Quality of demographic data

The estimates contain certain inaccuracies stemming from two types of errors:

- Errors in the census data;
- imperfections in other data sources and the method used to estimate the components.

Census data

A. Coverage, response and imputation errors

The errors attributable to census data can be divided into two groups: Response and processing errors, and coverage errors. The first group implies non-response error, misinterpretation by respondents, incorrect coding and non-response imputation. Errors in the second group primarily result from undercoverage and, to a lesser extent, overcoverage. It should be noted that both types of errors are intrinsic to any survey data.

The coverage errors occur when dwellings and/or individuals are missed, incorrectly included or counted more than once. Following each census, Statistics Canada undertakes coverage studies to measure these errors. The main studies are the *Reverse Record Check Survey* (RRC) and the *Census Overcoverage Study* (COS). Based on these studies, estimates of *net census undercoverage* (NCU) (which is equal to the difference between undercoverage and overcoverage) are produced. Demography Division adjusts the population enumerated in the census by province and territory using these estimates.

During the process of developing base populations, an attempt was made to correct only coverage errors in the population base. However, the correction based on the results of the coverage studies and on modeling of overcoverage for provinces and territories by age and sex prior to 1991, was also subject to sampling, collection, response and processing errors and uncertainty in the assumptions underlying the models. With respect to the coverage studies, statistical analysis concluded that the adjustment, although not without errors itself, improved the quality of census data (Royce, 1993). They were deemed to be consistent over time and across geographical areas, and to provide logical results. Users should also be aware that when calculating *net census undercoverage* (NCU) rates for small areas, it is likely that the underlying assumptions may be violated. If this is true, the resulting NCU rate would be misleading. Errors associated with these assumptions are, however, very difficult to quantify.

Nevertheless, the corrections to the census data due to NCU improved, in general, the quality of the estimates by compensating for the differential undercoverage by age, sex and by province/territory across censuses. It has a direct impact on:

- The error of closure and its distribution by age and sex within a province or a territory as well as by province/territory as the NCU and its distribution vary from one census to another;
- within-cohort consistency of population estimates. If for example, the male cohort in age group 0-4 in 1981 was tracked up to the 2001 Census (unadjusted for NCU) the age group 20-24 would be noticeably smaller in 2001 than the age group 15-19 in 1996. Since Canada receives many immigrants within these age groups, the opposite would be expected. However, only after adjustment for NCU, the cohort size increases from 1996 to 2001.

The adjustment also incorporates the results of a study on the estimates of the number of people living on incompletely enumerated Indian reserves to complete the corrections for coverage errors in the census. The results of the coverage studies contain mainly sampling errors. For further information regarding the main coverage studies, please see the following document on Statistics Canada's web site: 2001 Census Technical Report on Coverage.

Components

Errors due to estimation methodologies and data sources other than the census can also be significant.

A. Births and deaths

Since the law requires the recording of vital statistics, the final estimates for births and deaths data meet very high standards. Nevertheless, since preliminary estimates are derived, they can be slightly different from final estimates.

B. Immigration and non-permanent residents

With respect to immigrants and NPRs, Citizenship and Immigration Canada administers special data files on both of these components. Since immigration is controlled by law, data on immigrants and net permanent residents (NPRs) are compiled upon arrival in Canada. These data represent only “legal” immigration and exclude illegal immigrants. Thus, for the “legal” part of international movement into Canada, the data are considered to be of high quality. However, some biases such as the difference between the stated province of intended residence at the time of arrival and the actual province of residence, may persist. Finally, since information provided by the *Visitor Data System* (VDS) from *Citizenship and Immigration Canada* (CIC) is not complete (age and sex of dependents, province of residence for certain groups of permit holders), estimates of NPRs are more prone to error than data on immigrants.

C. Emigration, returning emigration and net temporary emigration

Of all the demographic components that are used in the population estimates program, these components are the most difficult to estimate with precision. Canada does not have a complete border registration system. While immigration and net permanents residents (NPRs) are well documented by the federal government, Statistics Canada has always used techniques of indirect estimation in the estimation of persons leaving the country. For this reason, available statistics regarding these three components have historically been of a lower quality than other components.

Estimates of the number of emigrants and returning emigrants are both derived using *Child Tax Benefit* (CTB) data provided by *Canada Revenue Agency* (CRA). Data are adjusted to take into account the incomplete coverage of the CTB program and to derive the emigration and returning emigration of adults.

These adjustments and the delay in obtaining the data are the two main sources of errors. As current information on the number of persons living temporarily abroad does not exist, estimates are based on the *Reverse Record Check* (RRC) and the census. Estimates for the intercensal period, distributed equally among the five years, are maintained constant for the postcensal period. Moreover, assumptions were made to allow for the distribution of annual estimates to a quarterly level. Any geographical or quarterly variation may introduce error in the estimation of these components.

D. Interprovincial migration

Since July 1993, preliminary interprovincial migration estimates have been based on *Child Tax Benefit* (CTB) files. Under this program, only 76% of children aged 0-17 at the Canada level were entitled to benefits on July 1, 2001. Consequently, preliminary CTB based estimates are subject to larger error than final estimates derived from *Canada Revenue Agency* (CRA) tax files.

E. Intraprovincial migration

These estimates were derived from *Canada Revenue Agency* (CRA) tax files and are subject to errors generally associated with small area administrative data such as errors in assigning *Standard Geographic Codes* (SGC) and those due to boundary changes over time.

F. Level of detail of components

As a more detailed breakdown of the data introduces a greater risk of inaccuracy into the estimates, the possibility of error in the components is augmented by the method used to distribute the estimates by age and sex. It seems that, in general, the initial errors should be minimal where the distribution of annual estimates of births, deaths and immigrants is concerned, and more significant with regard to the distribution of other components (net permanents residents, emigrants, returning emigrants, net temporary emigrants and interprovincial and subprovincial migrants). Finally, the size of error due to the age and sex distribution may vary by period and errors in some components may have a greater impact on a given age group or sex.

Geographical boundary changes for census divisions (CDs) and census metropolitan areas (CMAs)

Subprovincial geographical boundaries may change from one census to another. In order to facilitate chronological studies, demographic estimates for CDs, CMAs and economic regions (ERs) were produced in this CD-ROM for the 1986 to 2006 period according to boundaries delineated in the 2001 Census.

In order to clarify the demographic significance of geographical boundary changes, the 1996 population estimates according to 1996 Census boundaries will be compared to those of the same year based on 2001 Census boundaries. Data presented here apply to population enumerated in the 1996 Census without adjustment for NCU.

A. Census metropolitan areas (CMAs)

Among the 25 CMAs as defined in the 1996 Census[1], 10 have undergone geographical boundary changes in the 2001 Census. Had the latter been applied in 1996, population in all 25 CMAs would have reached 17,898,000 instead of 17,885,000, representing a slight increase of 33,000 persons or 0.2%.

In certain CMAs, the demographic repercussions of boundary changes were more pronounced. In London, the relative gain attributable to boundary change reached 4.5% and surpassed 1% in four other CMAs: Greater Sudbury / Grand Sudbury (3.2%), Halifax (3.1%), Windsor (2.9%) and Thunder Bay (1.5%).

In some cases (Montréal, Toronto and Winnipeg), boundary changes had a negligible effect on population.

In one instance, the boundary change translated into a decline in population. The Ontarian part of the Ottawa-Gatineau CMA dropped by 11,800 persons (1.5%).

B. Census divisions (CDs)

Boundary changes affected 34 of the 288 CDs in Canada and population in 17 CDs was negligibly affected with relative gains/losses not exceeding 0.1%.

Boundary changes greatly impacted population numbers in five CDs located in Ontario and Quebec. The CD most affected was Val-Saint-François in Quebec, with a loss of 15.8% followed by in decreasing order, Northumberland in Ontario (-9.0%), Rouville in Quebec (-8.8%), and Sudbury in Ontario (-6.4%). Finally, the CD of Hastings, in Ontario, registered gains of 6.2%.

1. Two new CMAs were added in the 2001 Census: Abbotsford in British Columbia and Kingston in Ontario.

Quality assessment

In order to assess the quality of our estimates, two evaluation measures are used: Precocity errors and errors of closure.

A. Precocity error

The quality of preliminary estimates of components is analyzed using precocity errors. Precocity error, is defined as the difference between preliminary and final estimate of a particular component in terms of its relative proportion of the total population for the relevant geographical area. It can be calculated for both population and component estimates.

Precocity error allows for useful comparisons between components, as well as between provinces and territories or geographical areas of different population size. Note that when compared to the total population for an area, the differences between preliminary and final estimates of the components are quite small. There are, however, differences in the amount of impact on the population estimates between components and between provinces and territories.

Generally speaking, net interprovincial migration yields the greatest precocity errors. This is likely the result of the use of different data sources for preliminary and final estimates. In most years and for most provinces/territories, births, deaths and immigration estimates yielded the smallest precocity errors. For immigration estimates, this reflects the completeness of the data source and the availability of data for the more timely preliminary estimates. In the case of births and deaths, small precocity errors support the use of short-term projections for preliminary estimates.

According to the analysis of the most recent precocity errors and assuming that the quality of the basic data remains constant, the present postcensal estimates should have an acceptable degree of reliability.

B. Error of closure

The error of closure measures the exactness level of the final postcensal estimates. It can be defined as the difference between the enumerated population of the most recent census (after adjustments for net census undercoverage (NCU)) and the most current postcensal population estimates as of Census Day.

The error of closure comes from two sources: The relative differences in the amount of NCU and errors in the components of demographic growth over the intercensal period. This can be calculated for total population estimates and for age, sex and marital status. With each 5-year intercensal period, the error of closure can only be calculated with the release of census data and estimates of NCU.

By dividing the error of closure by the adjusted census population rates, the differences are relatively small at the national level (0.38% for 1996 and 0.15% for 2001). At the provincial and territorial level, differences are understandably larger, since the estimates are also affected by errors in estimating interprovincial migration. Nevertheless, the provincial/territorial final postcensal estimates generally fall within 1% of the adjusted census population, except for the territories that falls within closer adjustments.

Appendix

Table 1 Net interprovincial migration, various sources, 2000-2001, provinces and territories

Region	Sources		
	Tax files	Census	Child tax benefit files
Newfoundland and Labrador	-4,493	-2,689	-3,541
Prince Edward Island	165	305	71
Nova Scotia	-2,077	-827	-824
New Brunswick	-1,530	-954	-81
Quebec	-9,442	-8,667	-11,782
Ontario	18,623	15,775	17,877
Manitoba	-4,323	-4,459	-3,094
Saskatchewan	-8,410	-9,528	-10,453
Alberta	20,457	19,533	25,748
British Columbia	-8,286	-7,305	-12,689
Yukon Territory	-572	-848	-846
Northwest Territories	-160	-550	-606
Nunavut	48	214	220

Note: Census data based on the one year mobility question and adjusted for age 0.

Table 2 Quarterly precocity error for population and components, Canada, provinces and territories, 2002-2003

Quarter/ Geography	Population	Births	Deaths	Immigration	Emigration	Returning emigration	Net temporary emigration	Net NPR	Interprovincial migration		
									In	Out	Net
	per thousand										
Canada											
Q3 2002	-0.86	-0.07	0.03	0.00	0.32	-0.04	0.13	-0.28	0.85	0.85	n/d
Q4 2002	-0.64	-0.08	0.08	0.00	0.21	0.00	0.10	-0.16	0.40	0.40	n/d
Q1 2003	-0.41	0.06	0.15	0.00	0.08	-0.03	0.06	-0.15	0.44	0.44	n/d
Q2 2003	-0.38	0.02	0.05	0.00	0.08	-0.02	0.00	-0.26	0.28	0.28	n/d
Newfoundland and Labrador											
Q3 2002	-0.10	-0.10	0.02	0.01	0.18	-0.02	0.06	-0.03	1.29	1.00	0.28
Q4 2002	0.04	-0.10	0.11	0.00	0.10	0.00	0.04	-0.04	1.07	0.63	0.44
Q1 2003	-0.13	0.13	0.38	0.00	0.05	-0.01	0.03	-0.11	1.95	1.62	0.33
Q2 2003	0.66	0.05	0.08	0.02	0.08	0.00	0.00	-0.04	1.30	0.51	0.79
Prince Edward Island											
Q3 2002	2.12	-0.03	-0.10	0.00	0.17	0.20	0.04	-0.01	2.16	0.09	2.07
Q4 2002	0.40	-0.07	0.18	0.01	0.10	0.10	0.02	0.01	0.90	0.24	0.66
Q1 2003	1.93	0.47	0.04	0.00	0.05	0.09	0.01	0.03	1.74	0.30	1.44
Q2 2003	0.60	-0.01	0.16	0.01	0.09	0.07	0.00	-0.01	1.28	0.49	0.79
Nova Scotia											
Q3 2002	-0.63	-0.06	-0.12	0.02	0.01	-0.06	-0.02	0.04	1.00	1.70	-0.69
Q4 2002	-0.66	-0.02	0.21	-0.01	0.02	-0.02	-0.01	-0.01	-0.02	0.36	-0.38
Q1 2003	-0.39	0.17	0.26	0.01	-0.02	-0.04	-0.02	-0.03	0.38	0.65	-0.28
Q2 2003	-0.29	0.05	0.25	0.00	0.06	-0.02	0.00	-0.07	0.36	0.29	0.07
New Brunswick											
Q3 2002	-0.89	-0.06	0.01	0.00	0.13	0.03	0.02	-0.03	1.29	1.98	-0.69
Q4 2002	-0.30	-0.15	0.08	0.00	0.08	0.03	0.01	-0.01	0.41	0.40	0.01
Q1 2003	-0.25	0.08	0.33	0.00	0.03	0.01	0.00	0.05	0.64	0.66	-0.02
Q2 2003	-0.15	0.06	0.11	0.01	0.10	-0.04	0.00	-0.06	0.57	0.49	0.08
Quebec											
Q3 2002	-0.95	0.00	0.02	0.00	0.29	-0.04	0.12	-0.19	0.31	0.60	-0.29
Q4 2002	-0.33	0.03	0.01	0.00	0.18	-0.01	0.09	-0.11	0.17	0.08	0.09
Q1 2003	-0.37	0.01	0.04	0.00	0.08	-0.03	0.06	-0.09	0.06	0.14	-0.07
Q2 2003	-0.22	-0.01	-0.04	0.00	0.07	-0.01	0.00	-0.17	0.14	0.13	0.00
Ontario											
Q3 2002	-1.14	-0.10	0.06	0.00	0.44	-0.04	0.19	-0.46	0.62	0.47	0.15
Q4 2002	-1.11	-0.14	0.13	0.00	0.28	0.00	0.14	-0.30	0.18	0.30	-0.13
Q1 2003	-0.60	0.12	0.23	0.00	0.12	-0.03	0.10	-0.29	0.25	0.22	0.03
Q2 2003	-0.59	0.09	0.12	0.01	0.06	-0.02	0.00	-0.44	0.14	0.19	-0.05

Q3 = July to September – Q4 = October to December – Q1 = January to March – Q2 = April to June

Table 2 Quarterly precocity error for population and components, Canada, provinces and territories, 2002-2003 cont.

Quarter/ Geography	Population	Births	Deaths	Immigration	Emigration	Returning emigration	Net temporary emigration	Net NPR	Interprovincial migration		
									In	Out	Net
	per thousand										
Manitoba											
Q3 2002	-1.86	-0.08	0.00	0.01	0.20	-0.16	0.13	-0.07	1.28	2.51	-1.23
Q4 2002	-0.51	-0.18	0.08	-0.01	0.13	-0.05	0.10	-0.02	0.95	0.89	0.05
Q1 2003	0.66	0.15	0.29	0.01	0.04	-0.10	0.07	0.01	1.68	0.69	0.99
Q2 2003	0.34	0.13	-0.01	0.00	0.06	-0.01	0.00	-0.10	0.83	0.46	0.37
Saskatchewan											
Q3 2002	-1.28	-0.03	0.13	0.01	0.13	0.00	0.08	-0.04	1.45	2.32	-0.87
Q4 2002	-0.28	-0.05	0.02	0.00	0.09	0.01	0.07	-0.04	0.85	0.88	-0.02
Q1 2003	-1.28	0.16	0.27	0.00	0.03	-0.01	0.04	0.03	0.77	1.89	-1.13
Q2 2003	0.00	0.01	0.08	0.00	0.13	0.03	0.00	-0.05	0.92	0.69	0.23
Alberta											
Q3 2002	0.25	-0.24	-0.01	0.01	0.50	-0.02	0.19	-0.24	2.40	0.98	1.41
Q4 2002	-0.47	-0.11	0.17	0.00	0.31	0.02	0.14	-0.07	1.24	0.93	0.31
Q1 2003	0.34	-0.07	0.14	-0.01	0.14	-0.03	0.09	-0.06	1.50	0.63	0.87
Q2 2003	-0.42	-0.10	0.06	-0.01	0.15	-0.03	0.00	-0.09	0.59	0.57	0.02
British Columbia											
Q3 2002	-0.44	-0.01	-0.03	0.01	0.09	-0.04	0.00	-0.19	0.88	1.03	-0.15
Q4 2002	-0.22	-0.01	-0.02	-0.01	0.08	0.00	0.01	-0.10	0.53	0.56	-0.03
Q1 2003	-0.68	-0.01	-0.02	0.00	-0.01	-0.04	-0.02	-0.07	0.13	0.75	-0.61
Q2 2003	-0.57	-0.05	-0.06	-0.04	0.08	-0.06	0.00	-0.19	0.16	0.37	-0.21
Yukon Territory											
Q3 2002	-8.79	0.27	-0.40	-0.07	0.60	0.20	0.66	-1.00	-4.55	2.79	-7.33
Q4 2002	-0.50	-0.30	0.33	0.00	0.33	0.10	0.50	-0.10	2.02	1.06	0.96
Q1 2003	-1.12	0.33	0.36	0.03	0.20	0.13	0.40	-0.16	2.41	2.90	-0.49
Q2 2003	4.33	0.03	-0.16	0.07	0.10	0.10	-0.03	-0.36	4.30	-0.10	4.40
Northwest Territories											
Q3 2002	-4.15	0.77	0.27	0.07	0.00	0.10	0.77	-0.17	0.07	3.95	-3.88
Q4 2002	-3.72	0.53	0.00	0.00	0.00	0.07	0.55	-0.19	-0.10	3.48	-3.57
Q1 2003	-5.36	-0.67	-0.12	0.00	0.00	0.05	0.43	0.02	1.44	5.88	-4.45
Q2 2003	-2.14	-0.60	-0.33	0.00	0.05	0.07	0.00	-0.24	-1.26	0.40	-1.67
Nunavut											
Q3 2002	-1.64	-0.35	-0.17	0.00	-0.07	0.00	0.70	0.03	-0.35	0.52	-0.87
Q4 2002	3.43	0.76	0.10	0.07	-0.03	0.00	0.48	0.00	3.15	0.00	3.15
Q1 2003	-0.24	-0.10	0.14	0.00	-0.07	0.00	0.38	0.00	5.19	4.87	0.31
Q2 2003	1.86	-0.76	-0.45	0.00	0.03	0.00	0.00	0.00	3.82	1.62	2.20

Q3 = July to September – Q4 = October to December – Q1 = January to March – Q2 = April to June

Table 3 The most recent annual precocity error for population and components, Canada, provinces and territories

	Canada	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T	Nvt.
							per thousand							
Population														
1999-2000	-0.12	0.21	0.58	-0.02	0.18	-0.13	-0.24	0.07	0.16	-0.46	0.17	0.13	2.66	0.15
2000-2001	-0.08	0.10	0.00	0.13	0.21	-0.08	-0.19	0.05	-0.14	0.13	-0.07	-0.99	-0.95	0.57
2001-2002	-0.13	0.07	0.55	-0.04	0.04	-0.13	-0.22	-0.20	-0.09	-0.13	0.05	-0.70	-1.00	0.12
2002-2003	-0.11	0.25	0.29	-0.04	-0.06	-0.07	-0.16	0.08	0.05	-0.18	-0.20	1.66	-0.73	0.75
Births														
1999-2000	-0.01	-0.06	-0.04	-0.02	0.00	0.00	-0.02	-0.02	0.01	0.00	0.00	0.01	0.24	0.09
2000-2001	0.01	-0.01	0.08	0.04	0.06	0.00	0.03	0.02	0.04	-0.04	-0.01	0.04	0.06	0.00
2001-2002	0.00	0.01	0.08	0.02	0.03	0.00	-0.01	0.02	-0.01	0.00	0.00	0.02	-0.01	0.14
2002-2003	0.00	0.00	0.01	0.01	-0.01	0.00	0.02	0.01	0.03	-0.04	-0.01	0.04	-0.13	-0.12
Deaths														
1999-2000	0.04	0.07	0.05	0.11	0.09	-0.01	0.04	0.05	0.04	0.04	0.07	0.06	0.02	0.09
2000-2001	0.03	0.06	0.03	0.07	0.09	-0.01	0.06	0.04	0.03	0.00	-0.01	0.03	-0.05	0.09
2001-2002	0.03	0.06	-0.01	0.02	0.05	-0.01	0.07	0.05	0.07	0.04	0.00	-0.01	0.02	0.04
2002-2003	0.01	0.01	0.00	0.03	0.02	0.00	0.02	0.02	0.01	0.02	0.00	0.00	-0.02	0.00
Immigration														
1999-2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01
2000-2001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00
2001-2002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01
2002-2003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Emigration														
1999-2000	0.02	-0.02	0.01	-0.02	-0.03	0.03	0.06	0.00	-0.02	0.05	-0.07	-0.05	0.00	-0.03
2000-2001	0.02	0.00	-0.01	-0.03	-0.02	0.02	0.06	0.01	-0.04	0.03	-0.03	0.10	-0.04	-0.03
2001-2002	0.06	0.02	0.01	0.00	0.00	0.05	0.10	0.04	0.02	0.09	-0.02	0.12	-0.01	-0.03
2002-2003	0.04	0.04	0.05	0.03	0.05	0.04	0.03	0.03	0.07	0.07	0.04	0.04	0.04	0.01
Retourning emigration														
1999-2000	0.00	0.00	0.03	-0.01	0.02	0.00	0.01	-0.04	0.01	0.01	0.01	0.01	0.01	0.00
2000-2001	0.00	-0.01	0.02	-0.01	0.03	0.00	0.00	-0.03	-0.01	0.02	0.02	0.02	0.01	0.00
2001-2002	0.00	0.00	0.01	0.00	0.01	0.00	0.00	-0.02	0.01	0.01	0.01	0.03	0.02	0.00
2002-2003	-0.01	0.00	0.02	-0.01	-0.01	-0.01	-0.01	-0.01	0.01	-0.02	-0.02	0.04	0.02	0.00
Net temporary emigration														
1999-2000	0.00	0.01	0.00	-0.02	-0.01	0.01	0.01	0.01	0.00	0.01	-0.05	0.11	0.15	0.15
2000-2001	0.01	0.01	0.00	-0.01	0.00	0.02	0.02	0.02	0.01	0.02	-0.03	0.14	0.17	0.16
2001-2002	0.02	0.01	0.01	-0.01	0.00	0.02	0.04	0.03	0.01	0.04	-0.02	0.18	0.20	0.18
2002-2003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01

Table 3 The most recent annual precocity error for population and components, Canada, provinces and territories cont.

	Canada	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T	Nvt.
							per thousand							
Net non-permanent residents														
1999-2000	-0.05	0.00	0.01	0.00	0.00	-0.05	-0.10	0.00	0.00	-0.01	-0.03	-0.02	0.00	0.00
2000-2001	-0.04	0.00	-0.01	0.00	0.00	-0.02	-0.09	0.00	0.01	0.00	-0.01	-0.01	0.00	0.00
2001-2002	-0.04	-0.01	0.00	0.00	0.00	-0.02	-0.06	-0.02	-0.01	-0.02	-0.02	-0.07	-0.04	0.00
2002-2003	-0.06	-0.02	0.00	-0.01	0.00	-0.03	-0.10	-0.01	-0.01	-0.04	-0.04	-0.17	-0.06	0.00
In-migrants - interprovincial														
1999-2000	0.18	0.59	0.51	0.25	0.37	0.06	0.11	0.43	0.61	0.07	0.36	1.35	1.85	0.15
2000-2001	0.19	0.58	0.23	0.32	0.42	0.05	0.10	0.43	0.54	0.51	0.17	1.04	0.96	1.65
2001-2002	0.14	0.56	0.55	0.23	0.25	0.03	0.10	0.31	0.44	0.29	0.13	-0.03	-0.43	-0.02
2002-2003	0.11	0.52	0.50	0.14	0.22	0.05	0.06	0.33	0.36	0.23	0.06	1.72	-0.45	1.55
Out-migrants - interprovincial														
1999-2000	0.18	0.27	-0.13	0.15	0.15	0.11	0.13	0.24	0.45	0.43	0.17	1.19	-0.60	0.02
2000-2001	0.19	0.40	0.30	0.19	0.23	0.08	0.10	0.32	0.74	0.33	0.27	1.94	2.05	1.03
2001-2002	0.14	0.40	0.10	0.27	0.20	0.09	0.08	0.39	0.42	0.28	0.10	0.54	0.54	-0.02
2002-2003	0.11	0.20	0.21	0.11	0.20	0.05	0.08	0.18	0.27	0.23	0.15	-0.06	0.11	0.67
Net interprovincial migration														
1999-2000	0.00	0.32	0.64	0.10	0.23	-0.06	-0.02	0.19	0.16	-0.37	0.19	0.16	2.45	0.13
2000-2001	0.00	0.18	-0.07	0.13	0.19	-0.03	-0.01	0.11	-0.20	0.18	-0.11	-0.91	-1.09	0.62
2001-2002	0.00	0.16	0.45	-0.04	0.05	-0.06	0.02	-0.08	0.02	0.02	0.04	-0.58	-0.97	0.00
2002-2003	0.00	0.32	0.30	0.03	0.03	0.00	-0.02	0.15	0.09	0.01	-0.09	1.78	-0.56	0.88

Table 4 Precocity error of annual population estimates for census metropolitan areas, Canada, July 1, 2002 and 2003

	2002		2003	
	number	percentage	number	percentage
All census metropolitan areas'	**23,238**	**0.115**	**37,918**	**0.185**
Abbotsford	13	0.008	1,771	1.132
Calgary	1,865	0.186	3,071	0.301
Edmonton	1,314	0.134	716	0.072
Greater Sudbury / Grand Sudbury	5	0.003	864	0.536
Halifax	77	0.021	866	0.230
Hamilton	963	0.138	2,053	0.291
Kingston	155	0.100	205	0.132
Kitchener	376	0.086	637	0.143
London	490	0.108	424	0.093
Montreal	4,575	0.129	4,426	0.124
Oshawa	3,192	1.011	4,740	1.463
Ottawa-Gatineau	976	0.087	152	0.013
Ontario	1,394	0.164	344	0.040
Quebec	418	0.157	496	0.182
Quebec	522	0.074	351	0.050
Regina	48	0.024	364	0.184
St. Catharines-Niagara	217	0.055	866	0.220
St. John's	48	0.027	877	0.490
Saguenay	68	0.044	95	0.061
Saint John	33	0.026	208	0.165
Saskatoon	78	0.034	1213	0.521
Sherbrooke	118	0.074	475	0.296
Thunder Bay	19	0.015	1,334	1.052
Toronto	8,568	0.171	15,340	0.300
Trois-Rivières	150	0.107	243	0.173
Vancouver	690	0.033	8,227	0.384
Victoria	14	0.004	1,826	0.556
Windsor	383	0.118	270	0.082
Winnipeg	495	0.071	1,070	0.153

Table 5 Distribution of census divisions by precocity error, Canada, provinces and territories, July 1, 2003

	Less than 0.1%	0.1 to 0.49%	0.5 to 0.99%	1% and more	Total of census divisions	Provincial error
	percentage				number	percentage
Canada	**56**	**143**	**69**	**20**	**288**	**0.146**
Newfoundland and Labrador	2	6	1	1	10	0.220
Prince Edward Island	1	2	0	0	3	0.332
Nova Scotia	4	11	3	0	18	0.052
New Brunswick	4	8	2	1	15	0.084
Quebec	26	54	15	4	99	0.100
Ontario	11	23	15	0	49	0.198
Manitoba	3	10	7	3	23	0.076
Saskatchewan	3	8	7	0	18	0.011
Alberta	1	12	4	2	19	0.242
British Columbia	1	8	13	6	28	0.212
Yukon Territory	0	0	0	1	1	1.590
Northwest Territories	0	0	1	1	2	0.850
Nunavut	0	1	1	1	3	0.751

Table 6 Error of closure of the estimates of total population for Canada, provinces and territories, July 1, 1996 and 2001

	1996		2001	
	number	percentage	number	percentage
Canada	**113,416**	**0.38**	**46,467**	**0.15**
Newfoundland and Labrador	8,840	1.58	11,416	2.19
Prince Edward Island	411	0.30	1,481	1.08
Nova Scotia	6,446	0.69	9,034	0.97
New Brunswick	5,634	0.75	4,638	0.62
Quebec	96,449	1.33	-320	0.00
Ontario	56,479	0.51	8,857	0.07
Manitoba	-852	-0.08	-1,121	-0.10
Saskatchewan	-7,400	-0.73	15,952	1.59
Alberta	-8,124	-0.29	714	0.02
British Columbia	-43,313	-1.12	-4,357	-0.11
Yukon Territory	-244	-0.78	-354	-1.18
Northwest Territories	-42	-0.10	481	1.18
Nunavut	-868	-3.39	46	0.16

Table 7 Error of closure of the estimates of population by age group and sex, July 1, 2001, Canada

Age groupe	Both sexes		Male		Female	
	number	percentage	number	percentage	number	percentage
All ages	**46,468**	**0.15**	**10,911**	**0.07**	**35,557**	**0.23**
0-4	-25,589	-1.45	-12,292	-1.37	-13,297	-1.55
5-9	12,183	0.60	6,878	0.67	5,305	0.54
10-14	-1,247	-0.06	392	0.04	-1,639	-0.16
15-19	-29,821	-1.41	-16,856	-1.55	-12,965	-1.26
20-24	5,654	0.27	842	0.08	4,812	0.47
25-29	42,893	2.07	17,763	1.69	25,130	2.46
30-34	27,792	1.24	13,489	1.19	14,303	1.29
35-39	10,266	0.39	4,294	0.32	5,972	0.46
40-44	1,733	0.07	-1,437	-0.11	3,170	0.24
45-49	4,613	0.19	6,159	0.52	-1,546	-0.13
50-54	-4,720	-0.22	-1,687	-0.16	-3,033	-0.29
55-59	-4,230	-0.26	-5,741	-0.71	1,511	0.18
60-64	2,948	0.23	486	0.08	2,462	0.37
65-69	-1,117	-0.10	-637	-0.12	-480	-0.08
70-74	-4,555	-0.45	-3,570	-0.76	-985	-0.18
75-79	558	0.07	-1,477	-0.43	2,035	0.43
80-84	1,148	0.22	670	0.34	478	0.15
85-89	4,475	1.57	2,081	2.26	2,394	1.25
90 and over	3,484	2.56	1,554	4.49	1,930	1.91

Table 8 Error of closure of the estimates of population aged 15 years and over by sex and marital status, July 1, 2001, Canada

Marital status	Both sexes		Male		Female	
	number	percentage	number	percentage	number	percentage
All statuses	**61,121**	**0.24**	**15,933**	**0.13**	**45,188**	**0.35**
Single	216,725	3.06	136,337	3.49	80,388	2.53
Married	-285,944	-1.88	-180,947	-2.38	-104,997	-1.38
Widowed	19,929	1.32	4,386	1.59	15,543	1.26
Divorced	110,411	8.05	56,157	9.80	54,254	6.80

Table 9 Error of closure of the estimates of population aged 15 years and over by sex and legal marital status, July 1, 2001, Canada

État matrimonial	Both sexes		Male		Female	
	number	percentage	number	percentage	number	percentage
All statuses	**61,121**	**0.24**	**15,933**	**0.13**	**45,188**	**0.35**
Single	29,171	0.34	19,249	0.41	9,922	0.25
Married	-82,269	-0.63	-66,359	-1.02	-15,910	-0.25
Widowed	12,078	0.77	1,754	0.59	10,324	0.81
Divorced	102,141	5.30	61,289	7.15	40,852	3.82

Table 10 Error of closure of estimates of population for census metropolitan areas, Canada, July 1, 2001

Regions	number	percentage
All Census metropolitan Areas	**-27,246**	**-0.14**
Abbotsford	…	…
Calgary	-8,051	-0.82
Edmonton	-8,110	-0.84
Greater Sudbury / Grand Sudbury	387	0.24
Halifax	-1	0.00
Hamilton	-8,490	-1.23
Kingston	…	…
Kitchener	-158	-0.04
London	-4,908	-1.09
Montréal	-6,440	-0.18
Oshawa	-3,858	-1.25
Ottawa-Gatineau	-8,724	-0.79
Ontario	-4,024	-0.48
Quebec	-4,700	-1.79
Quebec	-1,680	-0.24
Regina	811	0.41
St. Catharines-Niagara	1,000	0.26
St. John's	-8	0.00
Saguenay	593	0.38
Saint John	1,056	0.84
Saskatoon	-407	-0.18
Sherbrooke	-161	-0.10
Thunder Bay	230	0.18
Toronto	26,020	0.53
Trois-Rivières	681	0.49
Vancouver	4,126	0.20
Victoria	-8,053	-2.47
Windsor	2,519	0.79
Winnipeg	-5,620	-0.81

Table 11 Error of closure of the estimates of population by economic regions, Canada, provinces and territories, July 1, 2001		
Regions	number	percentage
All economic regions		
Absolute average error	199,878	0.95
Newfoundland and Labrador		
Avalon Peninsula	3,984	1.61
Notre Dame - Central Bonavista Bay	3,277	2.78
South Coast - Burin Peninsula	1,274	2.86
West Coast - Northern Peninsula - Labrador	2,881	2.56
Prince Edward Island		
Prince Edward Island	1,481	1.08
Nova Scotia		
Annapolis Valley	2,596	2.09
Cape Breton	2,775	1.83
Halifax	-1	0.00
North Shore	1,989	1.22
Southern	1,675	1.34
New Brunswick		
Campbellton - Miramichi	2,467	1.41
Edmundston - Woodstock	306	0.35
Fredericton - Oromocto	708	0.55
Moncton - Richibucto	-617	-0.33
Saint John - St. Stephen	1,774	1.03
Quebec		
Abitibi - Témiscamingue	988	0.66
Bas-Saint-Laurent	-1,333	-0.65
Capitale-Nationale	-3,598	-0.55
Centre-du-Québec	-1,188	-0.53
Chaudière - Appalaches	-387	-0.10
Côte-Nord	1,025	1.03
Estrie	5	0.00
Gaspésie - Îles-de-la-Madeleine	928	0.94
Lanaudière	2,755	0.70
Laurentides	3,265	0.69
Laval	4,788	1.37

Table 11 Error of closure of the estimates of population by economic regions, Canada, provinces and territories, July 1, 2001 cont.		
Regions	number	percentage
All economic regions		
Quebec cont**.**		
Mauricie	625	0.24
Montérégie	9,677	0.74
Montréal	-17,698	-0.96
Nord-du-Québec	-37	-0.09
Outaouais	-460	-0.14
Saguenay - Lac-Saint-Jean	325	0.11
Ontario		
Hamilton - Niagara Peninsula	-9,857	-0.74
Kingston - Pembroke	-417	-0.09
Kitchener - Waterloo - Barrie	-7,710	-0.70
London	-4,958	-0.81
Muskoka – Kawarthas	996	0.28
Northeast	1,770	0.31
Northwest	2,639	1.07
Ottawa	-168	-0.01
Stratford - Bruce Peninsula	-1,900	-0.64
Toronto	26,994	0.52
Windsor - Sarnia	1,468	0.23
Manitoba		
Interlake	673	0.80
North	3,134	3.69
North Central	-202	-0.41
Parklands	587	1.29
South Central	407	0.76
Southeast	292	0.33
Southwest	-207	-0.20
Winnipeg	-5,805	-0.91
Saskatchewan		
Northern	2,394	7.30
Prince Albert	4,361	2.16
Regina - Moose Mountain	3,775	1.36
Saskatoon - Biggar	1,730	0.59
Swift Current - Moose Jaw	1,211	1.14
Yorkton - Melville	2,481	2.74

Table 11 Error of closure of the estimates of population by economic regions, Canada, provinces and territories, July 1, 2001 cont.		
Regions	number	percentage
All economic regions		
Alberta		
Athabasca - Grande Prairie - Peace River	4,333	1.90
Banff - Jasper - Rocky Mountain House	-140	-0.17
Calgary	-5,974	-0.57
Camrose - Drumheller	906	0.48
Edmonton	-5,714	-0.57
Lethbridge - Medicine Hat	5,395	2.20
Red Deer	1,281	0.82
Wood Buffalo - Cold Lake	627	0.59
British Colombia		
Cariboo	-554	-0.33
Kootenay	-130	-0.09
Lower Mainland - Southwest	2,521	0.11
Nechako	538	1.22
North Coast	-41	-0.06
Northeast	-114	-0.18
Thompson - Okanagan	565	0.12
Vancouver Island and Coast	-7,142	-1.00
Yukon Territory		
Yukon Territory	-353	-1.17
Northwest Territories		
Northwest Territories	481	1.18
Nunavut		
Nunavut	46	0.16

Table 12 Distribution of census divisions by error of closure, Canada, provinces and territories, July 1, 2001

	Less than 1.0%	1.0 to 1.9%	2.0 to 2.9%	3.0 to 3.9%	4% and over	Total of CDs	Average absolute error	Provin-cial error	CDs with positi-ve error
	percentage					number	percentage		number
Canada	**145**	**85**	**31**	**18**	**9**	**288**	**1.26**	**0,15**	**186**
Newfoundland and Labrador	1	2	4	2	1	10	2.61	2.19	10
Prince Edward Island	1	2	0	0	0	3	1.16	1.08	3
Nova Scotia	6	5	6	1	0	18	1.55	0.97	17
New Brunswick	8	6	1	0	0	15	0.89	0.62	11
Quebec	63	26	6	4	0	99	0.88	0.00	57
Ontario	26	15	4	3	1	49	1.11	0.07	26
Manitoba	9	6	4	3	1	23	1.65	-0.10	13
Saskatchewan	3	6	4	4	1	18	2.32	1.59	17
Alberta	7	7	0	1	4	19	1.92	0.02	14
British Columbia	17	9	1	0	1	28	1.02	-0.11	13
Yukon Territory	1	0	0	0	0	1	1.17	-1.17	1
Northwest Territories	1	0	1	0	0	2	1.58	1.18	2
Nunavut	2	1	0	0	0	3	0.82	0.16	2

Table 13 Error of closure by age group and different subprovincial geographies, July 1, 2001, Canada

Regions	Age group							
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+
	percentage							
All census divisions								
Absolute average error	**3.16**	**2.31**	**7.04**	**2.73**	**2.26**	**1.64**	**2.83**	**2.45**
All economic regions								
Absolute average error	**1.97**	**1.43**	**5.06**	**1.70**	**1.32**	**0.71**	**1.81**	**1.37**
All census metropolitan area	**-0.46**	**-1.49**	**-1.04**	**1.48**	**0.06**	**0.13**	**-0.48**	**0.29**
Abbotsford	…	…	…	…	…	…	…	…
Calgary	-0.14	-2.79	-2.84	0.78	-0.22	-1.02	1.61	-0.90
Edmonton	-0.90	-1.77	-2.86	-0.27	0.09	0.04	0.39	-0.48
Greater Sudbury / Grand Sudbury	-7.17	0.54	6.10	0.50	1.72	0.63	-1.67	-0.68
Halifax	1.00	1.30	-3.36	2.16	0.59	0.17	-2.81	-0.77
Hamilton	-3.56	-2.16	-2.74	-1.38	-0.66	-0.49	0.38	2.06
Kingston	…	…	…	…	…	…	…	…
Kitchener	-0.84	-0.93	-2.34	1.19	1.88	0.16	0.34	0.32
London	-2.95	-0.90	-2.68	-1.17	0.52	-0.64	-0.62	0.10
Montreal	0.64	-0.64	-1.69	0.67	0.25	0.17	-1.11	-0.22
Oshawa	-3.35	-3.62	-1.62	-2.47	1.03	-1.63	0.78	5.02
Ottawa-Gatineau	-2.43	-1.73	-2.47	0.10	0.31	0.33	-1.29	1.02
Ontario	-2.91	-1.84	-2.29	0.58	0.75	0.69	0.21	1.74
Quebec	-0.95	-1.38	-3.10	-1.42	-0.99	-0.77	-6.26	-2.05
Quebec	-0.92	0.70	-2.40	1.25	0.94	0.16	-1.74	-1.16
Regina	0.07	-0.59	-0.06	1.80	1.70	0.27	0.09	-0.78
St. Catharines-Niagara	0.43	0.58	4.08	-0.10	-0.58	-1.04	-0.34	-0.77
St. John's	-3.67	0.75	-2.10	2.47	2.21	0.27	-0.32	-2.05
Saguenay	-1.39	1.48	3.05	-3.14	2.95	-0.79	-1.79	0.84
Saint John	2.43	-0.66	4.09	3.20	-1.89	0.47	0.10	-1.63
Saskatoon	0.43	-1.25	-3.98	3.03	1.02	0.64	1.53	-1.85
Sherbrooke	-1.32	0.82	-1.16	-0.36	2.80	0.37	-1.45	-2.38
Thunder Bay	-0.98	-2.44	4.37	-1.98	0.27	-0.18	-0.60	3.61
Toronto	-0.24	-1.80	0.08	3.53	-0.15	0.66	0.01	1.40
Trois-Rivières	-0.94	0.99	3.87	0.66	0.60	-0.57	-0.88	-0.48
Vancouver	1.62	-3.38	0.41	3.12	-1.19	0.38	-0.35	0.26
Victoria	-3.17	-4.04	-5.41	-2.96	-0.84	-0.79	-2.97	-0.38
Windsor	-1.97	-0.91	3.00	2.44	1.14	0.02	1.54	0.43
Winnipeg	-0.52	-0.93	-1.93	-0.21	-0.53	-0.21	-1.71	-0.83