three prairie provinces. However, Quebec's penetration rate in this quartile is only slightly less than Ontario's (83%).



Quebec's computer penetration rate of 23.5% is lower than the 28.8% national penetration rate. It is higher than the rates in all provinces east of Quebec, but lower than the rates in all provinces west of Quebec except Saskatchewan, which has the same penetration rate as Quebec.

Quebec's computer penetration rate is lower than the national rate in all four income quartiles. The provincial and national rates are 10.8% and 12.3% respectively in the lowest income quartile, 18.1% and 20.2% in the second quartile, 27.9% and 32.5% in the third quartile, and 45.8% and 50.2% in the highest income quartile.



Quebec's modem penetration rate is 8.4% of all households, compared to the national rate of 12%. Among only those households with computers, Quebec's modem penetration rate is 35.6% while the national rate is 41.8%.

Among all households, Quebec's modem penetration rate of 8.4% is higher than those of Newfoundland (7%) and Saskatchewan (7.7%). It is quite close to that in all other provinces except Ontario (14.5%), Alberta (15.7%) and British Columbia (14%). Among households with computers, Quebec's modem penetration rate of 35.6% is higher only than the 32.9% rate in Saskatchewan, and the rate is over 40% in all other provinces except Manitoba and Newfoundland.

Quebec's modem penetration rate remains below the national rate all across the income distribution. As a percentage of all households in each quartile, the penetration rates in Quebec and nationally are 4.1% and

4.8%, respectively, in the lowest quartile, 5.5% and 7.3% in the second quartile, 10.5% and 13.6% in the third quartile, and 16.5% and 22.4% in the highest income quartile.

As a percentage of households with computers, the Quebec and national penetration rates are 38.1% and 39%, respectively, in the lowest income quartile, 30.3% and 36.2% in the second quartile, 37.5% and 42% in the third quartile, and 36.1% and 44.7% in the highest quartile. Given that the differences persist in all quartiles and actually increase in the top two quartiles, income alone can not be the explanatory factor.

## IV: CHANGE IN PENETRATION RATES OVER TIME

### A: INTRODUCTION

This section examines the changes in penetration rates for telephone, cable television and computers over the nine years between 1986 and 1995. Because of data limitations, changes in modem penetration rates are between 1994 and 1995.

Change in penetration rates do not tell the whole story, since the number of households increased over time. Even if penetration rates had remained constant, the number of households with each medium would have increased. This aspect too is examined.

### B: NUMBER OF HOUSEHOLDS

The number of households increased by 10.8% between 1986 and 1991, and by another 7.4% between 1991 and 1995, for an overall increase of 19% between 1986 and 1995 (Table 1.A). Most recently, the number of households increased by 1.5% between 1993 and 1994, and by 1.7% between 1994 and 1995, for a 3.3% increase over the two-year period (Table 7.1.N).



The telephone penetration rate increased very little, from 98.1% in 1986 to 98.5% in 1995 (Table 1.A). Because the total number of households increased, however, the number with telephones actually increased by 19.5% between 1986 and 1995, with an increase of 10.6% between 1986 and 1991, and another 8% between 1991 and 1995. Consequently, the increase between 1986 and 1995 in the number of households with telephones (19.5%) was slightly more than the increase in the total number of households (19%).

Most recently, the number of households with a telephone increased by 1.6% between 1993 and 1994, and by 1.3% between 1994 and 1995, for an increase of 2.8% over two years.



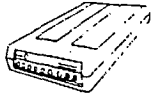
The cable penetration rate increased from 65.4% in 1986, to 70.8% in 1991, and 73.4% in 1995. Combining the 12.3% increase in the penetration rate and the 19% increase in households, the number of households with cable increased by more than one-third (33.6%) between 1986 and 1995. The penetration rate was also boosted because more areas were wired for cable. On the basis of other data, Heritage Canada concluded that the increase in the cable penetration rate between 1988 and 1994 was largely due to new subscribers in areas recently cabled. (*Canadian Cable Television: Industry Overview, 1994, September 1995*)

Most recently, the cable penetration rate increased by 2.3% between 1993 and 1994, then fell by 1.2% between 1994 and 1995, for a 1.1% increase over the two years. With the increase in total households, however, the number of households with cable increased by 3.9% between 1993 and 1994, and by 0.5% between 1994 and 1995, for a 4.4% increase between 1993 and 1995.



The computer penetration rate increased from 10.3% in 1986, to 18.5% in 1991, and 28.8% in 1995. Combining the 179.2% increase in the penetration rate with the 19% increase in households, the number of households with computers increased by 232.2% between 1986 and 1995.

Most recently, the computer penetration rate increased by 7.6% between 1993 and 1994 and by another 24% between 1994 and 1995, for a 15.3% increase over the two years. Combined with the increase in total households, the number of households with a computer increased by 9.2% between 1993 and 1994, and by 17.3% between 1994 and 1995, for an increase of 28.1% over two years.



The earliest data on modems are for 1994. Modem penetration rates increased from 8.4% in 1994 to 12% in 1995 - an increase of 43.1% in one year. The number of households with a modem increased by 45.6% in the same year.

### C: EMPLOYMENT OF HOUSEHOLD HEAD

The 19% increase in households between 1986 and 1995 consisted of a 38.7% increase in households with heads out of the labour force, a 30.6% increase in those with unemployed heads, a 9.3% increase in households with employed heads, and a 14% increase in those with self-employed heads (Table 1.A).

Because the number of households in each category increased at different rates, the distribution of households changed too. The proportion of households with heads out of the labour force increased from 27.6% of all households in 1986, through 29.7% in 1991, to 32.2% in 1995. The proportion with heads in the labour force fell from 72.4% in 1986, to 67.8% in 1995. Most of the reduction in the share of households in the labour force was caused by a reduction in the proportion with employed heads, from 58.8% of all households in 1986 to 54% in 1995. Households with unemployed heads actually increased, from 6% of all households in 1986 to 6.6% in 1995. Self-employed householders fell from 7.6% in 1986 to 7.2% in 1995.



Telephone penetration rates increased marginally for all household categories. Between 1986 and 1995 the overall penetration rate increased from 98.1% to 98.5%, with an increase from 97% to 97.5% for heads out of the labour force, from 94.2% to 95.7% for unemployed heads, from 98.9% to 99.2% for employed heads, and from 98.8% to 99.3% for self-employed heads (Table 1.A).

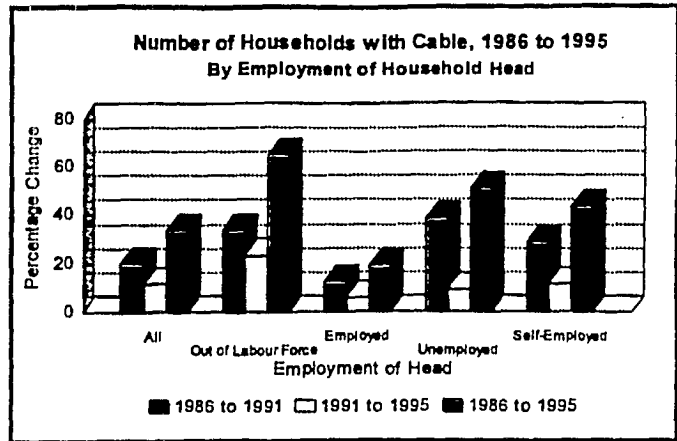
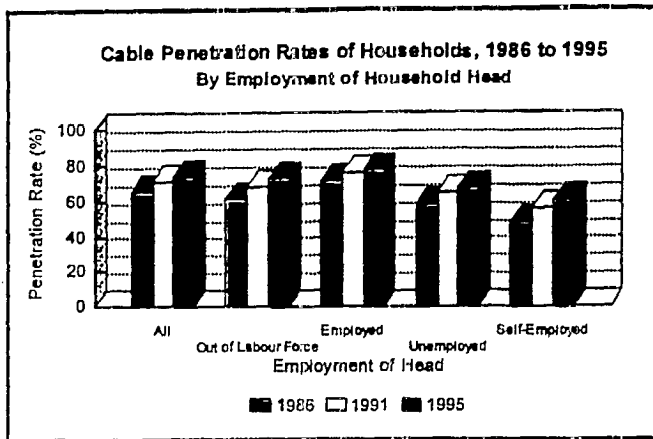
Although penetration rates changed little, there were significant increases in the numbers of households with a telephone. Between 1986 and 1995 the number with a telephone increased by 39.9% for households with heads outside the labour force, by 32.7% for households with unemployed heads, by 14% for those with self-employed heads, and by 9.5% for those with employed heads.



Increases in cable penetration rates were significantly higher between 1986 and 1991 than between 1991 and 1995, and differences among the employment groups fell between 1986 and 1995. Households with self-employed heads have the biggest increase in the penetration rate, from 47% in 1986 to 59.7% in 1995, but the smallest rate in both years.

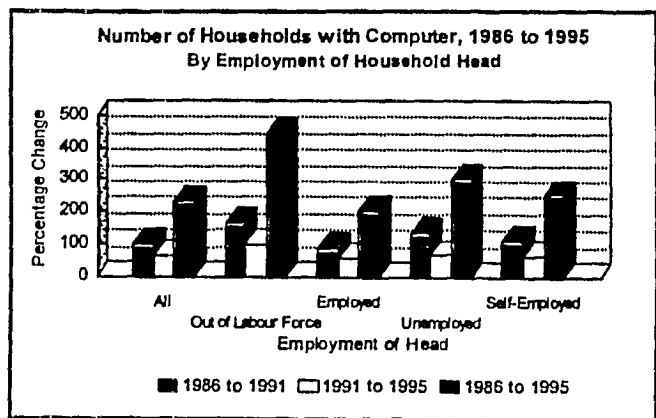
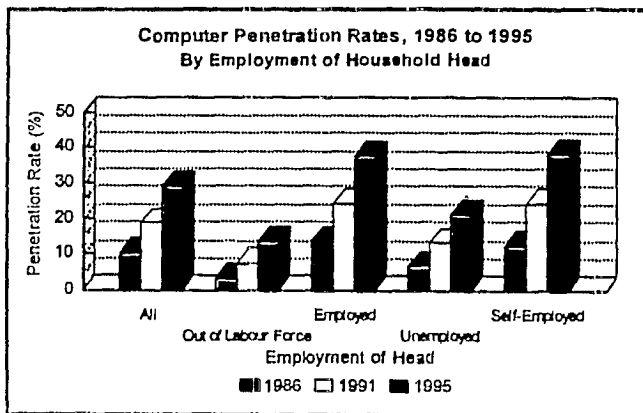
The second-largest increase is for households with heads out of the labour force (from 60.3% to 71.9%), followed by those with unemployed heads (from 57.4% to 66.4%). The smallest increase, from 70.9% in 1986 to 77% in 1995, is for households with employed heads, who nevertheless have the highest penetration rate in both years.

Combining higher penetration rates with the growth in households between 1986 and 1995, the number of households with cable increased by 65.3% for households with heads out of the labour force, by 50.9% for those with unemployed heads, by 44% for households with self-employed heads, and by 18.7% for those with unemployed heads.



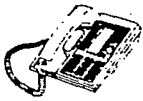
The 179.2% increase in the computer penetration rate, from 10.3% in 1986 to 28.8% in 1995, was caused by a substantial and continued increases in the penetration rates for all family types. The penetration rate for households with heads out of the labour force quadrupled (from 3.4% to 13.1%), and more than tripled for households with unemployed heads (from 6.8% to 21%) and self-employed heads (from 12.2% to 38.1%). The computer penetration rate for households with employed heads increased from 13.7% in 1986, through 24.2% in 1991, to 37.7% in 1995.

Combining the higher penetration rates with growth in the numbers of households between 1986 and 1995, the number of households with computers increased by 444.1% for heads out of the labour force, by 303.7% for unemployed heads, by 252.7% for self-employed heads, and by 201.6% for employed heads.



**D: RESIDENTIAL LOCATION**

Between 1986 and 1995, the number of urban households increased by 20.3% and the number of rural households increased by 12.2% (Table 2.A). Urban households fell from 84.2% of all households in 1986, to 83.6% in 1991, and then rose again to 85.1% in 1995. Rural households increased from 15.8% of all households in 1986, to 16.4% in 1991, and then fell to 14.9% in 1995.



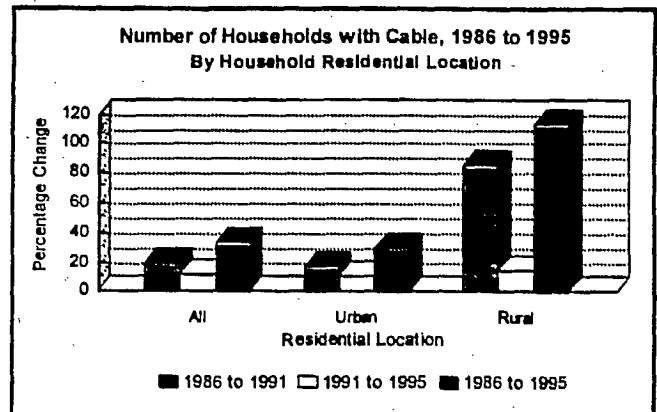
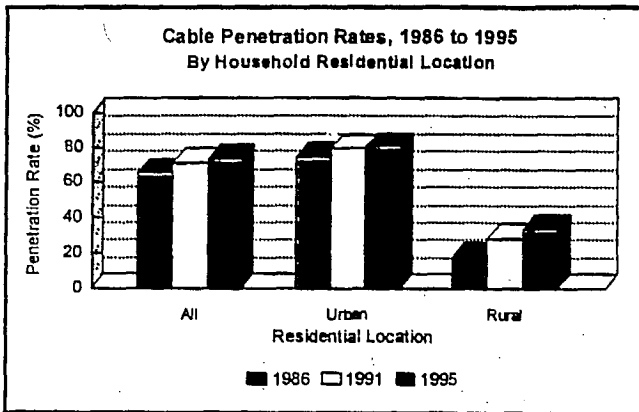
Telephone penetration rates in 1986 were higher in cities (98.3%) than in rural areas (97.1%), but by 1995 there was the same penetration rate (98.5%) in each location (Table 2.A).

Despite the marginal change in penetration rates between 1986 and 1995, the increase in total numbers of households caused a 20.6% increase in the number of urban households with a telephone and a 13.9% increase in the number of rural households with a telephone.



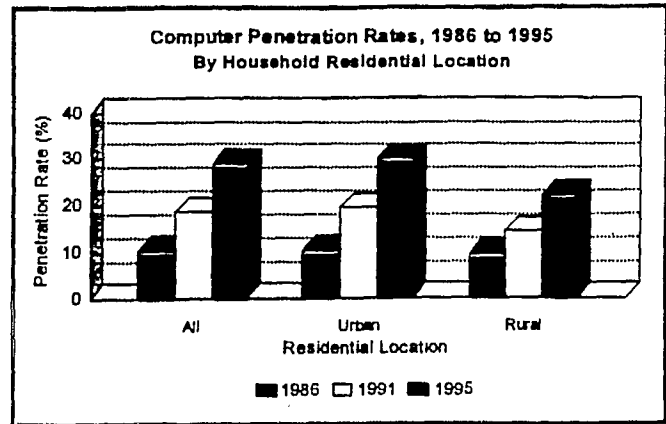
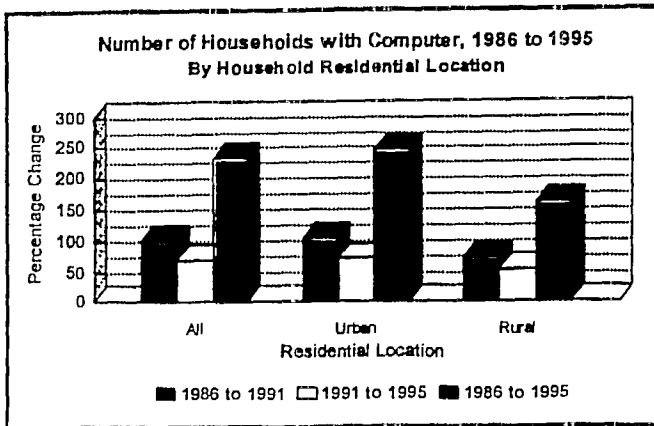
In both urban and rural areas, cable penetration rates increased significantly more between 1986 and 1991 than between 1991 and 1995. In urban areas the penetration rate increased from 74.2% in 1986, through 79% in 1991, to 80.2% in 1995. In rural areas it increased from 18.1% in 1986, through 29.2% in 1991, to 34.5% in 1995.

In urban areas, an 8.1% increase in the penetration rate combined with a 20.3% increase in the number of households caused the number of households with cable to increase by 30% between 1986 and 1995. There was an increase of 17% in the first five years, and another 11.1% in the last four. In rural areas, the combination of a 90.2% increase in the cable penetration rate and a 12.2% increase in households caused the number of households with cable to more than double between 1986 and 1995. The 113.3% increase over the whole period consisted of an 85.6% increase in the first five years, and a further 14.9% increase in the last four.



The computer penetration rate increased from 10.3% in 1986 to 28.8% in 1995, with large increases in both urban and rural areas. The urban penetration rate increased from 10.4% in 1986, through 19.4% in 1991, to 30% in 1995. The rural penetration rate increased from 9.6% in 1986, through 14.3% in 1991, to 22.1% in 1995.

The number of urban households with computers increased by 245% between 1986 and 1995, and the number of rural households with computers increased by 158.6%.



**E: AGE OF HOUSEHOLD HEAD**

The number of households with heads aged under 35 actually fell by 4.3% between 1986 and 1995. The number with heads aged 55 to 64 increased by 7.5%, and there were much bigger increases of between 31% and 46% for householders in other age groups (Table 3.A). During these nine years, the number of households with heads aged at least 65 increased by almost one-third (32.2%).

Households with heads under age 35 are still the largest proportion of all households, though they fell from 31.4% in 1986 to 25.2% in 1995. Households with heads aged 35 to 44 are a close second, having increased from 21.4% of all households in 1986 to 23.7% in 1995. Households with heads aged at least 65 continue to have the third-highest share, rising from 17.7% in 1986 to 19.7% in 1995. The share of households with heads aged 45 to 54 increased from 15% in 1986 to 18.4% in 1995, while the share with heads aged 55 to 64 fell from 14.4% to 13%.



Between 1986 and 1995, the telephone penetration rate hardly changed for households with heads under age 35 (from 97.2% to 97%), and was unchanged (at 98.7%) for householders aged 35 to 44. The change in the overall telephone penetration rate, from 98.1% to 98.5%, is attributable to the increases in penetration rates among householders aged 45 and over. The penetration rate increased from 98.6% in 1986 to 99.1% in 1995 for householders aged 45 to 54, and from 98.5% to 99.1% for those aged 55 to 64. Householders aged at least 65 had the second-lowest telephone penetration rate in 1986 (98.2%), but the highest (99.3%) in 1995.

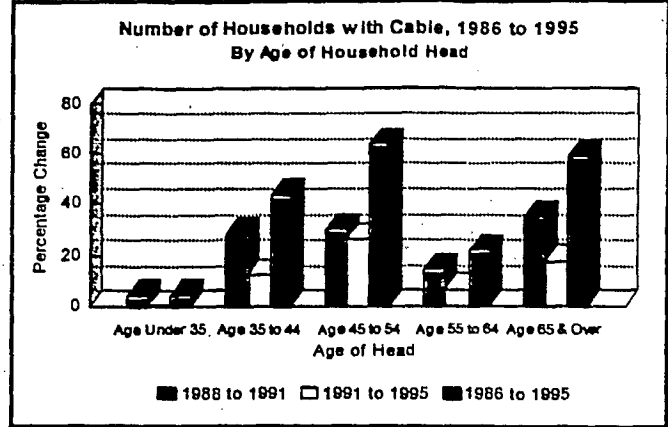
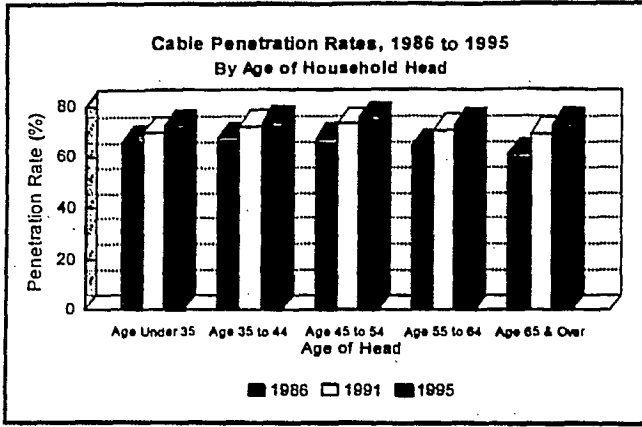
Because there have been very small changes in telephone penetration rates in all age groups, changes in the number of households dominate changes in the number of households with a telephone. For example, between 1986 and 1995, the number with a telephone fell by 4.6% in the youngest age group (under 35), but increased by 33.7% in the oldest age group (65 years and over).



Cable penetration rates have increased for all age groups, and differences between age groups have fallen somewhat. The overall penetration rate increased from 65.4% in 1986 to 73.4% in 1995. In 1986, households with heads aged 65 and over had the lowest penetration rate (60.7%), and those with heads aged 35 to 44 had the highest (67.4%). By 1995, householders under age 35 have the lowest penetration rate (72.4%), and those aged 45 to 54 have the highest (75.6%).

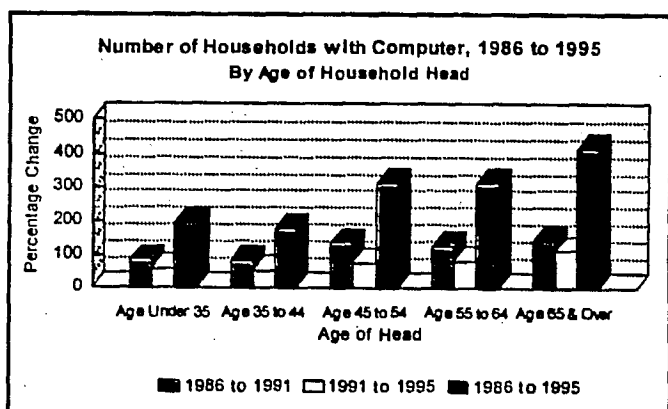
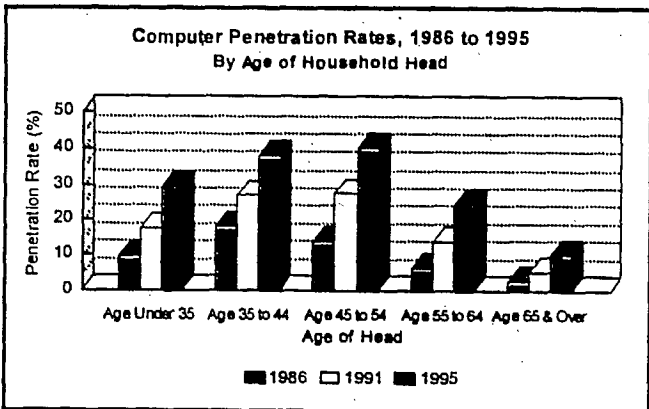


The increase in the cable penetration rate between 1986 and 1995 more than compensated for the falling number of households with heads under age 35, so the number of these households with cable actually increased by 4.5%. For all other age groups, the increase in penetration rates reinforced the increase in numbers of households. The number with cable increased by 21.7% for householders aged 55 to 64, by 43.4% for those aged 35 to 44, by 58.9% for those aged 65 or more, and by 63.9% for householders aged 45 to 54.



For all groups except ages 35 to 44, the computer penetration rate increased by more than the overall increase of 179.2% (from 10.3% in 1986 to 28.8% in 1995). Computer penetration rates for householders under age 35 increased from 9.5% in 1986 to 29.2% in 1995, from 18% to 37.8% for householders aged 35 to 44, from 13.9% to 39.5% for those aged 45 to 54, from 6.4% to 24.4% for those aged 55 to 64, and from 2.6% to 10.1% for householders aged 65 and over.

There was a dramatic rise in the number of households with computers in all age groups, but particularly in older age groups. The smallest increase in the number with a computer was 176% for householders aged 35 to 44, and the largest was 414.6% for those aged at least 65. The increase was more than 300% for householders aged 45 to 54, and aged 55 to 64.



**F: FAMILY TYPE**

Between 1986 and 1995 the number of single-family households increased by 14.1%, and the number of other households (mainly one-person households) increased by 32.4%. The number of single-family households without unmarried children under age 18 increased by 21%, while the number with children increased by only 7.3% (Table 4.A).

Because of the different rates of growth, single-family households fell from 73.3% of all households in 1986, to 70.9% in 1991, and to 70.2% by 1995. Conversely, other households increased from 26.7% of all households in 1985, to 29.1% in 1991, and 29.8% by 1995. Single-family households with unmarried children under age 18 fell from 36.8% of all households in 1986, to 33.2% in 1995, while those without children increased from 36.4% of all households in 1986, to 37% in 1995.

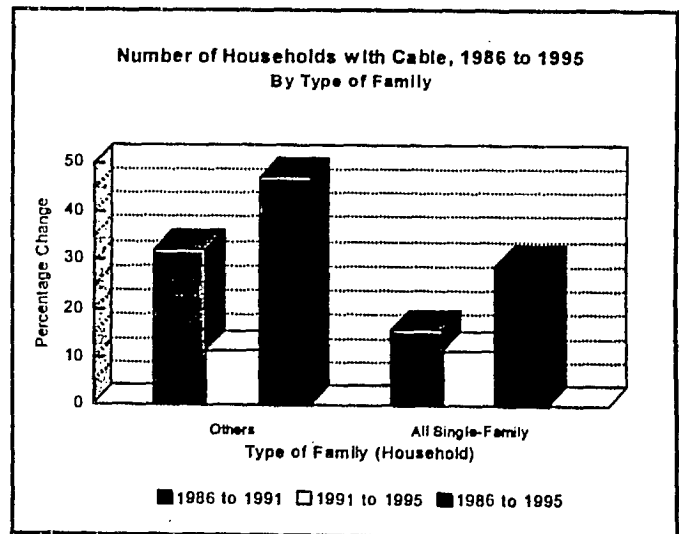
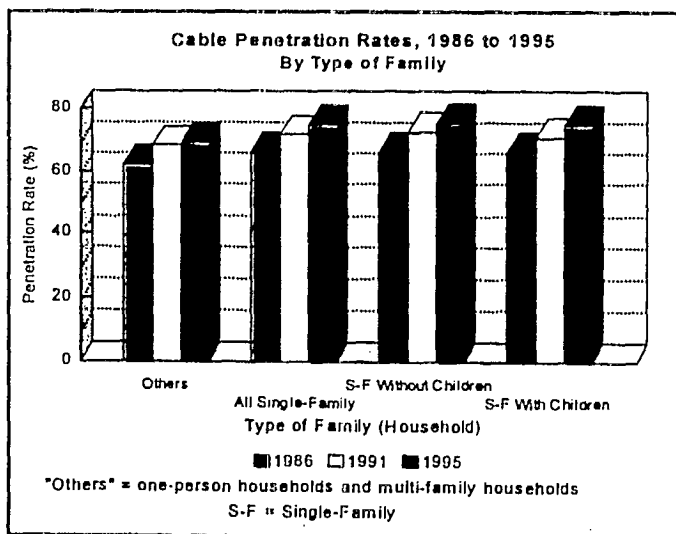


The penetration rate for single-family households increased from 98.9% in 1986 to 99.1% in 1995, and the rate for other households increased from 96.1% to 97.1%. The penetration rate for single-family households with unmarried children under age 18 hardly increased at all, from 98.6% in 1986 to 98.7% in 1995, while the rate for those without such children increased from 99.1% to 99.5%. These small increases are not surprising given that penetration rates were very high even in 1986.

Changes in the number and distribution of households over time have caused more visible changes in the numbers of families with telephones. There were 19.5% more households with telephones in 1995 than in 1986, with 14.4% more single-family households and 33.8% more other households (one-person plus multi-family households). The number of single-family households with a telephone increased by 21.5% for those without unmarried children under age 18, but by only 7.5% for those with such children.



For all family types, the increases in cable penetration rates between 1986 and 1995 were similar to the 12.3% national increase (from 65.4% to 73.4%). The penetration rate for single-family households increased from 66.5% in 1986 to 69.3% in 1995, with little difference between the increase for those with and those without unmarried children under age 18. The penetration rate for other households increased from 62.5% in 1986 to 69.3% in 1995.

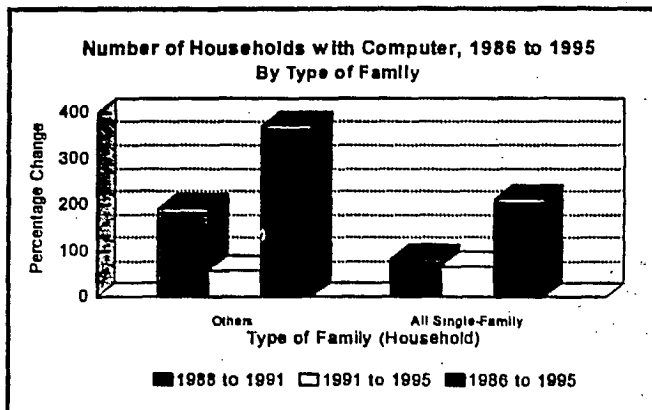
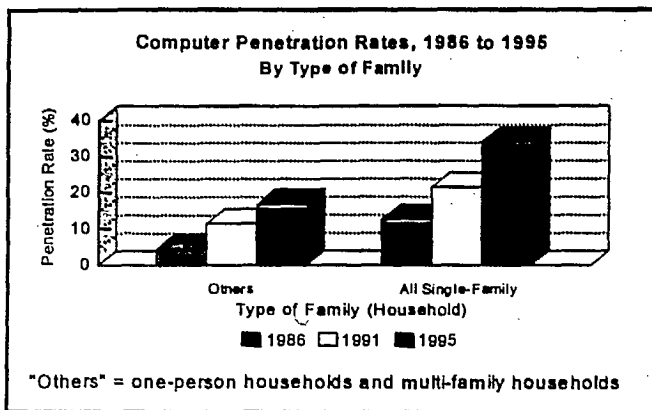


The increase in number of households reinforced the increases in cable penetration rates, but introduced more variability by family type. The total number with cable increased by 33.6%, with a 29.1% increase in single-family households with cable and a 47% increase in other households with cable. The number of single-family households with cable increased by 20.9% for those with unmarried children under age 18, and by 37.3% for those without such children.



The computer penetration rate for single-family households increased from 12.4% in 1986, through 21.4% in 1991, to 33.9% in 1995. The penetration rate increased from 7% in 1986 to 28% in 1995 for single-family households without unmarried children under age 18, and from 17.7% to 40.4% for families with such children. For other households, the penetration rate increased from 4.7% in 1986 to 16.8% in 1995.

The types of families with the lower computer penetration rates in 1986 had the bigger increases in penetration rates, and in the total number of households. By 1995 the number of single-family households with a computer had increased by 213%, but the number of other households with a computer increased by 370.6%. The number of single-family households with a computer increased by 384.9% for those without unmarried children under age 18, but by only 145.7% for those with such children.



**G: EDUCATION OF HOUSEHOLD HEAD**

Although the number of households increased by 19% between 1986 and 1995, the number with heads educated to no higher than grade 13 actually fell. There was a 20.8% reduction in those with less than grade 9, a 7.1% reduction in those with grades 9 to 10, and a 3.5% reduction in those with grades 11 to 13 and no post-secondary education. Householders with some post-secondary education but no certificate or diploma increased by 4%, those with a certificate or diploma increased by 173.2%, and those with a university degree increased by 34.4%.

Reflecting the change in numbers, the share of households in which the head had no post-secondary education fell while the share with post-secondary education increased. Specifically, the share of households in which the head had less than grade 9 fell from 22.2% of all households in 1986, to 14.8% in 1995, those with grade 9 or 10 fell from 15.1% to 11.8%, and those with grade 11 to 13 fell from 28.9% to 23.4%. Although householders with some post-secondary education but no certificate or diploma increased by 4%, their share of all households actually fell from 8.5% in 1986 to 7.4% in 1995. Householders with a post-secondary

certificate or diploma increased from 12% of all households in 1986 to 27.5% in 1995, while those with a university degree increased from 13.4% to 15.1%.



Although there is a relationship in 1995 between the level of penetration rates and the education of the household head, there is no apparent relationship between education and changes in penetration rates from 1986 to 1995. At one extreme, the penetration rate among householders with less than grade 9 increased from 97.1% in 1986 to 97.7% in 1995. At the other extreme, the penetration rate for householders with a university degree remained unchanged at 99.7%, and actually fell from 99.2% to 99.1% for householders with a post-secondary certificate or diploma.

The telephone penetration rate for all but the lowest education category actually fell a little between 1986 and 1991, before increasing again between 1991 and 1995. The reductions could be related to changes in income during the recession, or the one-tenth to one-fifth of a percentage point fall simply may not be statistically significant.

The total number of households increased by 10.8% between 1986 and 1991, but the number with less than grade 9 fell by 20.3% (from 22.2% of all households in 1986 to 14.8% in 1991). During the same period their telephone penetration rate increased from 97.1% to 97.6%. At the other extreme the number of households headed by someone with a post-secondary certificate or diploma increased by 123%, while their penetration rate fell from 99.2% to 98.6%. Similarly, the number of householders with a university degree increased by 12.8% between 1986 and 1991, while their telephone penetration rate fell from 99.7% to 99.1%. Households whose heads have grade 11 to 13 do not fit into this pattern, however, since their penetration rate fell (from 98.2% to 97.6%) and though their number also fell (by 2.9%), as did their share of all households (from 28.9% in 1986 to 25.4% in 1991).

Over the whole period from 1986 to 1995, the small changes in telephone penetration rates hide much larger changes in the numbers of households with telephones in every education category. Despite a 19% increase in total households, the 20.8% fall in householders with less than grade 9 caused a 20.3% fall in the number of these households with a telephone. For the next two education categories (grades 9 to 10 and grades 11 to 13), smaller reductions in numbers (7.1% and 3.5%) gave smaller reductions in their numbers with a telephone (6.6% and 3.4%).

At higher education levels the number of households increased, as did their number with a telephone. The number of householders with some post-secondary education but no certificate or diploma increased by 4%, and their number with a telephone increased by 3.4%. Householders with a post-secondary certificate or diploma increased by 173.2%, and their number with a telephone increased by 172.9%. Householders with a university degree increased by 34.4%, as did their number with a telephone.

In short, changes in the number and distribution of households by education has had a far greater impact on telephone usage than has changes in the penetration rates.

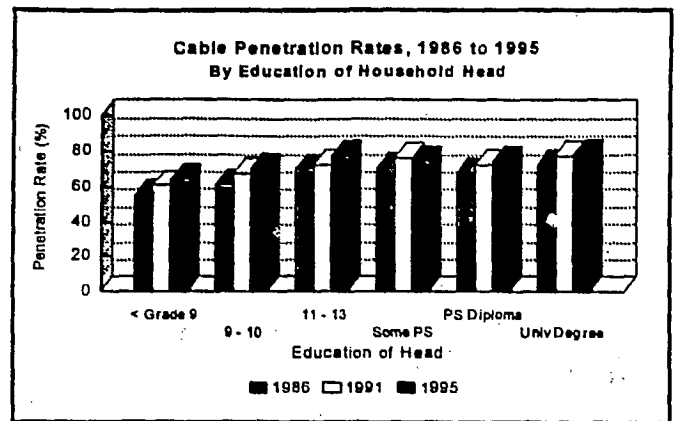
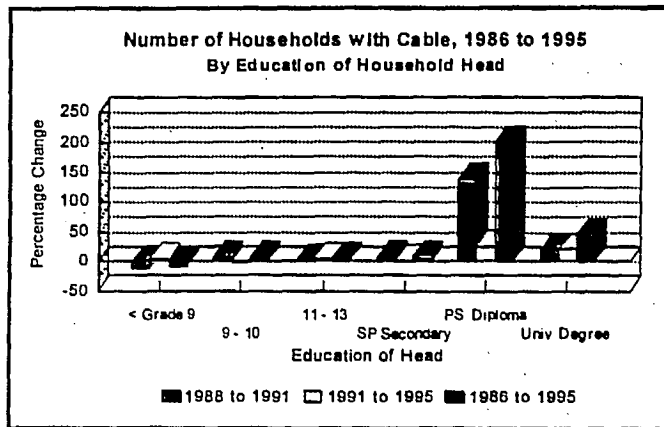


Although there are some noticeable differences between increases in cable penetration rates by education group, there is relatively little variability around the overall 12.3% increase between 1986 and 1995. Furthermore, the changes do not show an obvious pattern by education, and increases in penetration rates slowed in the latter part of the period (from 1991 to 1995) for all but one category (grade 11 to 13).

Over the whole period, the biggest increase in cable penetration rates was at the lowest levels of education: the penetration rate increased from 55% in 1986 to 63.7% in 1995 for householders with less than grade 9, and from 61.2% to 70.6% for those with grades 9 to 10. The next-largest increase, however, was for householders with a post-secondary certificate or diploma: their penetration rate increased from 67.4% in 1986 to 74.4% in 1995.

The cable penetration rate increased by 12.3% between 1986 and 1995, but the number of households with cable increased by 33.6%. The number with cable and less than grade 9 actually fell by 8.3%, despite the fact that their penetration rate increased from 55% in 1986 to 63.7% in 1995. For the next two education groups (grade 9 to 10 and grade 11 to 13), the increase in penetration rates more than compensated for the decline in numbers of households, so that the number with cable increased (by 7.1% and 5.3% respectively).

In the higher education groups, increases in number of households reinforced the increases in cable penetration rates. Most significantly, the number of householders with cable and a post-secondary certificate or diploma increased by 201.6% even though their penetration rate increased only from 67.4% in 1986 to 74.4% in 1995. The number of householders with a university degree and cable increased by 45.5%, while their penetration rate increased by 8.2% (from 72.5% to 78.4%).



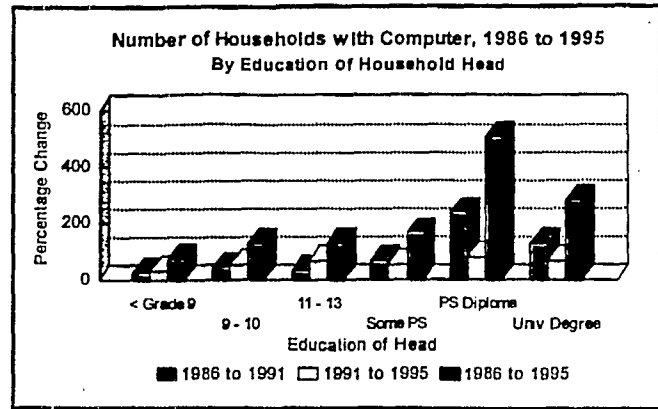
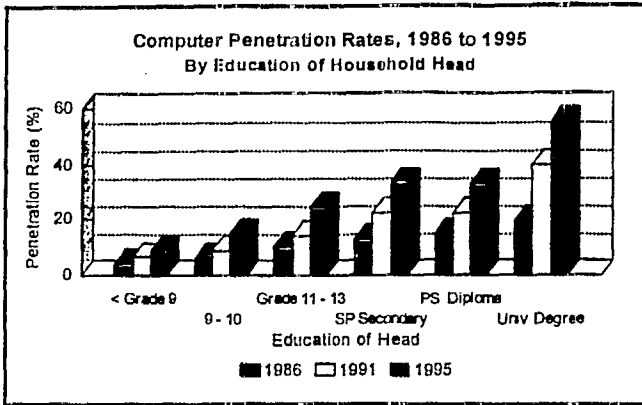
The computer penetration rate nearly tripled between 1986 and 1995 (from 10.3% to 28.8%). At the extremes of the education continuum, the increase for householders with less than grade 9, from 4.1% to 9.1%, was significantly less than the increase for householders with a university degree, from 19.6% to 55.6%.

Between the extremes, there is no consistent relationship between education and changes in the penetration rates between 1986 and 1995. Penetration rates rose from 6.1% to 14.9% for householders with grade 9 or 10, from 10.2% to 24.6% for those with grade 11 to 13, from 13.2% to 33.6% for those with some post-secondary education but no certificate or diploma, and from 14.9% to 33.3% for those with a post-secondary certificate or diploma.

The number of households with computers increased by 232.3% between 1986 and 1995, and the biggest increases were for householders with the highest levels of education: householders with a post-secondary certificate or diploma and a computer increased by 509.3%, and those with a university degree and a computer increased by 280.6%. The number of householders with some post-secondary education increased by only 4%,

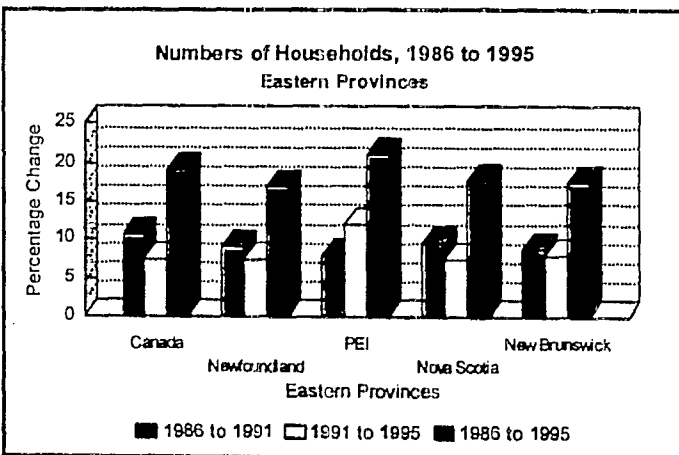
but their number with a computer increased by 164.9%. Again, changes in the number of households reinforced changes in the penetration rate at these levels of education.

At lower levels of education, changes in penetration rates more than compensated for reductions in the number of households. The number of householders with less than grade 9 fell by 20.8% but those with a computer increased by 74%. Those with grade 9 to 10 and grade 11 to 13 had smaller even bigger increases in their numbers with a computer (127.4% and 128.5% respectively), partly because of smaller reductions in the number of households (7.1% and 3.5%).



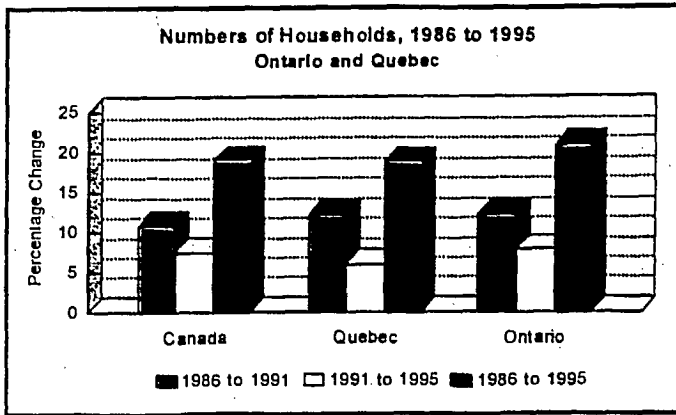
**H: CHANGES BY PROVINCE**

There was little change in the distribution of households by province in the nine years from 1986 to 1995 (Table 6.A). In 1986 roughly 8% of households lived east of Quebec, falling to 7.8% in 1991 and 1995. Quebec's share of all households increased from 26.2% in 1986 to 26.5% in 1991, then fell to 26.1% by 1995. Ontario households increased from 36.3% of all households in 1986 to 36.8% in 1995, while the prairie provinces fell from 17.6% in 1986, to 16.5% in 1991, and 16.1% in 1995. British Columbia's share increased from 12% in 1986, to 12.3% in 1991, and 13% in 1995.



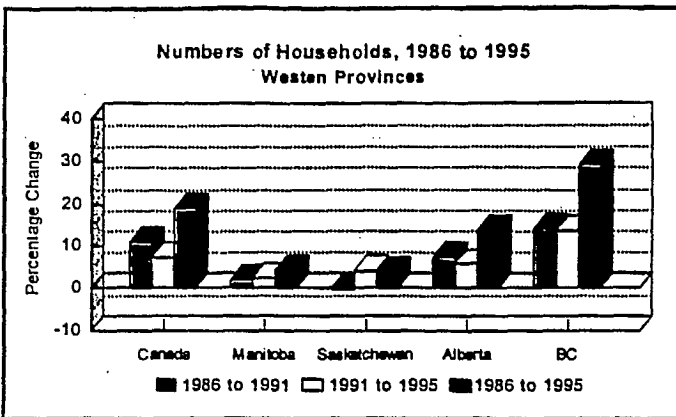
The change in numbers of households was far more noticeable than the change in distribution, and the number increased in all provinces between 1986 and 1995. East of Quebec, the increases of between 16.9% and 17.8% were slightly less than the 19% national increase, except for an increase of 21% in P.E.I..

The 18.7% increase in Quebec households between 1986 and 1995 was almost equal to the 19% national rate of increase, while the rate of increase



was 20.8% in Ontario. Only Ontario, P.E.I. and British Columbia had a rate of increase higher than the national rate.

The smallest rates of increase in the number of households between 1986 and 1995 were in Manitoba (4.8%) and Saskatchewan (3.8%). The number of households in Alberta increased by 13.6%, while British Columbia had by far the highest rate of increase in number of households (29.4%).



Most recently, in the one year between 1994 and 1995 (Table 7.1.N), the provincial rate of increase in the number of households exceeded the national rate (1.7%) in six provinces - British Columbia (4.7%), P.E.I. (4.5%), Nova Scotia (4.1%), New Brunswick (4%), Alberta (2.2%) and Quebec (1.9%). The number of households increased, but at less than the national rate, in another three provinces - Newfoundland (1.5%), Ontario (0.6%) and Saskatchewan (0.5%). Only in Manitoba did the number of households actually decline (by 1.2%).



The national telephone penetration rate increased from 98.1% in 1986 to 98.5% in 1995, but all provincial penetration rates are so high that the minor differences in their rates of increase are unremarkable.

Because there was little change in penetration rates, changes in the number of households with a telephone generally followed the distribution of change in the number of households by province. For example, in the three biggest provinces containing three-quarters of all households, the increase in number of households with a telephone almost exactly reflected the increase in numbers of households: in Ontario the number of households increased by 20.8% and the number of households with a telephone increased by 20.7%, in British Columbia these increases were 29.4% and 29.5% respectively, and in Quebec they were 18.7% and 22.2%.

Most recently, in the twelve months between 1994 and 1995 (Table 7.1.N), the number of households with a telephone increased at more than the national rate (1.3%) in British Columbia (3.8%), P.E.I. (3.4%), New Brunswick (3.3%), Nova Scotia (2.5%), Quebec (2.1%) and Alberta (1.7%). The percentage increase in Newfoundland (1.5%) was a little less than the national rate, while the numbers with a telephone actually fell in Ontario (-0.1%), Saskatchewan (-0.3%) and Manitoba (-1.5%).

The one year between 1994 and 1995 is too short for the changes to be regarded as a trend. Over the two years between 1993 and 1995, the number of households with a telephone increased by 2.8% nationally and

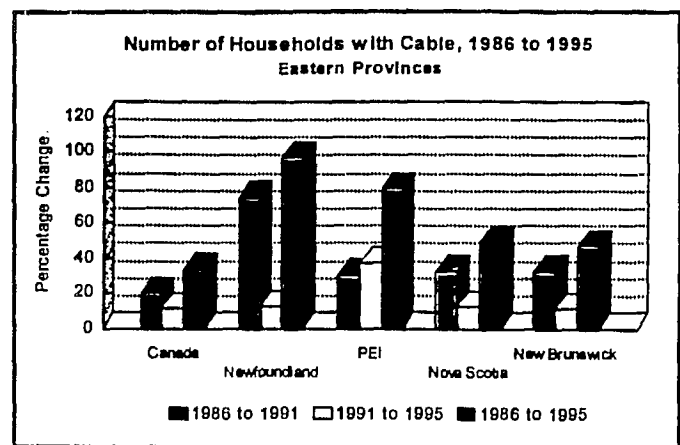
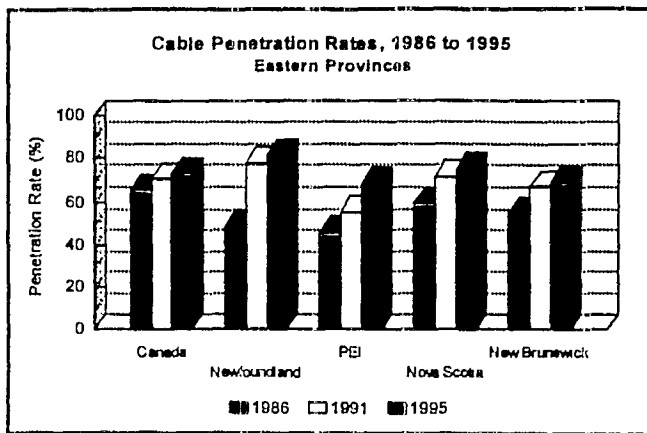
increased in all provinces except Newfoundland. Even in Newfoundland, the small reduction over two years is the net effect of a reduction from 1993 to 1994 but a subsequent increase from 1994 to 1995.



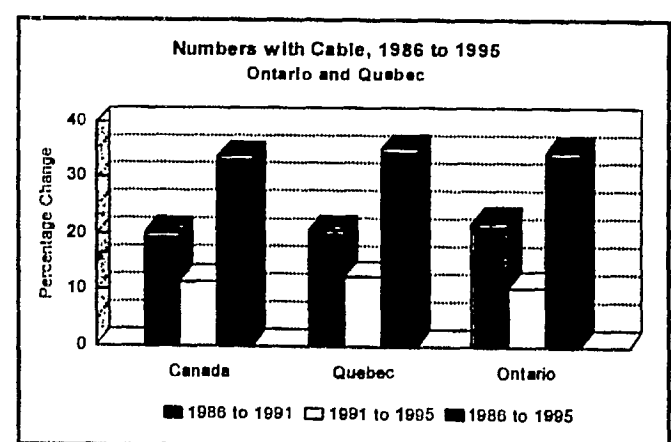
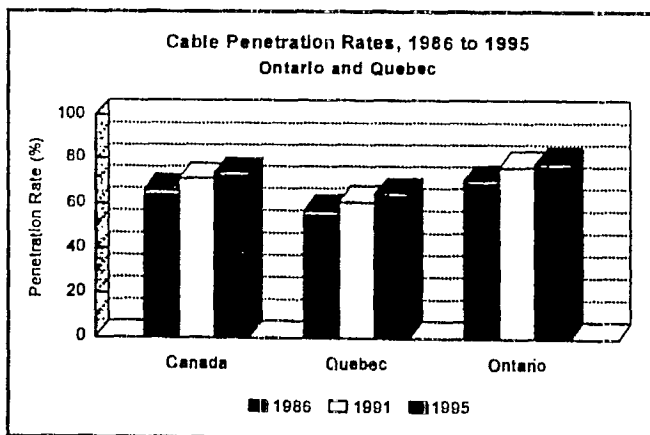
The national cable penetration rate increased by 12.3% between 1986 and 1995, from 65.4% to 73.4% (Table 6.A). Provinces east of Quebec had the lowest cable penetration rates in 1986, but the biggest increases between 1986 and 1995. In particular, Newfoundland's cable penetration rate increased from 48.6% in 1986 to 81.9% in 1995.

The penetration rate in P.E.I. increased from 46% to 68.4% in 1995, and Nova Scotia's increased from 59.4% to 75.5%. New Brunswick's penetration rate increased from 55.2% in 1986 to 69.3% in 1995.

The combination of more households and higher penetration rates, helped by more areas being wired for cable, caused the number of households with cable to increase by 20% between 1986 and 1991, and by another 11.4% between 1991 and 1995, for an increase of 33.6% over the whole period. The number with cable increased by 96% in Newfoundland, by 79.7% in P.E.I., by 49.6% in Nova Scotia, and by 47.5% in New Brunswick.

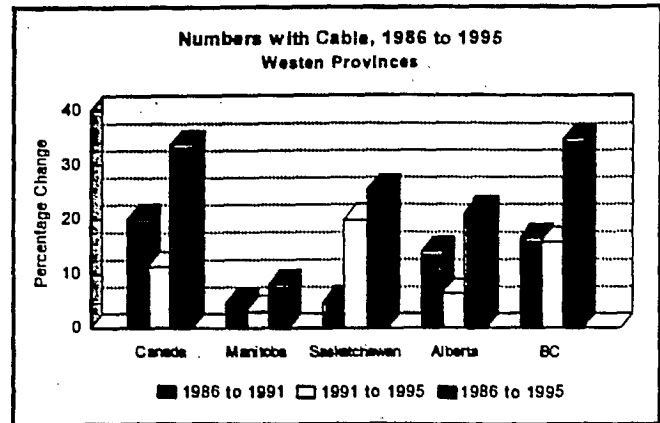
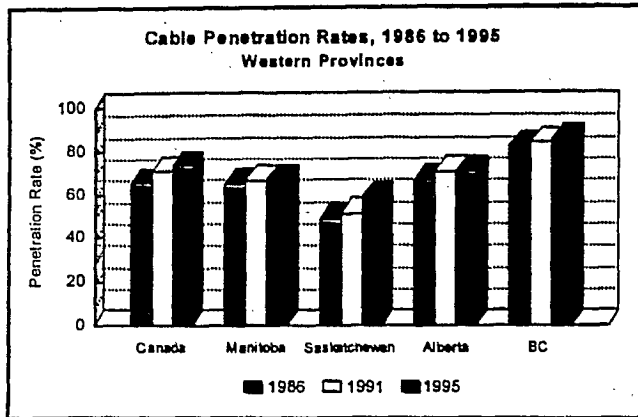


In the central provinces, the rate of increase in cable penetration rates in Quebec and Ontario approximated the national increase of 12.3% between 1986 and 1995. The penetration rate increased from 56.4% to 64.2% in Quebec, and from 70.2% to 78.2% in Ontario. Likewise, the number of households with cable increased at about the 33.6% national rate, rising by 34.5% in Ontario and 35% in Quebec. The similarities to the national rates of increase are not surprising given that Quebec has more than a quarter of all households and Ontario has more than a third.





Saskatchewan had one of the lowest cable penetration rates in 1986 (48.7%), and, despite a significant increase, has the lowest in 1995 (58.8%). The increases in penetration rates were relatively small though by no means insignificant in Manitoba (from 64.7% to 66.9%) and Alberta (from 66.3% to 70.6%). The increase in British Columbia was even smaller (from 82.1% to 85.4%), but its penetration rate in both years is the highest of all provinces, and substantially higher than most provinces.



In Manitoba, small increases in both the penetration rate and the number of households caused the number of households with cable to increase by only 7.9% between 1986 and 1995. Saskatchewan had a smaller increase in number of households but a bigger increase in the penetration rate, resulting in a 25.3% increase in households with cable. The number of households with cable increased by 21.1% in Alberta, and by 34.5% in British Columbia.

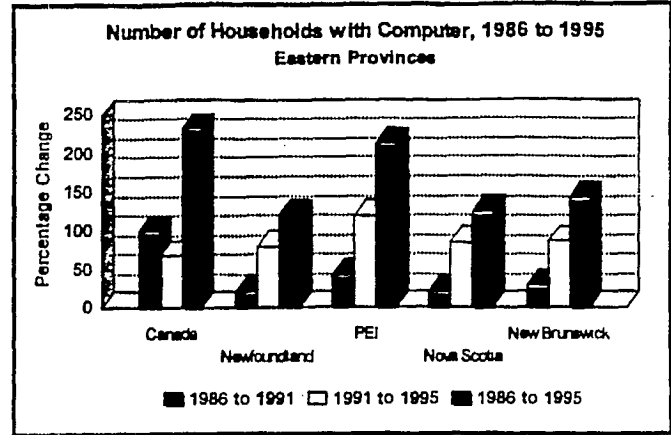
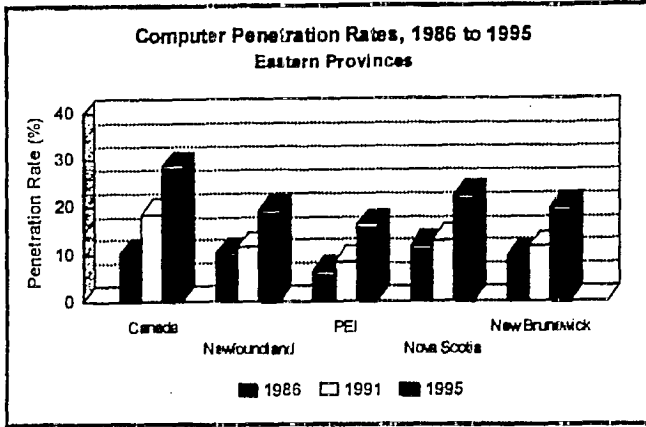
Most recently, between 1994 and 1995 (Table 7.A), the national cable penetration rate actually fell by 1.2%. No trend can be assumed, however, since the rate increased by 2.3% in the previous year, so that over the two years it increased by 1.1%. In the last year there were small reductions in the penetration rate in all provinces except Newfoundland, P.E.I., Nova Scotia and British Columbia. Only New Brunswick, Quebec and Manitoba had reductions in the penetration rate over the two years, and these were small.

Despite the 1.2% fall in the country's cable penetration rate from 1994 to 1995, the number of households with cable actually increased by 0.5% (Table 7.N.A). Numbers of households with cable fell noticeably in Manitoba (4%) and Quebec (1.7%), and there were very small reductions in Ontario (0.4%), Saskatchewan (0.5%) and New Brunswick (0.3%). Over the two years between 1993 and 1995, however, only Manitoba actually had a reduction (of 1.1%) in the number of households with cable.



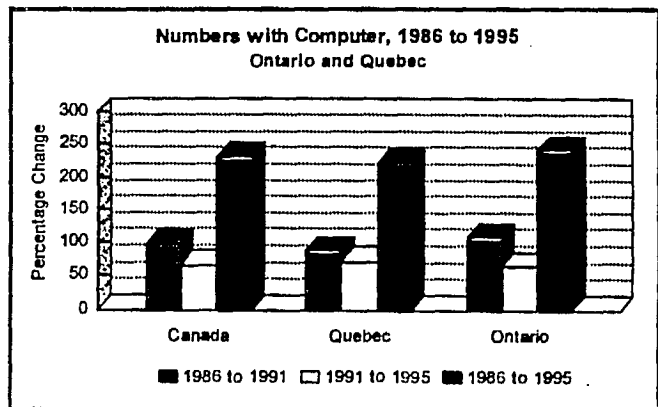
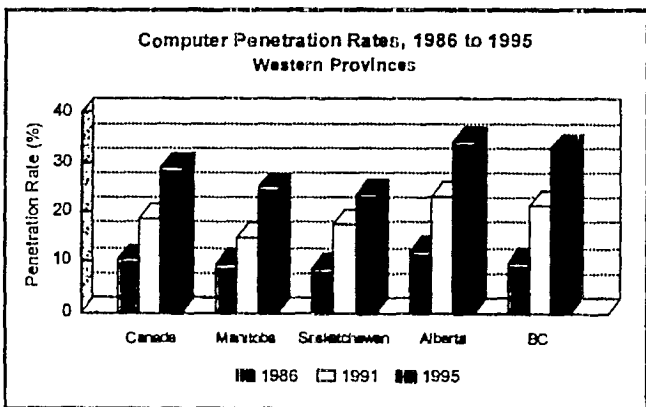
Over the nine years between 1986 and 1995, provincial computer penetration rates grew at less than the 179.2% national rate of increase in all but the three 'richer' provinces, Ontario (182.5%), Alberta (184.9%) and British Columbia (235.8%). Although the number of households with a computer increased by 232.3% nationally, the provincial increases exceeded the national rate only in Ontario (241.3%) and British Columbia (334.4%).

In provinces east of Quebec, Newfoundland's computer penetration rate increased 10.3% in 1986 to 19.4% in 1995, P.E.I.'s increased from 6.3% to 16.2%, Nova Scotia's from 11.8% to 22.4%, and New Brunswick's increased from 9.6% to 19.9%. Ignoring P.E.I., with only 0.4% of all households, the number of households with computers increased by 119.6% in Newfoundland, by 123.3% in Nova Scotia, and by 142.1% in New Brunswick.

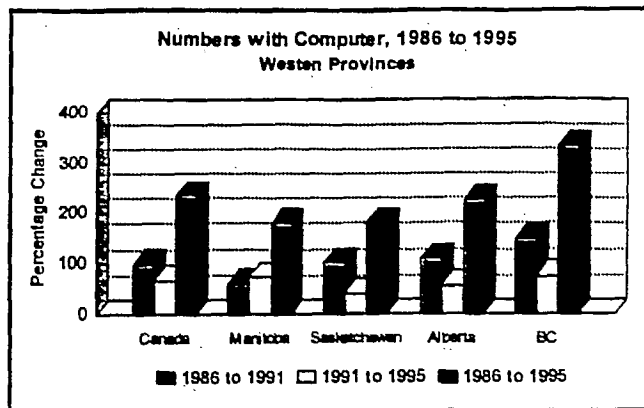
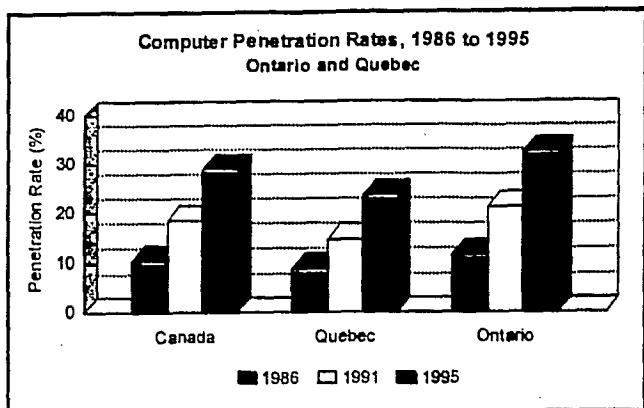


In the central provinces the number of households with computers more than tripled between 1986 and 1995. The number of households increased by 18.7% in Quebec and by 20.8% in Ontario, but the computer penetration rates increased from 8.7% to 23.5% in Quebec and from 11.5% to 32.5% in Ontario. Largely because of the increase in penetration rates, therefore, the number of households with computers increased by 222.3% in Quebec and 241.3% in Ontario.

In western provinces, the computer penetration rate in Manitoba increased from 9.3% in 1986 to 24.7% in 1995, from 8.7% to 23.5% in Saskatchewan, from 12% to 34.1% in Alberta, and from 9.8% to 32.8% in British Columbia. Over the whole period, the number of households with computers increased by 177.5% in Manitoba, by 179.3% in Saskatchewan, and by 223.6% in Alberta. British Columbia had the biggest percentage increase in both the penetration rate and the number of households, so the number of households with computers in British Columbia more than quadrupled (an increase of 334.4%).



It is difficult to discern a trend in differences across provinces, since provinces with the smaller percentage increases in computer penetration rates between 1986 and 1991 tended to have the larger increases between 1991 and 1995. Between 1986 and 1991 the increases were greater in provinces west of Ontario than in provinces east of Quebec, but the positions were reversed between 1991 and 1995.



Most recently, provincial computer penetration rates continued to increase between 1993 and 1995. Except for British Columbia, the rates of increase were much bigger between 1994 and 1995 than between 1993 and 1994. The computer penetration rate increased nationally from 23.2% in 1993, through 25% in 1994, to 28.8% in 1995. The number of households with computers increased by 9.2% between 1993 and 1994 and by 17.3% between 1994 and 1995, for an increase of 28.1% over the two years.

In eastern provinces, the computer penetration rate in Newfoundland increased from 13.9% in 1993 to 19.4% in 1995, from 12.9% to 16.2% in P.E.I., from 18.9% to 22.4% in Nova Scotia, and from 14.1% to 19.9% in New Brunswick. Over the two years, the number of households with computers increased by 40.1% in Newfoundland, by 32.1% in P.E.I., by 22.7% in Nova Scotia and by 46.7% in New Brunswick. In central provinces, the computer penetration rate in Quebec increased from 19.1% in 1993 to 23.5% in 1995, while the number of households with computers increased by 27.4%. In Ontario, the penetration rate increased from 26% to 32.5%, and the number of households with a computer increased by 27.8%.

In western provinces, the penetration rate in Manitoba actually fell from 18.9% in 1993 to 18.3% in 1994, but increased again to 24.7% in 1995. Similarly, Saskatchewan's penetration rate first fell from 21.2% to 20.7%, then increased to 23.5% by 1995. Alberta's penetration rate increased in both years, from 27.1% in 1993, through 28.9% in 1994, to 34.1% in 1995. British Columbia's penetration rate also increased in both years, although the increase from 27.3% in 1993 to 32.6% in 1994 was followed by an unusually small increase to 32.8% in 1995.

Between 1993 and 1995, the number of households with computers increased by 31.2% in Manitoba, by 10.6% in Saskatchewan, by 26% in Alberta, and by 20.2% in British Columbia. Between 1994 and 1995, however, the number in British Columbia increased by only 0.4%.

The national modem penetration rate increased from 8.4% in 1994 to 12% in 1995. The number of households with a modem increased by 45.6%, attributable mostly to the 42.9% increase in the penetration rate than to the 1.7% increase in total households. Among computer households, those with a modem increased from 33.7% in 1994 to 41.8% in 1995.

Although the modem penetration rate is much lower than the computer penetration rate, the gap has been closing. Between 1994 and 1995, the number of households with modems increased by 45.6%, even though the number with computers increased by only 17.3%. In eastern provinces the number of households in Newfoundland with a modem, and the number with a computer, increased by 90.2% and 28.4% respectively,

by 38.3% and 27.3% in Nova Scotia, and by 87% and 30.6% in New Brunswick. In Quebec the number with modems increased by 56.5% even though the number with computers increased by only 23.6%. In Ontario the increases were 48.6% and 16%. In western provinces, the increases were 56.4% and 33.2% in Manitoba, 28.4% and 13.9% in Saskatchewan, 54.9% and 20.6% in Alberta, and 19.1% and 5.1% in British Columbia.

## I: A CLOSER LOOK AT QUEBEC

Quebec had 26.2% of all households in 1986, rising to 26.5% in 1991, then falling to a constant 26.1% in 1993, 1994 and 1995. Between 1986 and 1995, the number of households in Quebec grew by 19.7%, which was similar to the 19% national rate of increase. The number increased by 12.2% between 1986 and 1991, which exceeded the 10.8% increase nationally, but by only 5.9% between 1991 and 1995 despite a national increase of 7.4%.

Most recently, the number of households in Quebec increased at the national rate of 3.3% between 1993 and 1995. The number grew by 1.4% provincially and 1.5% nationally between 1993 and 1994, and by 1.9% provincially and 1.7% nationally between 1994 and 1995.



In 1986, Quebec's telephone penetration rate of 97.7% was below the national rate of 98.1%. In 1995, however, Quebec's penetration rate of 98.9% is above the national rate of 98.5% - and is the highest provincial telephone penetration rate in 1995.

From 1986 to 1991 the number of households with a telephone increased by 12% in Quebec and by 10.7% nationally. Between 1991 and 1995, the increases were 7.4% in Quebec but 8% nationally. Over the whole period, the 20.2% increase in the number with a telephone in Quebec was greater than the 19.5% increase nationally.

Most recently, the numbers with a telephone increased by 1.5% between 1993 and 1994 in Quebec and by 1.6% nationally. Between 1994 and 1995 the 2.1% increase in Quebec was greater than the 1.3% increase nationally. Over the two years, therefore, there was a 3.6% increase in Quebec but only a 2.8% increase nationally.



The cable penetration rate in Quebec was below the national rate in 1986, and remains below the national rate in 1995. The provincial and national rates were 56.4% and 65.4% respectively in 1986, rising to 60.6% and 70.8% in 1991, and to 64.2% and 73.4% in 1995. Between 1986 and 1991 the number of households with cable increased by 20.5% in Quebec and 20% nationally. Between 1991 and 1995 the increase was 12.1% in Quebec and 11.4% nationally. Over whole period, the number with cable increased by 35% in Quebec and by 33.6% nationally.

Most recently, cable penetration rate in Quebec increased from 64.3% in 1993 to 66.6% in 1994, then fell to 64.2% in 1995, while the national rate increased from 72.6% to 74.3%, then fell to 73.4%. The number of households with cable increased by 5% provincially and 3.9% nationally between 1993 and 1994, but between 1994 and 1995 they fell by 1.7% in Quebec and rose by 0.5% nationally. Over the two years, the number of households with cable increased by 3.1% in Quebec and by 4.4% nationally.



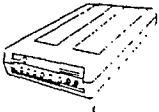
In 1986, the computer penetration rate was 8.7% in Quebec and 10.3% nationally. The provincial and national rates then increased to 15.5% and 18.5% respectively in 1991, and to 23.5% and 28.8% by 1995.

Quebec's computer penetration rate is less than the national rate, but the percentage increase in Quebec has recently pulled ahead of the national increase. The provincial and national increases in computer penetration rates were 67.4% and 79.6% respectively between 1986 and 1991, but 62.1% and 55.5% between 1991 and 1995. There is little difference over the whole nine years, with Quebec's penetration rate increasing by 171.4% and the national rate increasing by 179.2%.

Between 1986 and 1991 the number of households with computers increased by 87.8% in Quebec, and by 99% nationally. Between 1991 and 1995, however, the numbers increased by 71.6% in Quebec and by only 67% nationally. Over the nine years, therefore, Quebec's 222.3% increase in households with computers was close to the national 232.3% increase.

Most recently, the provincial and national computer penetration rates were 19.1% and 23.3% respectively in 1993, 19.4% and 25% in 1994, and 23.5% and 28.8% in 1995. The increase in the penetration rate between 1993 and 1994 was 1.7% in Quebec and 7.6% nationally, but between 1994 and 1995 the 21.2% increase in Quebec exceeded the 15.3% national increase. Over the two years, therefore, Quebec's 23.3% increase in the computer penetration rate was almost equal to the 24% national increase.

Similarly, the number of households with a computer increased by 3.1% in Quebec and 9.2% nationally between 1993 and 1994, but between 1994 and 1995 the number increased by 23.6% in Quebec and by only 17.3% nationally. Over the two years, the number of households with computers increased by 27.4% in Quebec and by 28.1% nationally.



The modem penetration rate in Quebec increased from 5.5% of all households in 1994, to 8.4% in 1995, while the national rate increased from 8.4% to 12%. Quebec's modem penetration rate, therefore, grew by 53.5% while the national rate grew by 43.1%. Among only those households with a computer, the modem penetration rate in 1994 was 28% in Quebec and 33.7% nationally, while in 1995 it was 35.6% in Quebec and 41.8% nationally. The number of households with a modem increased by 58.5% in Quebec and by 45.6% nationally.

## V: A COMPARISON WITH PENETRATION RATES IN THE UNITED STATES

This section summarises the U.S. findings, relevant to Canada, reported in *Falling Through The Net: A Survey of the "Have Nots" in Rural and Urban America* (U.S. Department of Commerce, July 1995). The data were collected in November of 1994, a few months earlier than the data used for the Canadian analysis in Section III. The U.S. findings are compared to the Canadian findings where feasible. The income and demographic categories are not identical, but general comparisons are possible. The U.S. study did not investigate cable penetration rates, nor did it classify households by employment status or by whether children were present. Although the U.S. study does not report penetration rates for the whole country, the national figures were obtained directly from the U.S. Department of Commerce.

Unlike the U.S. data, the Canadian data are not broken into racial categories. For example, the U.S. study finds that Native Americans have the lowest telephone penetration rate in rural areas (75.5%) while black-non-Hispanics have the lowest in urban areas (86.3%). The highest telephone penetration rates, on the other hand, are for white-non-Hispanics in both rural areas (95.4%) and urban areas (96.2%). Computer penetration rates are lowest for black-non-Hispanics in rural areas (6.4%) and highest for Asian or Pacific Islander-non-Hispanic (39.5%).

Also unlike the U.S. study, the Canadian data do not have information on the use of on-line services by people with computer modems. A particularly interesting finding of the U.S. study is that many groups with the lowest computer and modem penetration rates are actually the most enthusiastic users of on-line information services. In particular, low-income households, the young and the less well educated computer households are more likely to search classified employment advertisements, take educational courses, and access government reports via modems.



A higher proportion of households have a telephone in Canada (98.5%) than in the U.S. (93.8%). The penetration rates are lower in the U.S. than in Canada at all income levels, but particularly at the lowest incomes. About 99% of U.S. households with at least US\$75,000 have a telephone, while the penetration rate is almost 100% (99.8%) for Canadian households with at least C\$70,000. At the lowest incomes, however, less than 82% of U.S. households below US\$10,000 have a telephone, compared with more than 92% of Canadian households under C\$10,000.

There is very little difference between U.S. telephone penetration rates between urban and rural areas within income groups, and in Canada there is no difference at all.

The U.S. penetration rates are lower than Canadian rates in each age group, and the differences among age groups are bigger. The telephone penetration rate in Canada is 94.3% of householders under age 35, while in the U.S. it varies from 77.2% of rural householders under age 25 to 91.3% of rural householders aged 25 to 34 years. The U.S. penetration rate for householders under 35, therefore, must be lower than the Canadian rate. U.S. penetration rates are also lower than Canadian rates in other age groups - for example, the Canadian penetration rate exceeds 99% of householders aged at least 55 while the U.S. rate is less than 97%.

The penetration rate rises with education in the U.S. as in Canada, but the U.S. rates are lower and have more variance by education. For householders with less than 9 years of education, the telephone penetration rate is a 97.7% in Canada but less than 89% in the U.S. The difference is less at the highest levels of education, where the penetration rate is above 99% in Canada and a little less than 99% in the U.S.



The proportion of households with computers in the home is higher in Canada (28.5%) than in the U.S. (25.5%). Computer penetration rates are strongly related to household income in both countries. The data are not available to do a proper comparison, which should take into account any differences in computer prices, both absolute and relative to the prices of other goods and services, and in the distribution of income between the two countries. Ignoring these factors, the Canadian penetration rate is higher than the U.S. rate at low incomes but not at high incomes. This difference applies both in urban and in rural areas.

In Canada the lowest computer penetration rates are for households with income between C\$10,000 and C\$14,999, where penetration is 6.7% in rural areas, 11.9% in large cities, over 6% in smaller urban areas, and 9.9% overall. In the U.S. the lowest penetration rates are for household income less than US\$10,000, where penetration is 4.5% in rural areas and 8.1% in urban areas. At high incomes, however, penetration rates are higher in the U.S. than in Canada. Households with at least C\$70,000 in Canada have a penetration rate of 42.9% in rural areas, 55.3% in large cities, and 52.7% overall. Households with income of at least US\$75,000 in the U.S. have penetration rates of 59.6% in rural areas and 64.4% in urban areas.

The age pattern of computer penetration rates in the U.S. is similar to that in Canada - penetration first rises with age, then falls. For householders under age 35 the U.S. penetration rate varies from 12.3% for rural householders under 25 to 27.8% for urban householders between 25 and 34, while the Canadian penetration rate is 29.2% - therefore the rate is higher in Canada than in the U.S. for this age group. For householders aged 35 to 44 the Canadian rate of 37.8% also exceeds the U.S. rates of 34.7% in rural areas and 36.6% in urban areas. For householders aged 45 to 54 the Canadian penetration rate of 39.8% is higher than the U.S. rates of 32.5% in rural areas and 36.8% in urban areas. Finally, for householders aged at least 65, the Canadian rate of 15.8% is higher than the U.S. rates of 11.9% in rural areas and 13.8% in urban areas.

There is a strong relationship between computer penetration rates and education in both countries, but the Canadian penetration rate is higher at every comparable level of education, and particularly at the lower levels. For householders with less than 9 years of education, the Canadian penetration rate of 9.1% exceeds the U.S. rates of 2.6% in rural areas and 2.8% in urban areas. For householders who completed high school the Canadian penetration rate of 26.1% exceeds the U.S. rates of 16.5% in rural areas and 15.3% in urban areas. Canadians householders with a university degree have a penetration rate of 55.6%, while U.S. householders with at least four years of college have penetration rates of 51.2% in rural areas and 50.7% in urban areas.



Among householders with computers, the share with a modem is lower in Canada (41.8%) than in the U.S. (45.5%). Modem ownership increases with income in both countries. In Canada the share of computer owners with a modem increases from 39% in the lowest income quartile (but 41.9% in the bottom half of that quartile) to 44.7% in the top quartile.

In the U.S. the share among rural computer owners increases from 23.6% when household income is below US\$10,000 to 52.2% at US\$75,000 or more. The share among urban computer owners in the same household income brackets increases from 44.1% to 58.1%.

In rural areas, the modem penetration rate among computer households in Canada (29.2%) is lower than in every U.S. age group, where it starts at 27.4% of those under 25 years, then rises to 44% of those aged 25 to 44, and falls again to 38.5% of those aged 55 and over. In urban areas, the modem penetration rate among computer households in Canada (43.5%) is lower than in every U.S. age group except those aged 55 and over: the U.S. rate starts at 44.4% of computer householders under 25, rises to 52.3% of those aged 25 to 34, then falls to 41.7% of those aged 55 and over.

The modem penetration rate among households with computers is higher in the U.S. than in Canada, but the computer penetration rate is higher in Canada than in the U.S..Among all households, with and without computers, the modem penetration rate is slightly higher in Canada (12%) than in the U.S" (11.6%).

The modem penetration rate of computer households is higher in U.S. for householders aged 35 and older, but the data provide no direct evidence as to which country has the higher rate for computer householders under age 35. In Canada the modem penetration rate for computer householders under age 35 is 46%, while in the U.S. it varies from 27.4% of rural householders under age 25 to 52.3% of urban householders aged 25 to 34.

The share of computer owners with a modem increases with education in both countries. The Canadian modem penetration rate for computer householders with less than 9 years of education is 30.6% in Canada, and the U.S. rates are 23.7% in rural areas and 32.9% in urban areas. At the other extreme, the modem penetration rate of 48.5% of Canadian computer householders with a university degree is less than the U.S. modem penetration rates for urban and rural computer householders with at least 4 years of college (48.9% in rural areas and 53.5% in urban areas).



## VI: USING THE COMPUTER HIGHWAY

The discussion about computers and modems thus far has focused on the proportions of people who have the instruments which make the Information Highway accessible from their home. Now it turns to considering the extent to which people actually access the Information Highway. This section surveys data from other sources, and the statistics are as reported by the sources identified in the text.

### A: Computer Literacy

#### 1. Current Usage

Using a computer on the Information Highway not only requires a modem but also the knowledge of how to use the computer and modem. Although only one-quarter of Canadian households had a computer in 1994, the 1994 General Social Survey (GSS) reports that almost six in every ten (56%) adult Canadians were able to use a computer (up from 47% in 1989). Furthermore, 41% of Canadians aged 15 and over in 1994 had taken at least one computer course (*Canadian Social Trends*, Statistics Canada, Autumn 1995).

Computer literacy declines with age: two in every five (81%) people aged 15 to 24 in 1994 were able to use a computer, but only one in ten (10.1%) seniors could do so. Computer literacy also declines with income: 86% of people in households with incomes above \$100,000 could use a computer, compared with only 28% of people in families with incomes under \$20,000. Obviously, the patterns of ability to use a computer reflect the patterns of computer ownership.

Among people who use a computer, the most common activities in 1994 were word processing (done by 69% of users), data entry (65%), game playing (63%), record keeping (55%) and using an on-line service or the Internet (17%). Although one-third (34%) of home computers had a modem in 1994, therefore, it appears that many of those with a modem do not actually use it. Although the numbers are not strictly comparable since more than one person may use the same computer, the figures add weight to the observation that information on the incidence and frequency of modem use may well be more relevant than modem penetration rates.

Improvements in computer literacy and increases in computer and modem penetration rates will increase the number of Canadians who can do all or part of their work from home (known as 'teleworking'), and reduce the differences in access to education between urban and rural households. Statistics Canada's Adult Education and Training Survey estimated that over 400,000 Canadians were enrolled in a distance education course or program in 1994.

#### 2. Computers in the Classroom

The U.S. Department of Commerce emphasizes that economic growth will depend on whether the labour force has the necessary skills to be competitive in the global economy, and that these skills will more and more depend on whether individuals have the training and education to be computer literate and able to navigate information networks (*Connecting The Nation: Classrooms, Libraries, and Health Care Organizations in the Information Age, Update 1995*, United States Department of Commerce, June 1995). It estimates that 60% of the new jobs in the year 2010 will require skills possessed by only 22% of workers today. Information technology is needed in the classroom to give people the necessary skills, to level the playing field for students of different socio-economic backgrounds, to reduce the divide between information "haves" and "have nots",

and to allow people in rural and remote communities to have better quality health care by using the Information Highway to access specialists in urban medical centres.

Regardless of whatever benefits may be got from using computers as a teaching aide for many subjects, therefore, there is an obvious need to teach students how to use computers and the Information Highway. Put differently, whatever the need for 'a computer in every classroom', there is a definite need for 'many computers in one classroom'. Yet the U.S. document observes that, for telecommunications services, schools are among the most impoverished institutions in society.

A similar situation is seen to exist in Canada. A study by Industry Canada reports that computer penetration in schools is low, with an average of one computer per 15 or 20 students. (*Educational Opportunities on Canada's Information Highway*, Industry Canada, October 1994). Furthermore, computers in schools are too old and unsophisticated to access the Information Highway, and there is a low level of computer literacy among educators. Increasing and upgrading the computers in schools, to say nothing of the cost of developing French and Aboriginal language content on the information network, will be expensive but necessary. As the report notes, the cost should be quickly recovered through the effects of improved productivity and earnings, the associated increase in tax revenues, and reduced spending on social programs.

## B: Travelling the Highway

### 1. U.S.A. and Canada

The Commercenet/Nielsen Internet Demographics Survey, done in August 1995, was financed by an organization (the CommerceNet) of electronics, financial service and information service companies to improve information about the extent to which the Internet is used today, and to create a demographic profile of the users. It differs from other surveys in that it is not restricted to Internet users. It generated more than 4,200 completed interviews from a gross random sample of about 280,000 telephone calls in the U.S. and Canada. The respondents were split into three types: Internet users, on-line service users, and non-users. The sampling process was designed to allow the findings to be projected to the whole of the U.S. and Canadian population.

#### Usage

The projections from the survey estimate that 17% (37 million) of persons aged at least 16 of the joint population of the U.S. and Canada have access to the Internet, but 11% (24 million) used it in the previous three months. This leaves 8% (13 million) people aged at least 16 in the U.S. and Canada who currently have access to Internet services but do not use them. Approximately 8% (18 million) used the World Wide Web (WWW) in the previous three months. Usage in this study (as distinct from users) is defined as using the Internet for something other than e-mail.

62% of Internet users (6.7% of the population aged at least 16) had access from the home, 54% of users (5.8% of the population) had access from work, and 30% of users (3.2% of the population) had access from school or college. (Many people under 16 will also have some access from school). Since these numbers sum to 146% of users, on average a single user has 1.46 types of access location.

Those who had used the Internet in the previous 24 hours had used it from an average of 1.2 types of access location: 66% had accessed it from work, 44% had accessed it from home, and 8% had accessed it from school. Even though more people have access from home than work, access from work occurred more

frequently and for longer than access from home. Access from work also was disproportionately higher among Internet users who had not used it in the previous 24 hours.

Users averaged 5 hours and 28 minutes per week on the Internet. Since users are 11% of all persons aged at least 16 in the U.S. and Canada, time per Internet user is equivalent to 35 minutes per person for the whole 16+ population - which is similar to the total time spent playing back rented video tapes.

The average user of on-line services used them for 2 hours and 29 minutes per week, or 24 minutes per week per person aged at least 16 in the total U.S. and Canadian population - that is, average Internet usage of 35 minutes per week per person is 46% more than the average on-line service usage.

The survey distinguished between direct Internet access (connecting through an Internet service provider or using an employer's direct access) and indirect access (connecting through commercial on-line services). Persons with direct access were 44% of all those with direct plus indirect access, but they were 60% of those who had used the Internet in the past three months and 73% of those who used it in the past 24 hours.

Among those who used the Internet in the past 24 hours, a greater proportion (72%) used it to access the WWW than to send e-mail (65%). Smaller shares used it for non-interactive discussion (36%), for downloading software (31%), for using another computer (31%), and for interactive discussion (21%). Among those who used the Internet over 24 hours ago, 44% accessed the WWW and 48% sent e-mail.

Interestingly, 55% of WWW users had used computers to search for information on products and services, as had 50% of people using on-line services. While quite high proportions of users had searched for other information through the WWW (73%) and on-line services (61%), the biggest numbers of all were those who had simply browsed or explored the WWW (90%) and on-line services (74%). About half of the WWW users had accessed it for business purposes.

#### Users

Males are two-thirds (66%) of Internet users, but their more frequent access and longer duration account for more than three-quarters (77%) of total usage. Females are one-third (33%) of users but and account for less than one-quarter (23%) of total usage. Similarly, males comprise 59% of users of on-line services, but account for 63% of usage.

Disproportionate numbers of WWW users have high income, professional or managerial occupations, and high levels of education. Although only 10% of the total U.S. plus Canadian population have household income in excess of \$80,000, 25% of WWW users have this income. Similarly, only 27% of the population consider themselves to be in professional or managerial occupations, but they are 50% of WWW users. Although only 29% of the population have at least college degrees, they are 64% of WWW users.

The Commercenet/Nielsen survey concludes their findings demonstrate that other studies collecting information solely from the Internet, and thus restricted to people actually using the Internet, have biases which prevent the results from being projected to the whole population. Studies restricted to WWW sites overestimate Internet usage and the skills of Internet users, and downplay the extent to which females use the Internet. Nevertheless, this study concludes that there is a sizable base of Internet users, that a large amount of time is spent on the Internet, and that WWW users are a key target for business applications.

The study also concludes that many more people have access to the Internet than actually use it. Some of these people are provided access by their employers, and others feel they can access it through another family member or through a colleague at work.

## 2. Using Computers in the Canadian Workplace

An analysis of data from the 1994 General Social Survey (GSS) on education, work and retirement concluded that computers have become an integral part of the working environment of Canadians. Computers affect the nature of work, the skills needed to do the work, and Canadians' perceptions of their jobs (*Computer Use in the Workplace*, Statistics Canada, 12F0052XPE).

The proportion of employed Canadians using a computer at work increased from 15% in 1985 to 48% in 1994. This contrasts with the data on home computers reported in the previous sections, showing that the share of households with a computer in the home increased from 10.3% in 1986 to 25% in 1994 (and 28.8% in 1995). Just over half the employed people in the three 'richer' provinces - Ontario, Alberta and British Columbia - used computers at work, although Saskatchewan had the largest percentage increase.

A higher proportion of men (52%) than women (45%) used computers on the job in 1994, in all age groups. Both proportions have increased significantly since 1989, and the relative positions of men and women have changed: in 1989, 38% of women and 32% of men used computers on the job.

The difference in on-the-job computer usage between men and women reflects differences in their types of occupation: about 95% of science and engineering workers and almost 80% of managerial workers used computers at work in 1994, but only 15% of service sector workers and 20% of primary workers used them. Three-quarters of women in clerical positions used computers, but only one-quarter of all female workers were in these positions. In contrast, one-fifth of male workers were in construction and transportation, and only one-fifth of them used a computer at work.

Not only has the proportion of people using computers at work increased, but also the average amount of time each user is on the computer has increased. In 1989 the average user spent 16 hours per week using the computer, compared with almost 18 hours per week in 1994. Partly because of the differences in occupation, the average woman user spent 19 hours per week on the computer in 1994, compared with 16 hours for the average male user.

The tasks performed on the computer at work were similar to those performed on home computers, except for game playing. Roughly 80% did word processing at work, 80% did data entry, and 70% did record keeping. Data analysis and programming, however, were mainly done by science and engineering workers, and some managerial workers. About 14% were connected to the Information Highway, but actual use of the Internet was dominated by the 40% of science and engineering workers who used it, and the 23% of social scientists and teachers.

More than half of all employed people in 1994 felt that the nature of their work had been affected by technological change in the preceding five years. Among these people, three-quarters of both men and women felt that the computer had increased the level of skill needed for their jobs, a perception common to all major occupational groups. About two-thirds of computer users felt that the introduction of computers had made their work more interesting. About one in five employed computer users felt that computers had reduced their job security, but the number who felt it had increased their job security was only marginally smaller. These figures,

however, do not address the possibility that the introduction of computers may have had a greater adverse effect on perceptions of job security among people who do not use computers at work.

A comparison of the 1994 GSS data with the 1993 U.S. Current Population Survey shows the share of employed people using computers at work was a little higher in Canada in 1994 (48%) than in the U.S. in 1993 (43%). A breakdown by sex and occupation indicates that difference is mainly due to male workers and blue-collar occupations.

Although the 1994 GSS data indicate that 48% of Canadian workers actually use a computer on the job, another source reports that 62% of Canadians either use or have direct access to a computer at work (*Canada Information Monitor, Survey Report*, June 1995). However, this source gives a somewhat different perception of computer use in the work place. While the GSS analysis reports that managerial and professional jobs are highly computerized, the Information Monitor reports that senior executives and managers are active users of computers as a communication device but are not active users of electronic information. Only 10% of people in organizations access or communicate information via an external electronic network, only 7% use a commercial on-line or database service at work, and only 6% use the Internet at work. It concludes that the use of electronic information services is very much a corporate or back office need, and has not filtered down to front-line service or manufacturing staff.

The Monitor's report does conclude that, although the penetration of on-line services in the workplace is relatively low, it could grow rapidly even within the next year, from 10% to over 13% of the workplace population.

#### C: Cable or Satellite?

The fact that little more than a third (34.5%) of rural Canadian households have cable in 1995 does not mean that two-thirds of rural households are denied access to the same variety of television as urban households. In 1993, 3% of Canadian households had a satellite dish to receive television (*Canadian Social Trends*, Autumn 1995). The issue has been raised as to whether satellite will take a significant market share from cable.

Compressed digitized signals can now be received on smaller satellite dishes, which means more competition for cable (*Television: Glorious Past, Uncertain Future*, Statistics Canada, January 1996). The extent to which satellites will take audience and advertising dollars from cable, at least in urban areas depends not only on how satellite services expand but also on how cable services expand. In the U.K., for example, cable penetration has been very low relative to Canada, but satellite use has been more prevalent even among urban households (though satellite companies have faced problems from illegal use of unscramblers through which owners of satellite dishes can pirate the signals without paying the fees). Most recently, however, many more areas are being wired for cable - and the new cable systems are bidirectional, offering telephone as well as television services.

Anecdotal evidence suggests that the combined cost of telephone and television for some households, particularly for people who pay telephone charges to access Internet hosts, is less when subscribers pay for a joint service through cable than for separate services by satellite and telephone line. The choices faced by Canadians also should change as convergence occurs, and households will have access to the same types of services through more than one delivery channel.

## VII: LOOKING AHEAD

This report improves our understanding of the current relationships between various household characteristics and the ability of Canadian households to access the Information Highway from their homes. It also examines how these relationships have evolved over time. These relationships are only part of the platform of understanding upon which policies affecting both the public and private sector will be designed and developed. Much more needs to be done to extend the platform's reach and improve its structural integrity. If policies are to guide rather than follow, and to facilitate rather than hinder the Highway's unstoppable progression into the lives of all Canadians, the list of what needs to be done in the near future should include at least the following items.

The platform should be extended to help illuminate the impact of the Information Highway on the provision of education, health care and community services generally. This step will help to improve the integrity of cost estimates associated with such developments as distance education and tele-medicine, and put the various policy options in perspective. The first step in this area is to extend the analysis for households to cover schools and other educational institutions, hospitals and clinics and health care facilities generally, and libraries and other community centres.

The structural integrity of the platform of understanding depends not only on the ability of households and other institutions to access the Information Highway, but also on the extent to which they transform their accessibility into actual use of the Highway. This requires moving on from an analysis of the infrastructure and its accessibility to an analysis of its actual and potential use by households and institutions. Although the report touches on this aspect, more is required for a thorough understanding.

The Information Highway transcends national boundaries, as do many of the policy issues associated with the Highway. This report compares household penetration rates in Canada with those in the United States, based on their own study. Similar comparisons should be done for as many countries as possible, but particularly for Canada's partners in the OECD and the G-7. Furthermore, the studies of other countries should be extended so that our platform of understanding includes how their various infrastructures have evolved, and covers the problems and issues that have arisen during the evolution of their networks. Not only is this understanding particularly important in an era when international cooperation is the norm, and in an area where international cooperation is imperative, but also because the synergies found and the lessons learned can be exploited at the policy level in Canada.

The structural integrity of the platform of understanding depends not only on the information it provides about the present, but also on the extent to which this information can be used to identify issues that may arise in the future, so that policies can be developed to address these issues before they actually arise. This requires a critical review of the vast and increasing literature on the future of the Information Highway, not necessarily from a statistical perspective. The review will help to develop a coherent framework within which alternative policy options can be examined, and the policies that will best serve Canada's economic and social interests can be developed.

## APPENDIX - List of Tables

### Table Set 1: Penetration Rates in 1995

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Additional sets of tables for penetration rates in 1986 and 1991, and changes in penetrations rates by household characteristics for the periods 1986-1991, 1991-1995 and 1986-1995 are available.

**Table 1 - 95: Penetration Rates (%) by Employment of Household Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Distribution of Households</b>							
<b>All</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
Out of Labour Force	32.2	8.2	7.5	15.7	9.4	4.5	2.6
<b>Labour Force</b>	<b>67.8</b>	<b>4.3</b>	<b>5.0</b>	<b>9.3</b>	<b>15.6</b>	<b>20.5</b>	<b>22.4</b>
Employed	54.0	2.2	3.0	5.3	11.7	17.3	19.7
Unemployed	6.6	1.5	1.2	2.7	1.8	1.3	0.7
Self-Employed	7.2	0.6	0.8	1.3	2.1	1.9	1.9
<b>Telephone Penetration Rates</b>							
<b>All</b>	<b>98.5</b>	<b>94.3</b>	<b>97.8</b>	<b>96.0</b>	<b>98.8</b>	<b>99.5</b>	<b>99.7</b>
Out of Labour Force	97.9	94.8	98.1	96.4	99.0	99.5	100.0
<b>Labour Force</b>	<b>98.8</b>	<b>93.3</b>	<b>97.3</b>	<b>95.5</b>	<b>98.7</b>	<b>99.5</b>	<b>99.7</b>
Employed	99.2	94.9	97.2	96.2	98.9	99.5	99.7
Unemployed	95.7	89.0	96.9	92.5	97.3	98.2	99.1
Self-Employed	99.3	98.9	98.4	98.6	98.9	99.9	99.8
<b>Cable Penetration Rates</b>							
<b>All</b>	<b>73.4</b>	<b>62.5</b>	<b>66.3</b>	<b>64.4</b>	<b>70.3</b>	<b>76.7</b>	<b>82.2</b>
Out of Labour Force	71.9	64.1	69.5	66.6	72.4	81.0	86.0
<b>Labour Force</b>	<b>74.1</b>	<b>59.5</b>	<b>61.7</b>	<b>60.7</b>	<b>69.1</b>	<b>75.8</b>	<b>81.8</b>
Employed	77.0	63.9	65.7	64.9	72.2	77.4	82.8
Unemployed	66.4	56.1	60.2	58.0	67.5	74.1	81.0
Self-Employed	59.7	51.6	48.1	49.5	53.0	62.1	71.4
<b>Computer Penetration Rates</b>							
<b>All</b>	<b>28.8</b>	<b>11.5</b>	<b>13.1</b>	<b>12.3</b>	<b>20.2</b>	<b>32.5</b>	<b>50.2</b>
Out of Labour Force	13.3	7.7	8.8	8.2	12.2	21.0	34.4
<b>Labour Force</b>	<b>36.1</b>	<b>18.8</b>	<b>19.5</b>	<b>19.2</b>	<b>25.0</b>	<b>35.0</b>	<b>52.0</b>
Employed	37.7	20.2	20.3	20.3	24.8	35.1	52.4
Unemployed	21.0	13.7	17.9	15.6	17.2	27.4	39.7
Self-Employed	38.1	26.9	19.2	22.5	33.4	39.4	52.6
<b>Modem Penetration Rates</b>							
<b>All</b>	<b>12.0</b>	<b>4.8</b>	<b>4.8</b>	<b>4.8</b>	<b>7.3</b>	<b>13.6</b>	<b>22.4</b>
Out of Labour Force	5.2	2.9	3.2	3.0	4.4	8.6	15.0
<b>Labour Force</b>	<b>15.3</b>	<b>8.4</b>	<b>7.2</b>	<b>7.8</b>	<b>9.0</b>	<b>14.7</b>	<b>23.3</b>
Employed	16.0	8.1	7.7	7.9	9.3	14.9	23.2
Unemployed	8.2	6.6	4.8	5.8	5.3	11.3	18.4
Self-Employed	16.4	14.7	8.8	11.3	10.9	15.4	26.5



**Table 1.N - 95: Number of Households by Employment of Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Numbers of Households</b>							
<b>All</b>	<b>11,243,615</b>	<b>1,405,628</b>	<b>1,405,516</b>	<b>2,811,144</b>	<b>2,810,471</b>	<b>2,810,949</b>	<b>2,811,051</b>
Out of Labour Force	3,615,102	922,201	839,034	1,761,235	1,057,149	504,539	292,179
<b>Labour Force</b>	<b>7,628,513</b>	<b>483,427</b>	<b>566,482</b>	<b>1,049,909</b>	<b>1,753,322</b>	<b>2,306,410</b>	<b>2,518,872</b>
Employed	6,067,252	248,985	341,601	590,586	1,312,150	1,947,494	2,217,022
Unemployed	746,373	170,892	138,161	309,053	207,022	147,674	82,624
Self-Employed	814,888	63,550	86,720	150,270	234,150	211,242	219,226
<b>Numbers with Telephone</b>							
<b>All</b>	<b>11,077,844</b>	<b>1,325,082</b>	<b>1,374,415</b>	<b>2,699,497</b>	<b>2,777,872</b>	<b>2,796,501</b>	<b>2,803,974</b>
Out of Labour Force	3,537,965	873,905	823,208	1,697,113	1,046,733	502,069	292,050
<b>Labour Force</b>	<b>7,539,879</b>	<b>451,177</b>	<b>551,207</b>	<b>1,002,384</b>	<b>1,731,139</b>	<b>2,294,432</b>	<b>2,511,924</b>
Employed	6,016,032	236,266	331,990	568,256	1,298,034	1,938,430	2,211,312
Unemployed	714,341	152,075	133,890	285,965	201,437	145,023	81,916
Self-Employed	809,506	62,836	85,327	148,163	231,668	210,979	218,696
<b>Numbers with Cable</b>							
<b>All</b>	<b>8,254,766</b>	<b>878,728</b>	<b>932,104</b>	<b>1,810,832</b>	<b>1,976,439</b>	<b>2,156,682</b>	<b>2,310,813</b>
Out of Labour Force	2,598,724	590,901	582,854	1,173,755	765,076	408,503	251,390
<b>Labour Force</b>	<b>5,656,042</b>	<b>287,827</b>	<b>349,250</b>	<b>637,077</b>	<b>1,211,363</b>	<b>1,748,179</b>	<b>2,059,423</b>
Employed	4,674,626	159,108	224,371	383,479	947,521	1,507,574	1,836,052
Unemployed	495,319	95,935	83,210	179,145	139,830	109,419	66,925
Self-Employed	486,097	32,784	41,669	74,453	124,012	131,186	156,446
<b>Numbers with Computer</b>							
<b>All</b>	<b>3,238,018</b>	<b>161,548</b>	<b>184,725</b>	<b>346,273</b>	<b>568,451</b>	<b>913,503</b>	<b>1,409,791</b>
Out of Labour Force	480,666	70,818	73,982	144,800	129,382	106,025	100,459
<b>Labour Force</b>	<b>2,757,352</b>	<b>90,730</b>	<b>110,743</b>	<b>201,473</b>	<b>439,069</b>	<b>807,478</b>	<b>1,309,332</b>
Employed	2,289,965	50,288	69,377	119,665	325,355	683,632	1,161,313
Unemployed	156,949	23,334	24,732	48,066	35,553	40,520	32,810
Self-Employed	310,438	17,108	16,634	33,742	78,161	83,326	115,209
<b>Numbers with Modem</b>							
<b>All</b>	<b>1,354,681</b>	<b>67,650</b>	<b>67,455</b>	<b>135,105</b>	<b>205,621</b>	<b>383,405</b>	<b>630,550</b>
Out of Labour Force	187,900	26,823	26,759	53,582	47,023	43,405	43,890
<b>Labour Force</b>	<b>1,166,781</b>	<b>40,827</b>	<b>40,696</b>	<b>81,523</b>	<b>158,598</b>	<b>340,000</b>	<b>586,660</b>
Employed	972,693	20,139	26,403	46,542	121,953	290,861	513,337
Unemployed	60,847	11,325	6,661	17,986	11,008	16,660	15,193
Self-Employed	133,241	9,363	7,632	16,995	25,637	32,479	58,130

**Table 2 - 95: Penetration Rates (%) by Residential Location, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Distribution of Households</b>							
All	100	12.5	12.5	25.0	25.0	25.0	25.0
Urban	85.1	10.7	10.5	21.2	20.3	21.3	22.3
Rural	14.9	1.8	2.0	3.8	4.7	3.7	2.7
<b>Telephone Penetration Rates</b>							
All	98.5	94.3	97.8	96.0	98.8	99.5	99.7
Urban	98.5	94.3	97.8	96.0	98.9	99.4	99.7
Rural	98.5	94.2	97.9	96.2	98.6	99.8	99.9
<b>Cable Penetration Rates</b>							
All	73.4	62.5	66.3	64.4	70.3	76.7	82.2
Urban	80.2	67.4	72.7	70.0	79.1	83.9	87.4
Rural	34.5	33.5	32.4	32.9	32.4	35.7	38.5
<b>Computer Penetration Rates</b>							
All	28.8	11.5	13.1	12.3	20.2	32.5	50.2
Urban	30.0	12.4	14.0	13.2	20.6	33.4	51.2
Rural	22.1	6.3	8.4	7.4	18.6	27.5	41.5
<b>Modem Penetration Rates</b>							
All	12.0	4.8	4.8	4.8	7.3	13.6	22.4
Urban	13.0	5.3	5.5	5.4	7.9	14.6	23.4
Rural	6.5	2.1	1.2	1.6	4.6	8.4	13.9

Underlined numbers are not statistically reliable

**Table 2.N - 95: Number of Households by Residential Location, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Number of Households</b>							
All	11,243,615	1,405,628	1,405,516	2,811,144	2,810,471	2,810,949	2,811,051
Urban	9,568,892	1,203,182	1,183,711	2,386,893	2,281,825	2,389,926	2,510,248
Rural	1,674,723	202,446	221,805	424,251	528,646	421,023	300,803
<b>Number with Telephone</b>							
All	11,077,844	1,325,082	1,374,415	2,699,497	2,777,872	2,796,501	2,803,974
Urban	9,428,077	1,134,299	1,157,280	2,291,579	2,256,512	2,376,495	2,503,491
Rural	1,649,767	190,783	217,135	407,918	521,360	420,006	300,483
<b>Number with Cable</b>							
All	8,254,766	878,728	932,104	1,810,832	1,976,439	2,156,682	2,310,813
Urban	7,677,215	810,953	860,206	1,671,159	1,804,908	2,006,253	2,194,895
Rural	577,551	67,775	71,898	139,673	171,531	150,429	115,918
<b>Number with Computer</b>							
All	3,238,018	161,548	184,725	346,273	568,451	913,503	1,409,791
Urban	2,867,201	148,757	166,155	314,912	469,938	797,539	1,284,812
Rural	370,817	12,791	18,570	31,361	98,513	115,964	124,979
<b>Number with Modem</b>							
All	1,354,681	67,650	67,455	135,105	205,621	383,405	630,550
Urban	1,246,317	63,436	64,856	128,292	181,237	348,157	588,631
Rural	108,364	4,214	2,599	6,813	24,384	35,248	41,919

Numbers under 4,000 are not statistically reliable

**Table 3 - 95: Penetration Rates (%) by Age of Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Distribution of Households</b>							
<b>All Ages</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
Age Under 35	25.2	3.5	3.1	6.6	6.9	7.0	4.8
Age 35 to 44	23.7	1.8	1.8	3.6	5.1	7.4	7.7
Age 45 to 54	18.4	1.4	1.2	2.7	3.3	5.0	7.4
Age 55 to 64	13.0	2.1	1.3	3.4	3.2	2.9	3.5
Age 65 & Over	19.7	3.7	5.1	8.8	6.5	2.7	1.7
<b>Telephone Penetration Rates</b>							
<b>All Ages</b>	<b>98.5</b>	<b>94.3</b>	<b>97.8</b>	<b>96.0</b>	<b>98.8</b>	<b>99.5</b>	<b>99.7</b>
Age Under 35	97.0	90.3	95.4	92.7	97.5	98.8	99.5
Age 35 to 44	98.7	92.5	96.6	94.5	98.9	99.6	99.8
Age 45 to 54	99.1	94.5	98.4	96.3	98.9	99.7	99.8
Age 55 to 64	99.1	95.7	99.1	97.0	99.8	99.8	99.9
Age 65 & Over	99.3	97.9	99.1	98.6	99.8	100.0	100.0
<b>Cable Penetration Rates</b>							
<b>All Ages</b>	<b>73.4</b>	<b>62.5</b>	<b>66.3</b>	<b>64.4</b>	<b>70.3</b>	<b>76.7</b>	<b>82.2</b>
Age Under 35	72.4	60.0	64.8	62.3	70.3	77.3	82.0
Age 35 to 44	73.5	58.8	64.7	61.7	68.7	75.9	80.0
Age 45 to 54	75.6	59.7	66.1	62.7	69.6	75.6	82.9
Age 55 to 64	72.8	60.8	65.1	62.4	69.4	74.7	84.6
Age 65 & Over	72.9	68.7	68.1	68.4	72.5	81.5	84.7
<b>Computer Penetration Rates</b>							
<b>All Ages</b>	<b>28.8</b>	<b>11.5</b>	<b>13.1</b>	<b>12.3</b>	<b>20.2</b>	<b>32.5</b>	<b>50.2</b>
Age Under 35	29.2	18.7	20.3	19.4	25.3	32.4	43.3
Age 35 to 44	37.8	16.0	20.0	18.0	26.1	38.9	53.8
Age 45 to 54	39.8	11.5	17.8	14.4	26.0	35.9	57.9
Age 55 to 64	24.4	6.6	14.3	9.5	16.8	24.3	46.0
Age 65 & Over	10.1	5.4	5.0	5.2	8.9	18.1	27.5
<b>Modem Penetration Rates</b>							
<b>All Ages</b>	<b>12.0</b>	<b>4.8</b>	<b>4.8</b>	<b>4.8</b>	<b>7.3</b>	<b>13.6</b>	<b>22.4</b>
Age Under 35	13.4	7.8	8.2	8.0	10.4	15.2	22.7
Age 35 to 44	15.1	7.0	7.3	7.1	8.4	15.4	23.0
Age 45 to 54	16.9	6.5	6.0	6.3	8.4	14.9	25.8
Age 55 to 64	9.5	2.3	3.7	2.8	6.3	10.6	18.0
Age 65 & Over	3.8	1.7	1.9	1.8	3.1	6.0	13.6

**Table 3.N - 95: Numbers of Households by Age of Head, 1995**

Income Group	Lowest		Second	Lowest	Second	Third	Highest
	All	Octile	Octile	Quartile	Quartile	Quartile	Quartile
<b>Number of Households</b>							
<b>All Ages</b>	<b>11,243,815</b>	<b>1,405,828</b>	<b>1,406,516</b>	<b>2,811,144</b>	<b>2,810,471</b>	<b>2,810,949</b>	<b>2,811,051</b>
Age Under 35	2,835,197	389,376	347,180	736,556	777,180	782,044	539,417
Age 35 to 44	2,661,107	202,403	197,562	399,965	569,557	829,215	862,370
Age 45 to 54	2,065,534	159,889	139,406	299,295	373,326	562,121	830,792
Age 55 to 64	1,465,988	235,479	145,426	380,905	362,796	329,609	392,678
Age 65 & Over	2,215,789	418,481	575,942	994,423	727,612	307,960	185,794
<b>Number with Telephone</b>							
<b>All Ages</b>	<b>11,077,844</b>	<b>1,326,082</b>	<b>1,374,415</b>	<b>2,699,497</b>	<b>2,777,872</b>	<b>2,796,501</b>	<b>2,803,974</b>
Age Under 35	2,749,811	351,748	331,157	682,905	757,590	772,855	536,461
Age 35 to 44	2,627,694	187,230	190,897	378,127	563,212	826,057	860,298
Age 45 to 54	2,047,230	151,120	137,232	288,352	369,198	560,669	829,011
Age 55 to 64	1,452,992	225,395	144,124	369,519	362,049	329,014	392,410
Age 65 & Over	2,200,117	409,589	571,005	980,594	725,823	307,906	185,794
<b>Number with Cable</b>							
<b>All Ages</b>	<b>8,254,766</b>	<b>878,728</b>	<b>932,104</b>	<b>1,810,832</b>	<b>1,976,439</b>	<b>2,156,682</b>	<b>2,310,813</b>
Age Under 35	2,052,262	233,505	225,139	458,644	546,508	604,556	442,554
Age 35 to 44	1,957,156	119,068	127,829	246,897	391,001	629,700	689,558
Age 45 to 54	1,561,642	95,480	92,183	187,663	259,756	425,196	689,027
Age 55 to 64	1,067,960	143,131	94,616	237,747	251,693	246,226	332,294
Age 65 & Over	1,615,746	287,544	392,337	679,881	527,481	251,004	157,380
<b>Number with Computer</b>							
<b>All Ages</b>	<b>3,238,018</b>	<b>161,548</b>	<b>184,725</b>	<b>346,273</b>	<b>568,451</b>	<b>913,503</b>	<b>1,409,791</b>
Age Under 35	826,867	72,622	70,524	143,146	196,679	253,524	233,518
Age 35 to 44	1,006,691	32,388	39,581	71,969	148,758	322,422	463,542
Age 45 to 54	822,889	18,415	24,821	43,236	97,058	201,754	480,841
Age 55 to 64	358,081	15,529	20,727	36,256	61,006	80,064	180,755
Age 65 & Over	223,490	22,594	29,072	51,666	64,950	55,739	51,135
<b>Number with Modem</b>							
<b>All Ages</b>	<b>1,354,681</b>	<b>67,650</b>	<b>67,455</b>	<b>135,105</b>	<b>205,621</b>	<b>383,405</b>	<b>630,550</b>
Age Under 35	380,386	30,349	28,539	58,888	80,592	118,696	122,210
Age 35 to 44	401,973	14,199	14,363	28,562	47,612	127,445	198,354
Age 45 to 54	348,475	10,459	8,399	18,858	31,484	83,942	214,191
Age 55 to 64	139,136	5,387	5,310	10,697	23,027	34,843	70,569
Age 65 & Over	84,711	7,256	10,844	18,100	22,906	18,479	25,226

**Table 4 - 95: Penetration Rates (%) by Family Type, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Distribution of Households</b>							
<b>All Households</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
Others	29.8	9.0	6.3	15.3	7.3	4.7	2.5
<b>Single-Family</b>	<b>70.2</b>	<b>3.5</b>	<b>6.3</b>	<b>9.7</b>	<b>17.7</b>	<b>20.3</b>	<b>22.5</b>
Without Children	37.0	1.5	3.4	4.9	10.5	10.2	11.4
With Children	33.2	2.0	2.8	4.8	7.2	10.1	11.1
<b>Telephone Penetration Rates</b>							
<b>All Households</b>	<b>98.5</b>	<b>94.3</b>	<b>97.8</b>	<b>96.0</b>	<b>98.8</b>	<b>99.5</b>	<b>99.7</b>
Others	97.1	93.9	98.0	95.6	98.6	98.4	99.2
<b>Single-Family</b>	<b>99.1</b>	<b>95.2</b>	<b>97.5</b>	<b>96.7</b>	<b>98.9</b>	<b>99.7</b>	<b>99.8</b>
Without Children	99.5	97.9	98.9	98.6	99.3	99.7	99.8
With Children	98.7	93.2	95.9	94.8	98.4	99.8	99.8
<b>Cable Penetration Rates</b>							
<b>All Households</b>	<b>73.4</b>	<b>62.5</b>	<b>66.3</b>	<b>64.4</b>	<b>70.3</b>	<b>76.7</b>	<b>82.2</b>
Others	69.3	61.6	67.0	63.8	72.4	77.4	79.2
<b>Single-Family</b>	<b>75.2</b>	<b>65.0</b>	<b>65.6</b>	<b>65.4</b>	<b>69.5</b>	<b>76.6</b>	<b>82.5</b>
Without Children	75.5	63.9	63.0	63.3	70.8	78.3	82.4
With Children	74.8	65.7	68.8	67.5	67.5	74.8	82.6
<b>Computer Penetration Rates</b>							
<b>All Households</b>	<b>28.8</b>	<b>11.5</b>	<b>13.1</b>	<b>12.3</b>	<b>20.2</b>	<b>32.5</b>	<b>50.2</b>
Others	16.8	9.5	10.5	9.9	18.1	25.0	39.9
<b>Single-Family</b>	<b>33.9</b>	<b>16.7</b>	<b>15.8</b>	<b>16.1</b>	<b>21.1</b>	<b>34.2</b>	<b>51.3</b>
Without Children	28.0	17.3	13.1	14.4	16.6	27.5	44.8
With Children	40.4	16.3	19.1	18.0	27.7	41.0	58.0
<b>Modem Penetration Rates</b>							
<b>All Households</b>	<b>12.0</b>	<b>4.8</b>	<b>4.8</b>	<b>4.8</b>	<b>7.3</b>	<b>13.6</b>	<b>22.4</b>
Others	7.4	3.6	4.7	4.0	7.5	12.0	19.0
<b>Single-Family</b>	<b>14.0</b>	<b>8.0</b>	<b>4.9</b>	<b>6.0</b>	<b>7.2</b>	<b>14.0</b>	<b>22.8</b>
Without Children	11.8	8.3	4.8	5.9	6.1	11.8	19.7
With Children	16.5	7.8	5.1	6.2	8.9	16.2	26.0

"Others" are one-person and multi-family households

"Children are single (unmarried) children under age 18

**Table 4.N - 95: Number of Households by Family Type, 1995**

Income Group	Lowest		Second		Third		Highest
	All	Octile	Octile	Quartile	Quartile	Quartile	Quartile
<b>Number of Households</b>							
<b>All Households</b>	<b>11,243,615</b>	<b>1,405,628</b>	<b>1,405,516</b>	<b>2,811,144</b>	<b>2,810,471</b>	<b>2,810,949</b>	<b>2,811,051</b>
Others	3,345,492	1,012,759	702,731	1,715,490	823,901	529,439	276,662
<b>Single-Family</b>	<b>7,898,123</b>	<b>392,869</b>	<b>702,785</b>	<b>1,095,654</b>	<b>1,986,570</b>	<b>2,281,510</b>	<b>2,534,389</b>
Without Children	4,164,007	166,756	385,426	552,182	1,176,947	1,149,238	1,285,640
With Children	3,734,116	226,113	317,359	543,472	809,623	1,132,272	1,248,749
<b>Number with Telephone</b>							
<b>All Households</b>	<b>11,077,844</b>	<b>1,325,082</b>	<b>1,374,415</b>	<b>2,699,497</b>	<b>2,777,872</b>	<b>2,796,501</b>	<b>2,803,974</b>
Others	3,248,195	951,164	688,888	1,640,052	812,439	521,202	274,502
<b>Single-Family</b>	<b>7,829,649</b>	<b>373,918</b>	<b>685,527</b>	<b>1,059,445</b>	<b>1,965,433</b>	<b>2,275,299</b>	<b>2,529,472</b>
Without Children	4,142,319	163,180	381,257	544,437	1,168,854	1,145,647	1,283,381
With Children	3,687,330	210,738	304,270	515,008	796,579	1,129,652	1,246,091
<b>Number with Cable</b>							
<b>All Households</b>	<b>8,254,766</b>	<b>878,728</b>	<b>932,104</b>	<b>1,810,832</b>	<b>1,976,439</b>	<b>2,156,682</b>	<b>2,310,813</b>
Others	2,319,273	623,463	470,804	1,094,267	596,219	409,790	218,997
<b>Single-Family</b>	<b>5,935,493</b>	<b>255,265</b>	<b>461,300</b>	<b>716,565</b>	<b>1,380,220</b>	<b>1,746,892</b>	<b>2,091,816</b>
Without Children	3,142,393	106,625	242,968	349,593	833,425	899,416	1,059,959
With Children	2,793,100	148,640	218,332	366,972	546,795	847,476	1,031,857
<b>Number with Computer</b>							
<b>All Households</b>	<b>3,238,018</b>	<b>161,548</b>	<b>184,725</b>	<b>346,273</b>	<b>568,451</b>	<b>913,503</b>	<b>1,409,791</b>
Others	560,889	95,845	73,481	169,326	148,912	132,330	110,321
<b>Single-Family</b>	<b>2,677,129</b>	<b>65,703</b>	<b>111,244</b>	<b>176,947</b>	<b>419,539</b>	<b>781,173</b>	<b>1,299,470</b>
Without Children	1,166,862	28,801	50,544	79,345	195,535	316,548	575,434
With Children	1,510,267	36,902	60,700	97,602	224,004	464,625	724,036
<b>Number with Modem</b>							
<b>All Households</b>	<b>1,354,681</b>	<b>67,650</b>	<b>67,455</b>	<b>135,105</b>	<b>205,621</b>	<b>383,405</b>	<b>630,550</b>
Others	247,317	36,222	32,769	68,991	61,877	63,783	52,666
<b>Single-Family</b>	<b>1,107,364</b>	<b>31,428</b>	<b>34,686</b>	<b>66,114</b>	<b>143,744</b>	<b>319,622</b>	<b>577,884</b>
Without Children	492,662	13,844	18,565	32,409	71,693	135,738	252,822
With Children	614,702	17,584	16,121	33,705	72,051	183,884	325,062

"Others" are one-person and multi-family households

"Children are single (unmarried) children under age 18

Underlined numbers are not statistically reliable

**Table 5 - 95: Penetration Rates (%) by Education of Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Fourth Quartile
<b>Distribution of Households</b>							
<b>All</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
Less Than Grade 9	14.8	3.7	3.2	6.9	4.3	2.1	1.5
Grade 9 to 10	11.8	2.0	2.0	4.0	3.6	2.5	1.7
Grade 11 to 13 (NG)	5.3	0.8	0.8	1.6	1.4	1.3	0.9
Grade 11 to 13 (G)	18.1	1.9	2.0	3.9	4.7	5.2	4.3
Some PS (No D/D)	7.4	1.0	1.0	2.0	1.8	2.0	1.6
PS (D/D)	27.5	2.2	2.7	4.9	6.8	8.0	7.8
Univ Degree	15.1	0.9	0.8	1.7	2.3	3.8	7.3
<b>Telephone Penetration Rates</b>							
<b>All</b>	<b>98.5</b>	<b>94.3</b>	<b>97.8</b>	<b>96.0</b>	<b>98.8</b>	<b>99.5</b>	<b>99.7</b>
Less Than Grade 9	97.7	94.3	97.4	95.7	99.2	99.7	99.6
Grade 9 to 10	97.6	93.0	97.7	95.3	98.1	99.3	99.2
Grade 11 to 13 (NG)	97.5	93.3	96.6	95.0	97.9	98.5	99.8
Grade 11 to 13 (G)	98.6	93.7	98.2	96.0	99.0	99.4	99.6
Some PS (No D/D)	97.9	92.5	96.9	94.7	98.6	99.0	99.6
PS (D/D)	99.1	95.6	98.6	97.2	98.8	99.7	99.9
Univ Degree	99.7	97.9	98.5	98.2	99.8	99.8	99.9
<b>Cable Penetration Rates</b>							
<b>All</b>	<b>73.4</b>	<b>62.5</b>	<b>66.3</b>	<b>64.4</b>	<b>70.3</b>	<b>76.7</b>	<b>82.2</b>
Less Than Grade 9	63.7	58.6	60.6	59.5	62.6	71.9	74.4
Grade 9 to 10	70.6	61.0	71.5	66.2	70.2	72.0	80.3
Grade 11 to 13 (NG)	73.0	64.7	71.2	68.1	70.4	74.3	84.2
Grade 11 to 13 (G)	77.3	69.7	70.5	70.1	75.5	79.7	82.9
Some PS (No D/D)	74.0	63.0	66.1	64.5	69.7	79.7	84.1
PS (D/D)	74.4	62.9	64.9	64.0	70.8	76.9	81.6
Univ Degree	78.4	63.7	65.9	64.7	73.4	77.3	83.7
<b>Computer Penetration Rates</b>							
<b>All</b>	<b>28.8</b>	<b>11.5</b>	<b>13.1</b>	<b>12.3</b>	<b>20.2</b>	<b>32.5</b>	<b>50.2</b>
Less Than Grade 9	9.1	4.3	4.6	4.5	7.1	14.9	27.8
Grade 9 to 10	14.9	3.9	7.1	5.5	13.8	20.0	32.4
Grade 11 to 13 (NG)	17.7	6.4	14.3	10.4	16.1	18.8	31.7
Grade 11 to 13 (G)	26.1	11.1	13.1	12.1	20.2	29.6	40.9
Some PS (No D/D)	33.6	18.7	23.9	21.3	26.4	36.2	54.7
PS (D/D)	33.3	16.2	16.4	16.3	23.9	35.4	49.9
Univ Degree	55.6	43.6	37.4	40.7	41.7	51.2	65.8
<b>Modem Penetration Rates</b>							
<b>All</b>	<b>12.0</b>	<b>4.8</b>	<b>4.8</b>	<b>4.8</b>	<b>7.3</b>	<b>13.6</b>	<b>22.4</b>
Less Than Grade 9	2.8	0.9	2.0	1.4	1.7	5.6	8.0
Grade 9 to 10	4.7	0.9	2.0	1.4	3.2	6.8	12.4
Grade 11 to 13 (NG)	6.6	3.5	6.2	4.9	5.9	5.4	12.5
Grade 11 to 13 (G)	10.0	5.6	4.5	5.0	7.1	12.2	14.9
Some PS (No D/D)	14.3	8.6	7.2	7.9	9.5	15.7	26.3
PS (D/D)	13.8	5.6	5.5	5.6	9.2	15.1	21.7
Univ Degree	27.0	22.8	16.9	20.1	18.3	23.3	33.3

Less Than Grade 9      No schooling or grade 8 or lower, no other education  
Grade 9 to 10            Grade 9-10, no other education  
Grade 11 to 13 (NG)    Grade 11-13 did not graduate from high school, no other education  
Grade 11 to 13 (G)    Grade 11-13, graduated from high school, no other education  
Some PS (No D/D)      Some post secondary, no degree or certificate  
PS (D/D)                Post secondary certificate or diploma (includes trades certificate)  
Univ Degree             University Degree

Underlined numbers are not statistically reliable

**Table 5.N - 95: Number of Households by Education of Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Fourth Quartile
<b>Number of Households</b>							
<b>All</b>	<b>11,243,615</b>	<b>1,406,628</b>	<b>1,405,516</b>	<b>2,811,144</b>	<b>2,810,471</b>	<b>2,810,949</b>	<b>2,811,051</b>
Less Than Grade 9	1,660,649	411,848	360,264	772,112	485,862	237,019	165,656
Grade 9 to 10	1,326,960	228,222	224,766	452,988	402,439	283,970	187,563
Grade 11 to 13 (NG)	598,591	90,432	94,639	185,071	161,243	147,842	104,435
Grade 11 to 13 (G)	2,031,638	210,865	223,701	434,566	529,495	587,442	480,135
Some PS (No D/D)	831,158	114,012	111,221	225,233	206,287	224,333	175,305
PS (D/D)	3,097,123	249,821	301,370	551,191	765,523	900,589	879,820
Univ Degree	1,697,496	100,428	89,555	189,983	259,622	429,754	818,137
<b>Number with Telephone</b>							
<b>All</b>	<b>11,077,844</b>	<b>1,325,082</b>	<b>1,374,415</b>	<b>2,699,497</b>	<b>2,777,872</b>	<b>2,796,501</b>	<b>2,803,974</b>
Less Than Grade 9	1,622,371	388,167	350,834	739,001	482,064	236,354	164,952
Grade 9 to 10	1,294,825	212,247	219,592	431,839	394,879	282,007	186,100
Grade 11 to 13 (NG)	583,348	84,354	91,374	175,728	157,821	145,578	104,221
Grade 11 to 13 (G)	2,003,289	197,619	219,591	417,210	524,017	583,918	478,144
Some PS (No D/D)	813,390	105,503	107,745	213,248	203,310	222,178	174,654
PS (D/D)	3,068,870	238,897	297,028	535,925	756,718	897,509	878,718
Univ Degree	1,691,751	98,295	88,251	186,546	259,063	428,957	817,185
<b>Number with Cable</b>							
<b>All</b>	<b>8,254,766</b>	<b>878,728</b>	<b>932,104</b>	<b>1,810,832</b>	<b>1,976,439</b>	<b>2,156,682</b>	<b>2,310,813</b>
Less Than Grade 9	1,057,240	241,260	218,204	459,464	304,237	170,305	123,234
Grade 9 to 10	937,329	139,232	160,685	299,917	282,422	204,374	150,616
Grade 11 to 13 (NG)	437,257	58,531	67,421	125,952	113,508	109,853	87,944
Grade 11 to 13 (G)	1,571,268	146,894	157,722	304,616	399,926	468,457	398,269
Some PS (No D/D)	615,391	71,813	73,540	145,353	143,761	178,850	147,427
PS (D/D)	2,305,250	157,066	195,482	352,548	542,024	692,461	718,217
Univ Degree	1,331,031	63,932	59,050	122,982	190,561	332,382	685,106
<b>Number with Computer</b>							
<b>All</b>	<b>3,238,018</b>	<b>161,548</b>	<b>184,725</b>	<b>346,273</b>	<b>568,451</b>	<b>913,503</b>	<b>1,409,791</b>
Less Than Grade 9	150,469	17,829	16,671	34,500	34,553	35,379	46,037
Grade 9 to 10	197,935	8,810	15,978	24,788	55,598	56,711	60,838
Grade 11 to 13 (NG)	106,061	5,823	13,492	19,315	25,908	27,732	33,106
Grade 11 to 13 (G)	530,343	23,433	29,264	52,697	106,947	174,108	196,591
Some PS (No D/D)	279,388	21,375	26,550	47,925	54,424	81,167	95,872
PS (D/D)	1,030,085	40,508	49,306	89,814	182,764	318,475	439,032
Univ Degree	943,737	43,770	33,464	77,234	108,257	219,931	538,315
<b>Number with Modem</b>							
<b>All</b>	<b>1,354,681</b>	<b>67,650</b>	<b>67,455</b>	<b>135,105</b>	<b>205,621</b>	<b>383,405</b>	<b>630,550</b>
Less Than Grade 9	45,994	3,708	7,314	11,022	8,442	13,343	13,187
Grade 9 to 10	62,023	2,122	4,436	6,558	12,858	19,266	23,341
Grade 11 to 13 (NG)	39,577	3,161	5,910	9,071	9,547	7,946	13,013
Grade 11 to 13 (G)	202,292	11,813	9,977	21,790	37,407	71,532	71,563
Some PS (No D/D)	118,725	9,844	8,046	17,890	19,532	35,252	46,051
PS (D/D)	427,988	14,061	16,607	30,668	70,242	136,122	190,956
Univ Degree	458,082	22,941	15,165	38,106	47,593	99,944	272,439

Less Than Grade 9 No schooling or grade 8 or lower, no other education  
 Grade 9 to 10 Grade 9-10, no other education  
 Grade 11 to 13 (NG) Grade 11-13, did not graduate from high school, no other education  
 Grade 11 to 13 (G) Grade 11-13, graduated from high school, no other education  
 Some PS (No D/D) Some post secondary, no degree or certificate  
 PS (D/D) Post secondary certificate or diploma (includes trades certificate)  
 Univ Degree University Degree

Numbers less than 4,000 are not statistically reliable



**Table 5.1 - 95: Penetration Rates (%) by Education of Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Fourth Quartile
<b>Distribution of Households</b>							
All	100	12.5	12.5	25.0	25.0	25.0	25.0
Not Graduate High	31.9	6.5	6.0	12.5	9.3	5.9	4.1
No Other Certificate	25.5	2.9	3.0	5.9	6.5	7.2	5.8
Cert. Dip, Degree	42.6	3.1	3.5	6.6	9.1	11.8	15.1
<b>Telephone Penetration Rates</b>							
All	98.5	94.3	97.8	96.0	98.8	99.5	99.7
Not Graduate High	97.6	93.7	97.4	95.5	98.6	99.3	99.5
No Other Certificate	98.4	93.3	97.7	95.6	98.9	99.3	99.6
Cert. Dip, Degree	99.3	96.3	98.6	97.5	99.1	99.7	99.9
<b>Cable Penetration Rates</b>							
All	73.4	62.5	66.3	64.4	70.3	76.7	82.2
Not Graduate High	67.8	60.1	65.7	62.8	66.7	72.4	79.1
No Other Certificate	76.4	67.3	69.0	68.2	73.9	79.7	83.3
Cert. Dip, Degree	75.8	63.1	65.1	64.2	71.5	77.0	82.6
<b>Computer Penetration Rates</b>							
All	28.8	11.5	13.1	12.3	20.2	32.5	50.2
Not Graduate High	12.7	4.4	6.8	5.6	11.1	17.9	30.6
No Other Certificate	28.3	13.8	16.7	15.3	21.9	31.4	44.6
Cert. Dip, Degree	41.2	24.1	21.2	22.5	28.4	40.5	57.6
<b>Modem Penetration Rates</b>							
All	12.0	4.8	4.8	4.8	7.3	13.6	22.4
Not Graduate High	4.1	1.2	2.6	1.9	2.9	6.1	10.8
No Other Certificate	11.2	6.7	5.4	6.0	7.7	13.2	17.9
Cert. Dip, Degree	18.5	10.6	8.1	9.3	11.5	17.7	27.3

**Table 5.1.N - 95: Number of Households by Education of Head, 1995**

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Fourth Quartile
<b>Number of Households</b>							
All	11,243,616	1,405,628	1,405,516	2,811,144	2,810,471	2,810,949	2,811,051
Not Graduate High	3,586,200	730,502	679,669	1,410,171	1,049,544	668,831	457,654
No Other Certificate	2,862,796	324,877	334,922	659,799	735,782	811,775	655,440
Cert. Dip, Degree	4,794,619	350,249	390,925	741,174	1,025,145	1,330,343	1,697,957
<b>Number with Telephone</b>							
All	11,077,844	1,325,082	1,374,415	2,699,497	2,777,872	2,796,501	2,803,974
Not Graduate High	3,500,544	684,768	661,800	1,346,568	1,034,764	663,939	455,273
No Other Certificate	2,816,679	303,122	327,336	630,458	727,327	806,096	652,798
Cert. Dip, Degree	4,760,621	337,192	385,279	722,471	1,015,781	1,326,466	1,695,903
<b>Number with Cable</b>							
All	8,254,766	878,728	932,104	1,810,832	1,976,439	2,156,682	2,310,813
Not Graduate High	2,431,826	439,023	446,310	885,333	700,167	484,532	361,794
No Other Certificate	2,186,659	218,707	231,262	449,969	543,687	647,307	545,696
Cert. Dip, Degree	3,636,281	220,998	254,532	475,530	732,585	1,024,843	1,403,323
<b>Number with Computer</b>							
All	3,238,018	161,548	184,725	346,273	568,451	913,503	1,409,791
Not Graduate High	454,465	32,462	46,141	78,603	116,059	119,822	139,981
No Other Certificate	809,731	44,808	55,814	100,622	161,371	255,275	292,463
Cert. Dip, Degree	1,973,822	84,278	82,770	167,048	291,021	538,406	977,347
<b>Number with Modem</b>							
All	1,354,681	67,650	67,455	135,105	205,621	383,405	630,550
Not Graduate High	147,594	8,991	17,660	26,651	30,847	40,555	49,541
No Other Certificate	321,017	21,657	18,023	39,680	56,939	106,784	117,614
Cert. Dip, Degree	886,070	37,002	31,772	68,774	117,835	236,066	463,395

Not Graduate High Did not graduate high school  
 No Other Certificate No or some post-secondary education, no certificate or diploma  
 Cert. Dip, Deg. Post-secondary certificate or diploma, or university degree

Numbers less than 4,000 are not statistically reliable

**Table 6 - 95: Household Penetration Rates (%) by Province , 1995**

Income Group	Lowest		Second	Lowest		Second	Third	Highest
	All	Octile	Octile	Quartile	Quartile	Quartile	Quartile	Quartile
<b>Distribution of Households</b>								
<b>Canada</b>	<b>100</b>	<b>12.5</b>	<b>12.5</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
Newfoundland	1.7	0.3	0.3	0.5	0.5	0.4	0.3	
PEI	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nova Scotia	3.2	0.5	0.5	1.0	0.9	0.8	0.6	0.6
New Brunswick	2.5	0.4	0.3	0.7	0.7	0.6	0.4	0.4
Quebec	26.1	4.4	3.6	8.0	6.9	6.3	5.0	
Ontario	36.8	3.5	4.3	7.8	8.6	9.2	11.3	
Manitoba	3.7	0.5	0.5	1.0	1.0	0.9	0.8	0.8
Saskatchewan	3.4	0.6	0.5	1.0	1.0	0.8	0.6	0.6
Alberta	9.0	0.8	1.1	2.0	2.2	2.4	2.4	2.4
BC	13.0	1.5	1.5	3.0	3.1	3.5	3.5	3.5
<b>Telephone Penetration Rates</b>								
<b>Canada</b>	<b>98.5</b>	<b>94.3</b>	<b>97.8</b>	<b>96.0</b>	<b>98.8</b>	<b>99.5</b>	<b>99.7</b>	
Newfoundland	96.9	89.5	96.9	93.1	97.0	99.6	99.6	
PEI	97.5	92.5	99.1	96.0	95.9	99.3	100.0	
Nova Scotia	97.4	92.6	96.9	94.7	97.1	99.7	99.1	
New Brunswick	97.9	93.7	96.7	95.0	98.4	99.3	99.7	
Quebec	98.9	95.7	98.7	97.0	99.6	99.7	100.0	
Ontario	98.8	95.1	98.0	96.7	98.6	99.3	99.8	
Manitoba	98.3	93.1	97.6	95.2	98.7	99.7	99.9	
Saskatchewan	97.7	91.3	96.8	93.8	98.7	99.7	100.0	
Alberta	98.5	92.9	97.4	95.5	99.0	99.5	99.7	
BC	98.1	92.0	96.3	94.1	98.8	99.4	99.4	
<b>Cable Penetration Rates</b>								
<b>Canada</b>	<b>73.4</b>	<b>62.5</b>	<b>66.3</b>	<b>64.4</b>	<b>70.3</b>	<b>76.7</b>	<b>82.2</b>	
Newfoundland	81.9	64.5	71.0	67.7	80.3	91.1	96.6	
PEI	68.4	69.7	69.0	69.3	64.0	66.2	78.8	
Nova Scotia	75.5	62.1	70.6	66.2	74.8	78.7	87.8	
New Brunswick	69.3	61.8	65.9	63.6	66.5	71.2	80.8	
Quebec	64.2	49.1	54.9	51.7	62.3	71.1	78.0	
Ontario	78.2	75.0	73.3	74.1	74.4	79.3	83.0	
Manitoba	66.9	55.1	54.2	54.7	67.1	72.0	76.4	
Saskatchewan	58.8	53.2	50.7	52.1	56.4	61.1	70.5	
Alberta	70.6	64.2	61.0	62.3	68.0	73.6	76.8	
BC	85.4	77.5	84.5	81.0	82.5	86.4	90.8	
<b>Computer Penetration Rates</b>								
<b>Canada</b>	<b>28.8</b>	<b>11.5</b>	<b>13.1</b>	<b>12.3</b>	<b>20.2</b>	<b>32.5</b>	<b>50.2</b>	
Newfoundland	19.4	5.6	7.0	6.3	11.1	27.6	43.8	
PEI	16.2	5.3	5.2	5.3	6.9	21.5	42.5	
Nova Scotia	22.4	7.1	8.7	7.8	18.7	29.3	43.5	
New Brunswick	19.9	8.0	7.4	7.8	14.9	25.5	41.0	
Quebec	23.5	10.7	10.9	10.8	18.1	27.9	45.8	
Ontario	32.5	13.3	13.8	13.6	21.0	35.2	52.0	
Manitoba	24.7	7.1	15.7	11.0	19.5	28.9	44.6	
Saskatchewan	23.5	7.7	8.2	7.9	19.2	30.9	45.6	
Alberta	34.1	13.5	18.2	16.2	26.1	35.6	54.7	
BC	32.8	15.0	17.7	16.3	23.0	35.6	52.4	
<b>Modem Penetration Rates</b>								
<b>Canada</b>	<b>12.0</b>	<b>4.8</b>	<b>4.8</b>	<b>4.8</b>	<b>7.3</b>	<b>13.6</b>	<b>22.4</b>	
Newfoundland	7.0	2.3	1.4	1.9	3.4	8.0	20.1	
PEI	8.1	2.4	1.2	1.8	1.0	11.8	25.2	
Nova Scotia	9.1	3.8	4.5	4.1	7.1	11.3	18.0	
New Brunswick	8.8	3.5	2.4	3.0	6.1	10.8	20.5	
Quebec	8.4	4.1	4.2	4.1	5.5	10.5	16.5	
Ontario	14.5	6.0	4.6	5.2	8.0	15.3	25.4	
Manitoba	8.9	2.3	5.1	3.6	6.0	10.7	17.6	
Saskatchewan	7.7	3.0	0.9	2.0	5.0	11.1	16.8	
Alberta	15.7	5.5	8.6	7.3	10.6	15.9	26.9	
BC	14.0	6.7	6.5	6.6	9.7	16.5	21.6	

Underlined Numbers are not statistically reliable

**Table 6 . N - 95: Numbers of Households by Province, 1995**

Income Group	Total	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Number of Households</b>							
<b>Canada</b>	<b>11,243,615</b>	<b>1,405,628</b>	<b>1,405,516</b>	<b>2,811,144</b>	<b>2,810,471</b>	<b>2,810,949</b>	<b>2,811,051</b>
Newfoundland	194,137	29,945	29,308	59,253	55,113	44,276	35,495
PEI	49,568	6,198	6,835	13,033	15,063	13,367	8,105
Nova Scotia	357,426	55,209	51,861	107,070	101,520	85,045	63,791
New Brunswick	285,559	47,062	36,798	83,860	82,161	70,936	48,602
Quebec	2,936,811	490,208	404,147	894,355	773,850	704,763	563,843
Ontario	4,142,890	393,596	479,676	873,272	964,679	1,037,210	1,267,729
Manitoba	418,769	60,925	51,527	112,452	114,226	106,659	85,432
Saskatchewan	385,456	62,151	52,531	114,682	110,571	88,115	72,088
Alberta	1,009,183	93,087	127,055	220,142	248,206	270,510	270,325
BC	1,463,816	167,247	165,778	333,025	345,082	390,068	395,641
<b>Number with Telephone</b>							
<b>Canada</b>	<b>11,077,844</b>	<b>1,325,082</b>	<b>1,374,415</b>	<b>2,699,497</b>	<b>2,777,872</b>	<b>2,796,501</b>	<b>2,803,974</b>
Newfoundland	188,065	26,800	28,385	55,185	53,454	44,080	35,346
PEI	48,340	5,735	6,774	12,509	14,447	13,279	8,105
Nova Scotia	348,045	51,109	50,279	101,388	98,595	84,828	63,234
New Brunswick	279,420	44,084	35,580	79,664	80,859	70,443	48,454
Quebec	2,904,820	469,090	398,728	867,818	770,568	702,591	563,843
Ontario	4,091,257	374,420	470,121	844,541	951,622	1,030,296	1,264,798
Manitoba	411,463	56,700	50,316	107,016	112,765	106,377	85,305
Saskatchewan	376,657	56,735	50,856	107,591	109,127	87,851	72,088
Alberta	994,461	86,522	123,720	210,242	245,600	269,090	269,529
BC	1,435,316	153,887	159,656	313,543	340,835	387,666	393,272
<b>Number with Cable</b>							
<b>Canada</b>	<b>8,254,766</b>	<b>878,728</b>	<b>932,104</b>	<b>1,810,832</b>	<b>1,976,439</b>	<b>2,156,682</b>	<b>2,310,813</b>
Newfoundland	158,966	19,306	20,814	40,120	44,230	40,331	34,285
PEI	33,905	4,317	4,713	9,030	9,639	8,848	6,388
Nova Scotia	269,812	34,292	36,622	70,914	75,915	66,966	56,017
New Brunswick	197,781	29,071	24,265	53,336	54,660	50,530	39,255
Quebec	1,885,531	240,779	221,817	462,596	481,878	501,131	439,926
Ontario	3,238,876	295,075	351,742	646,817	717,874	822,247	1,051,938
Manitoba	280,161	33,563	27,917	61,480	76,615	76,783	65,283
Saskatchewan	226,752	33,040	26,654	59,694	62,385	53,862	50,811
Alberta	712,723	59,723	77,532	137,255	168,678	199,088	207,702
BC	1,250,259	129,562	140,028	269,590	284,565	336,896	359,208
<b>Number with Computer</b>							
<b>Canada</b>	<b>3,238,018</b>	<b>161,548</b>	<b>184,725</b>	<b>346,273</b>	<b>568,451</b>	<b>913,503</b>	<b>1,409,791</b>
Newfoundland	37,645	1,691	2,050	3,741	6,128	12,216	15,560
PEI	8,048	328	358	686	1,044	2,874	3,444
Nova Scotia	80,050	3,913	4,489	8,402	18,940	24,946	27,762
New Brunswick	56,721	3,784	2,718	6,502	12,249	18,054	19,916
Quebec	691,408	52,582	44,228	96,810	139,844	196,740	258,014
Ontario	1,345,728	52,503	66,141	118,644	202,367	365,599	659,118
Manitoba	103,618	4,356	8,068	12,424	22,295	30,804	38,095
Saskatchewan	90,483	4,762	4,327	9,089	21,251	27,262	32,881
Alberta	344,634	12,562	23,081	35,643	64,905	96,270	147,816
BC	479,683	25,067	29,265	54,332	79,428	138,738	207,185
<b>Number with Modem</b>							
<b>Canada</b>	<b>1,354,681</b>	<b>67,650</b>	<b>67,455</b>	<b>135,105</b>	<b>205,621</b>	<b>383,405</b>	<b>630,550</b>
Newfoundland	13,682	687	410	1,097	1,892	3,549	7,144
PEI	4,002	146	83	229	158	1,576	2,039
Nova Scotia	32,694	2,073	2,324	4,397	7,200	9,634	11,463
New Brunswick	25,129	1,639	900	2,539	4,997	7,636	9,957
Quebec	246,104	19,930	16,936	36,866	42,391	73,793	93,054
Ontario	602,488	23,580	21,995	45,575	76,754	158,618	321,541
Manitoba	37,331	1,388	2,642	4,030	6,839	11,393	15,069
Saskatchewan	29,750	1,850	459	2,309	5,542	9,789	12,110
Alberta	158,119	5,108	10,940	16,048	26,421	43,055	72,595
BC	205,382	11,249	10,766	22,015	33,427	64,362	85,578

Numbers less than 4,000 are not statistically reliable

Table 7: Penetration Rates by Province, Various Years

	1995	1994	1993	1991	1990	1986	1985
<b>Distribution of Households</b>							
<b>All Provinces</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Newfoundland	1.7	1.7	1.8	1.7	1.8	1.8	1.8
PEI	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Nova Scotia	3.2	3.1	3.2	3.2	3.2	3.2	3.2
New Brunswick	2.5	2.5	2.5	2.5	2.6	2.6	2.6
Quebec	26.1	26.1	26.1	26.5	26.2	26.2	26.1
Ontario	36.8	37.3	37.2	36.7	36.6	36.3	36.2
Manitoba	3.7	3.8	3.8	3.9	4.1	4.3	4.2
Saskatchewan	3.4	3.5	3.5	3.5	3.7	3.9	4.0
Alberta	9.0	8.9	9.0	9.1	9.0	9.4	9.4
BC	13.0	12.7	12.5	12.3	12.5	12.0	12.1
<b>Telephone Penetration Rates</b>							
<b>All Provinces</b>	<b>98.5</b>	<b>99.0</b>	<b>98.9</b>	<b>98.0</b>	<b>98.5</b>	<b>98.1</b>	<b>98.1</b>
Newfoundland	96.9	97.7	97.5	97.8	97.9	96.1	94.5
PEI	97.5	98.6	97.5	96.7	97.5	96.5	95.8
Nova Scotia	97.4	98.9	98.3	97.3	98.5	97.4	96.5
New Brunswick	97.9	98.5	98.2	99.2	97.7	96.6	94.8
Quebec	98.9	98.8	98.7	97.5	98.5	97.7	98.5
Ontario	98.8	99.4	99.5	98.5	98.8	98.9	99.0
Manitoba	98.3	98.5	98.2	97.5	98.1	97.8	97.1
Saskatchewan	97.7	98.5	97.9	97.3	97.7	97.8	97.3
Alberta	98.5	99.0	98.9	98.4	98.0	98.1	97.9
BC	98.1	98.8	99.1	97.6	98.5	97.9	97.6
<b>Cable Penetration Rates</b>							
<b>All Provinces</b>	<b>73.4</b>	<b>74.3</b>	<b>72.6</b>	<b>70.8</b>	<b>71.4</b>	<b>65.4</b>	<b>62.9</b>
Newfoundland	81.9	79.2	75.5	77.9	77.2	48.6	43.1
PEI	68.4	66.5	63.6	55.6	51.0	46.0	41.6
Nova Scotia	75.5	75.3	72.3	72.0	70.7	59.4	56.2
New Brunswick	69.3	72.2	71.4	67.2	66.0	55.2	52.4
Quebec	64.2	66.6	64.3	60.6	62.8	56.4	51.4
Ontario	78.2	78.9	77.7	76.3	76.0	70.2	68.9
Manitoba	66.9	68.8	68.3	66.5	66.8	64.7	63.4
Saskatchewan	58.8	59.4	55.4	51.1	51.6	48.7	44.6
Alberta	70.6	71.5	69.0	70.3	70.8	66.3	64.2
BC	85.4	84.1	83.8	83.8	84.9	82.1	82.0
<b>Computer Penetration Rates</b>							
<b>All Provinces</b>	<b>28.8</b>	<b>25.0</b>	<b>23.2</b>	<b>18.5</b>	<b>16.2</b>	<b>10.3</b>	-
Newfoundland	19.4	15.3	13.9	11.6	12.2	10.3	-
PEI	16.2	13.3	12.9	8.3	9.0	6.3	-
Nova Scotia	22.4	18.3	18.9	13.1	12.5	11.8	-
New Brunswick	19.9	15.8	14.1	11.5	10.4	9.6	-
Quebec	23.5	19.4	19.1	14.5	12.1	8.7	-
Ontario	32.5	28.2	26.0	21.3	19.4	11.5	-
Manitoba	24.7	18.3	18.9	14.6	10.5	9.3	-
Saskatchewan	23.5	20.7	21.2	17.4	14.1	8.7	-
Alberta	34.1	28.9	27.1	23.2	19.8	12.0	-
BC	32.8	32.6	27.3	21.1	18.1	9.8	-
<b>Modem Penetration Rates</b>							
<b>All Provinces</b>	<b>12.0</b>	<b>8.4</b>	-	-	-	-	-
Newfoundland	7.0	3.8	-	-	-	-	-
PEI	8.1	4.9	-	-	-	-	-
Nova Scotia	9.1	6.9	-	-	-	-	-
New Brunswick	8.8	4.9	-	-	-	-	-
Quebec	8.4	5.5	-	-	-	-	-
Ontario	14.5	9.8	-	-	-	-	-
Manitoba	8.9	5.6	-	-	-	-	-
Saskatchewan	7.7	6.0	-	-	-	-	-
Alberta	15.7	10.3	-	-	-	-	-
BC	14.0	12.3	-	-	-	-	-

Underlined numbers are not statistically reliable

Table 7.N: Numbers of Households by Province, Various Years

	1995	1994	1993	1991	1990	1986	1985
<b>All Households</b>							
<b>All Provinces</b>	<b>11,243,615</b>	<b>11,051,303</b>	<b>10,885,704</b>	<b>10,465,979</b>	<b>10,203,350</b>	<b>9,448,053</b>	<b>9,253,041</b>
Newfoundland	194,137	191,316	193,462	180,873	179,204	166,003	162,440
PEI	49,568	47,419	47,231	44,279	43,585	40,979	40,370
Nova Scotia	357,426	343,360	344,482	332,445	325,714	303,382	299,521
New Brunswick	285,559	274,696	273,888	264,428	260,924	243,117	236,196
Quebec	2,936,811	2,880,888	2,842,172	2,774,463	2,676,962	2,473,546	2,411,187
Ontario	4,142,890	4,120,085	4,047,406	3,845,254	3,731,035	3,428,546	3,351,007
Manitoba	418,769	424,029	414,628	408,625	417,130	401,593	392,610
Saskatchewan	385,456	383,580	383,684	370,713	374,071	371,225	367,293
Alberta	1,009,183	987,477	981,704	954,524	921,648	888,253	871,638
BC	1,463,816	1,398,453	1,357,047	1,290,375	1,273,077	1,131,409	1,120,779
<b>Households with Telephone</b>							
<b>All Provinces</b>	<b>11,077,844</b>	<b>10,938,588</b>	<b>10,770,989</b>	<b>10,258,058</b>	<b>10,048,744</b>	<b>9,269,780</b>	<b>9,081,790</b>
Newfoundland	188,065	186,894	188,666	176,972	175,525	159,579	153,482
PEI	48,340	46,745	46,051	42,824	42,513	39,545	38,655
Nova Scotia	348,045	339,461	338,785	323,596	320,844	295,637	288,932
New Brunswick	279,420	270,534	268,978	262,356	254,949	234,778	223,915
Quebec	2,904,820	2,845,710	2,804,371	2,705,365	2,637,805	2,416,002	2,374,086
Ontario	4,091,257	4,093,985	4,025,321	3,789,015	3,685,892	3,389,180	3,316,629
Manitoba	411,463	417,569	407,285	398,306	409,382	392,686	381,274
Saskatchewan	376,657	377,885	375,636	360,847	365,311	362,985	357,510
Alberta	994,461	977,521	970,709	938,952	902,826	871,261	853,146
BC	1,435,316	1,382,284	1,345,187	1,259,825	1,253,697	1,108,127	1,094,161
<b>Households with Cable</b>							
<b>All Provinces</b>	<b>8,254,766</b>	<b>8,211,069</b>	<b>7,904,117</b>	<b>7,412,756</b>	<b>7,286,211</b>	<b>6,176,531</b>	<b>5,816,952</b>
Newfoundland	158,966	151,589	146,159	140,931	138,304	80,674	70,091
PEI	33,905	31,548	30,060	24,626	22,248	18,864	16,779
Nova Scotia	269,812	258,403	249,150	239,317	230,189	180,321	168,403
New Brunswick	197,781	198,359	195,440	177,723	172,165	134,105	123,759
Quebec	1,885,531	1,918,777	1,828,019	1,681,953	1,681,000	1,396,223	1,238,759
Ontario	3,238,876	3,250,518	3,145,265	2,934,586	2,837,046	2,407,645	2,307,416
Manitoba	280,161	291,819	283,270	271,859	278,554	259,746	249,014
Saskatchewan	226,752	227,811	212,522	189,410	193,044	180,900	163,821
Alberta	712,723	705,817	677,192	671,038	652,414	588,651	559,649
BC	1,250,259	1,176,428	1,137,040	1,081,313	1,081,247	929,402	919,261
<b>Households with Computer</b>							
<b>All Provinces</b>	<b>3,238,018</b>	<b>2,760,940</b>	<b>2,528,212</b>	<b>1,938,688</b>	<b>1,653,278</b>	<b>974,428</b>	<b>-</b>
Newfoundland	37,645	29,325	26,865	20,952	21,936	17,143	-
PEI	8,048	6,289	6,093	3,678	3,940	2,582	-
Nova Scotia	80,050	62,894	65,255	43,630	40,729	35,850	-
New Brunswick	56,721	43,425	38,661	30,527	27,193	23,429	-
Quebec	691,408	559,525	542,688	402,865	324,646	214,531	-
Ontario	1,345,728	1,160,161	1,053,035	818,689	725,296	394,258	-
Manitoba	103,618	77,779	78,180	59,704	43,880	37,334	-
Saskatchewan	90,483	79,472	81,416	64,591	52,637	32,402	-
Alberta	344,634	285,793	266,056	221,352	182,756	106,486	-
BC	479,683	456,277	369,963	272,700	230,265	110,413	-
<b>Households with Modem</b>							
<b>All Provinces</b>	<b>1,354,681</b>	<b>930,555</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
Newfoundland	13,682	7,194	-	-	-	-	-
PEI	4,002	2,318	-	-	-	-	-
Nova Scotia	32,694	23,547	-	-	-	-	-
New Brunswick	25,129	13,440	-	-	-	-	-
Quebec	246,104	157,247	-	-	-	-	-
Ontario	602,488	405,350	-	-	-	-	-
Manitoba	37,331	23,865	-	-	-	-	-
Saskatchewan	29,750	23,177	-	-	-	-	-
Alberta	158,119	102,097	-	-	-	-	-
BC	205,382	172,320	-	-	-	-	-

Numbers less than 4,000 are not statistically reliable

Table 8 - 95: Modern Penetration Rates for Households with Computers, 1995

Income Group	All	Lowest Octile	Second Octile	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile
<b>Incidence by Labour Force Component</b>							
All	41.8	41.9	36.5	39.0	36.2	42.0	44.7
Out of Labour Force	39.1	37.9	36.2	37.0	36.3	40.9	43.7
<b>Labour Force</b>	<b>42.3</b>	<b>45.0</b>	<b>36.7</b>	<b>40.5</b>	<b>36.1</b>	<b>42.1</b>	<b>44.8</b>
Employed	42.5	40.0	38.1	38.9	37.5	42.5	44.2
Unemployed	38.8	48.5	26.9	37.4	31.0	41.1	46.3
Self-Employed	42.9	54.7	45.9	50.4	32.8	39.0	50.5
<b>Incidence by Residential Location</b>							
All	41.8	41.9	36.5	39.0	36.2	42.0	44.7
Urban	43.5	42.6	39.0	40.7	38.6	43.7	45.8
Rural	29.2	32.9	14.0	21.7	24.8	30.4	33.5
<b>Incidence by Age of Head</b>							
All Ages	41.8	41.9	36.5	39.0	36.2	42.0	44.7
Age Under 35	46.0	41.8	40.5	41.1	41.0	46.8	52.3
Age 35 to 44	39.9	43.8	36.3	39.7	32.0	39.5	42.8
Age 45 to 54	42.3	56.8	33.8	43.6	32.4	41.6	44.5
Age 55 to 64	38.9	34.7	25.6	29.5	37.7	43.5	39.0
Age 65 & Over	37.9	32.1	37.3	35.0	35.3	33.2	49.3
<b>Incidence by Family Type</b>							
All Households	41.8	41.9	36.5	39.0	36.2	42.0	44.7
Others	44.1	37.8	44.6	40.7	41.6	48.2	47.7
<b>Single-Family</b>	<b>41.4</b>	<b>47.8</b>	<b>31.2</b>	<b>37.4</b>	<b>34.3</b>	<b>40.9</b>	<b>44.5</b>
Without Children	42.2	48.1	36.7	40.8	36.7	42.9	43.9
With Children	40.7	47.7	26.6	34.5	32.2	39.6	44.9
<b>Incidence by Education of Head</b>							
All	41.8	41.9	36.5	39.0	36.2	42.0	44.7
Less Than Grade 9	30.6	20.8	43.9	31.9	24.4	37.7	28.6
Grade 9 to 10	31.3	24.1	27.8	26.5	23.1	34.0	38.4
Grade 11 to 13 (NG)	37.3	54.3	43.8	47.0	36.8	28.7	39.3
Grade 11 to 13 (G)	38.1	50.4	34.1	41.3	35.0	41.1	36.4
Some PS (No D/D)	42.5	46.1	30.3	37.3	35.9	43.4	48.0
PS (D/D)	41.5	34.7	33.7	34.1	38.4	42.7	43.5
Univ Degree	48.5	52.4	45.3	49.3	44.0	45.4	50.6
<b>Incidence by Province</b>							
Canada	41.8	41.9	36.5	39.0	36.2	42.0	44.7
Newfoundland	36.3	40.6	20.0	29.3	30.9	29.1	45.9
PEI	49.7	44.5	23.2	33.4	15.1	54.8	59.2
Nova Scotia	40.8	53.0	51.8	52.3	38.0	38.6	41.3
New Brunswick	44.3	43.3	33.1	39.0	40.8	42.3	50.0
Quebec	35.6	37.9	38.3	38.1	30.3	37.5	36.1
Ontario	44.8	44.9	33.3	38.4	37.9	43.4	48.8
Manitoba	36.0	31.9	32.7	32.4	30.7	37.0	39.6
Saskatchewan	32.9	38.8	10.6	25.4	26.1	35.9	36.8
Alberta	45.9	40.7	47.4	45.0	40.7	44.7	49.1
BC	42.8	44.9	36.8	40.5	42.1	46.4	41.3

Underlined numbers are not statistically reliable

