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Evaluation of Data on the Total Population in the 1996 Census, Canada, Provinces and Territories

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1.0 Introduction

The mission of the Census of Population is to enumerate the Canadian population as accurately as possible, without omission or double counting. However, the complexity of the operation and the limited resources allocated to it make the task difficult. In the 1996 Census, the main objective was to improve net coverage, or at least to maintain it at the level of the previous census (Lachapelle, 1996). In this report, we will see whether, with the data from the 1996 Census, we have fulfilled this mission.

Accordingly, this report presents an evaluation of the data from the 1996 census for the total population for Canada, the provinces and territories. To evaluate these data, we will first examine their quality, comparing the 1996 Census data with the postcensal population estimates, data from previous censuses, and data from health insurance plans. We will also analyse the census coverage by examining differences between the census and postcensal estimates of the 1996 population, using the concept of apparent net undercoverage and estimating net undercoverage and the error of closure.

Secondly we will compare the population growth based on the 1991 and 1996 censuses with the increase derived from the demographic components taken into account in producing the postcensal population estimates. We will attempt to explain the differences observed between these two data sources, this time by analysing the quality of the data on the components of demographic change, namely births and deaths, internal migration, immigration, emigration, non-permanent residents and returning Canadians.

It should be noted that when this report was produced, the following information was not available: the results of the Reverse Record Check of the 1996 Census coverage, as well as the final data for certain components of the population.

We will conclude this report by discussing the quality of the census data in relation to that of the postcensal estimates of the 1996 population.

2.0 Quality of the 1996 Census data

The quality of the 1996 Census data will be evaluated primarily by comparing those data with postcensal estimates of the 1996 population. Data from the 1996 Census will also be compared with previous censuses and health insurance data.

The postcensal estimates of the 1996 population are obtained by adding to the 1991 Census of Population, adjusted for net undercoverage, the components of demographic change, namely natural increase (births minus deaths), international migration (immigrants minus emigrants, non-permanent residents and returning Canadians) as well as internal net migration (migration within Canada as measured by the in-migrants minus out-migrants for a given province or territory).

Unlike in previous censuses and consequently in the postcensal estimates, the data on total population by province or territory in the 1996 Census do not include an adjustment for temporary residents who were not enumerated.[1] In order to allow for comparisons between these data sources, we therefore made two types of corrections, one to the census and the other to the postcensal estimates.

First, we added to the 1996 Census data the number of missed temporary residents from the 1991 Census, on the hypothesis that the number missed in 1996, by province or territory, was the same as in 1991.

Then we estimated the components of demographic change (monthly and annual data) on the 14th day of the month according to a linear method. This method assumes that the distribution of the components of demographic change is constant for each day of May.

Since health insurance programs are under provincial or territorial jurisdiction, both the reference date and the coverage of the data collected differ from one region to another. Comparisons will therefore be made solely for certain provinces and territories for which we have complete information, namely New Brunswick, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia and Yukon. For these regions, the data cover persons registered in the plan and also include the following persons: dependents of members of the Canadian Armed Forces and the RCMP; dependents of members of the Canadian Security Intelligence Service; dependents of federal penitentiary inmates (except for Quebec); foreign students and student authorization holders (only for Saskatchewan, Alberta and British Columbia), foreign workers and employment authorization holders; Ministerial permit holders (only for Quebec, Manitoba, Saskatchewan and Alberta); and refugee claimants provided that they had filed their claim prior to January 1989 (only for Alberta) (Rémillard, 1996).

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[1] Temporary residents are persons who were not enumerated because they were temporarily absent from their usual place of residence.

2.1 Comparison between census data, postcensal estimates and health insurance data as of May 14, 1996

Table 2.1 compares data from the population census of May 14, 1996 to postcensal population estimates (based on the 1991 Census adjusted for net undercoverage), postcensal estimates (based on the 1991 Census not adjusted for net undercoverage) as well as data from health insurance plans.

First, as might be expected, the postcensal estimates (with net undercoverage for 1991) are higher than the census figures (not adjusted for net undercoverage) by 986,900, reflecting a difference of 3.4%. At the level of the provinces and territories, it is in Ontario that the gap is the greatest, with a difference of 4.2%. The difference between the two data sources for that province alone represents nearly half of the total difference, namely 448,200. Three other provinces exhibit differences greater than 3%: Quebec, with 3.3% (232,500), and Nova Scotia and Newfoundland with 3.2% (29,300 and 17,500 respectively). At the other extreme are two regions with small differences: Yukon with 0.6% (200) and Prince Edward Island with 1.4% (1,900). The differences observed might be explained by various factors: an error in the estimate of net undercoverage for 1991; an error introduced into the postcensal estimates via the components of demographic change; net undercoverage in the 1996 Census; or a combination of the above.

When the postcensal estimates are compared to data from the population census (in both cases without adjusting for net undercoverage), a gap of 0.7% (195,500) is observed for Canada. This difference is much smaller than the one obtained by comparing the census to the adjusted estimates (3.4%). At the provincial level, four provinces exhibit differences greater than the one observed at the national level: Newfoundland, with 1.1% (6,100); Nova Scotia, with 1.3% (12,100); Alberta, with 1.0% (27,400); and Saskatchewan, with 0.9% (8,500). However, three other regions show negative differences: Yukon, with -3.1% (-100); the Northwest Territories, with -2.2% (-1,400); and New Brunswick, with -0.4% (-2,600).

As well, according to Table 2.1, the health insurance figures are higher than the census figures for New Brunswick (1.3%), Quebec (2.8%), Manitoba (2.4%), Saskatchewan (3.3%), Alberta (1.3%) and Yukon (7.1%). For British Columbia, the health insurance figures are lower than those from the census (-2.8%). That province requires residents to pay a premium in order to be covered by the health insurance plan, which may result in incomplete coverage, particularly of the young adult population, which is generally healthy and poorer than the general population. Alberta residents also pay a premium in order to be covered by the provincial health insurance plan. However, Alberta has better coverage than British Columbia, since it also includes Ministerial permit holders as well as refugee claimants provided that they filed their claim before January 1989.

Table 2.1: Comparison between census data, postcensal estimates and health insurance data, Canada, provinces and territories, May 14, 1996

Province or territory	Census of population data* (1)	Estimate with adjustment for net undercoverage for 1991 (+NU) (2)	Estimate without adjustment for net undercoverage for 1991 (-NU) (3)	Health insurance data** (4)	Differences					
					Estimate (+NU) and census		Estimate (-NU) and census		Health insurance and census	
					No. (2)-(1)=(5)	% (5)/(1)*100=(8)	No. (3)-(1)=(7)	% (7)/(1)*100=(8)	No. (4)-(1)=(9)	% (9)/(1)*100=(10)
Nfld.	554,413	571,874	560,494	..	17,461	3.15	6,081	1.10	..	..
P.E.I.	134,880	136,753	135,532	..	1,873	1.39	652	0.48	..	..
N.S.	912,965	942,248	925,056	..	29,283	3.21	12,091	1.32	..	..
N.B.	740,592	762,100	737,943	750,550	21,508	2.90	-2,649	-0.36	9,958	1.34
Que.	7,155,257	7,387,708	7,207,915	7,357,632	232,451	3.25	52,658	0.74	202,375	2.83
Ont.	10,784,493	11,232,738	10,858,748	..	448,245	4.16	74,255	0.69	..	..
Man.	1,117,996	1,141,359	1,121,021	1,144,643	23,363	2.09	3,025	0.27	26,647	2.38
Sask.	995,045	1,021,254	1,003,534	1,027,551	26,209	2.63	8,489	0.85	32,506	3.27
Alta.	2,707,918	2,786,605	2,735,343	2,742,333	78,687	2.91	27,425	1.01	34,415	1.27
B.C.	3,739,830	3,845,673	3,755,654	3,633,971	105,843	2.83	15,824	0.42	-105,859	-2.83
Yukon	31,111	31,302	30,154	33,303	191	0.61	-957	-3.08	2,192	7.05
N.W.T.	64,845	66,612	63,420	..	1,767	2.72	-1,425	-2.20	..	..
Canada	28,939,345	29,926,228	29,134,814	..	988,881	3.41	195,469	0.68	..	..

* Census data include temporary residents from 1991.

** Data from the health insurance file for New Brunswick are dated May 14, 1996; for Quebec, July 1, 1996; for Manitoba, June 1, 1996; for Saskatchewan, June 30, 1996; for Alberta, June 1,1996; for British Columbia, March 31, 1996; and for Yukon, June 1, 1996.

(..)Data not available.

NU : Net undercoverage.

Source: Statistics Canada, Census of Population and Demography Division, Demographic Estimates Section.

Compared to the postcensal estimates in Table 2.2, the health insurance data are closer to the postcensal estimates adjusted for net undercoverage for 1991 than to those that are not adjusted, except in the case of Alberta and British Columbia. For three provinces, the health insurance figures are higher than the estimates corrected for net undercoverage: Manitoba (0.3%), Saskatchewan (0.6%) and Yukon (6.4%). This overestimation may be explained in part by the administrative delays caused by lags in the registration of deaths and the reporting of emigrants, which affect data quality. Because the coverage of the data and the reference period differ from one region to another, the health insurance data must be interpreted with caution.

2.2 Comparison between census data and postcensal estimates for 1976 to 1996

Table 2.3 gives the numerical and percentage differences between the population data from the censuses and from postcensal estimates for the census years from 1976 to 1996. These differences are calculated from two series of census data; the first series refers to census data without non-permanent residents for the years 1976 to 1991 and with non-permanent residents for the years 1991 and 1996, while the other series consists of data adjusted for net undercoverage with inclusion of non-permanent residents. The postcensal estimates, for their part, include non-permanent residents, and their base population is the previous census adjusted for net undercoverage.

At the national level, the differences between the postcensal estimates and the census data (without adjustment for net undercoverage) increase between 1976 and 1991, rising from 2.8% to 4.0% respectively. For 1991, the inclusion of non-permanent residents in the censuses reduces the differences between the estimates and the censuses by 0.9 percentage points. From 1991 to 1996, the differences between the postcensal estimates and the censuses (including non-permanent residents) also increase, rising from 3.1% to 3.4% respectively. Similarly, at the provincial level, six regions exhibit greater differences in 1996 than in 1991: Nova Scotia (29,300 vs 21,900, respectively), Quebec (232,500 vs 186,500), Ontario (448,200 vs 366,300), Alberta (78,700 vs 66,200), British Columbia (105,800 vs 96,800) and the Northwest Territories (1,800 vs 1,200).

However, if the adjustment for net undercoverage is taken into account, the differences between the postcensal estimates and the censuses for Canada as a whole decrease from 1976 to 1991, falling from 0.6% to 0.2% respectively. At the provincial level, no trend emerges, since the differences vary from one region to another and from one year to another.

Table 2.2: Comparison between postcensal estimates and health insurance data, selected provinces and territories, May 14, 1996

Province or territory	Estimate with adjustment for net undercoverage for 1991 (+NU) (1)	Estimate without adjustment for net undercoverage for 1991 (-NU) (2)	Health insurance data* (3)	Differences			
				Estimate (+NU) and health insurance		Estimate (-NU) and health insurance	
				No. (3)-(1)=(4)	% (4)/(1)*100=(5)	No. (3)-(2)=(6)	% (6)/(2)*100=(7)
N.B.	762,100	737,943	750,550	-11,550	-1.52	12,607	1.71
Que.	7,387,708	7,207,915	7,357,632	-30,076	-0.41	149,717	2.08
Man.	1,141,359	1,121,021	1,144,643	3,284	0.29	23,622	2.11
Sask.	1,021,254	1,003,534	1,027,551	6,297	0.62	24,017	2.39
Alta.	2,786,605	2,735,343	2,742,333	-44,272	-1.59	6,990	0.26
B.C.	3,845,673	3,755,654	3,633,971	-211,702	-5.50	-121,683	-3.24
Yukon	31,302	30,154	33,303	2,001	6.39	3,149	10.44

* Data from the health insurance file for New Brunswick are dated May 14, 1996; for Quebec, July 1, 1996; for Manitoba, June 1, 1996; for Saskatchewan, June 30, 1996; for Alberta, June 1, 1996; for British Columbia, March 31, 1996; and for Yukon, June 1, 1996.

NU : Net undercoverage.

Source: Statistics Canada, Demography Division, Demographic Estimates Section.

Table 2.3: Numerical and percentage difference between census data and postcensal estimates, Canada, provinces and territories, 1976 , 1981, 1986, 1991 and 1996

Source	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon	N.W.T.
							No.						
June 1, 1976													
Census	631,330	18,354	3,696	23,063	22,497	168,729	258,503	22,405	17,750	29,253	65,667	236	1,177
Adjusted census	135,287	12,809	3,335	15,775	8,945	-11,442	100,828	10,716	6,331	-696	-10,184	-445	-685
June 1, 1981													
Census	615,638	13,903	819	15,298	17,126	173,185	271,296	28,277	11,163	-5,598	91,393	-1,360	136
Adjusted census	87,471	4,830	-394	6,309	5,307	47,056	66,757	16,864	2,221	-62,598	4,943	-2,083	-1,741
June 1, 1986													
Census	951,796	20,812	2,666	21,568	24,904	246,377	354,107	29,491	22,241	99,213	129,502	-305	1,220
Adjusted census	82,773	10,522	339	3,024	7,025	50,443	-4,752	-1,929	-548	25,182	-2,995	-1,466	-2,072
June 1, 1991													
Census	1,069,549	19,893	4,156	23,644	24,239	230,428	492,424	34,310	33,667	80,303	124,829	327	1,329
Census*	846,153	19,066	4,034	21,940	22,883	186,456	366,265	30,287	30,792	66,219	96,797	238	1,176
Adjusted census	57,690	7,671	2,818	4,792	-1,252	7,212	-6,130	9,983	13,037	15,236	7,423	-905	-2,195
May 14, 1996													
Census*	986,881	17,461	1,873	29,283	21,508	232,451	448,245	23,363	26,209	78,687	105,843	191	1,767
							%						
June 1, 1976													
Census	2.75	3.29	3.13	2.78	3.32	2.71	3.13	2.19	1.93	1.59	2.66	1.08	2.76
Adjusted census	0.58	2.27	2.81	1.89	1.29	-0.18	1.20	1.04	0.68	-0.04	-0.40	-1.98	-1.54
June 1, 1981													
Census	2.53	2.45	0.67	1.81	2.46	2.69	3.15	2.76	1.15	-0.25	3.33	-5.87	0.30
Adjusted census	0.35	0.84	-0.32	0.74	0.75	0.72	0.76	1.63	0.23	-2.73	0.17	-8.72	-3.66
June 1, 1986													
Census	3.76	3.66	2.11	2.47	3.51	3.77	3.89	2.77	2.20	4.19	4.49	-1.30	2.34
Adjusted census	0.32	1.82	0.26	0.34	0.97	0.75	-0.05	-0.18	-0.05	1.03	-0.10	-5.94	-3.73
June 1, 1991													
Census	3.95	3.50	3.21	2.63	3.35	3.36	4.94	3.15	3.41	3.17	3.84	1.18	2.31
Census*	3.10	3.35	3.11	2.44	3.16	2.70	3.63	2.77	3.11	2.60	2.95	0.86	2.04
Adjusted census	0.20	1.31	2.11	0.52	-0.17	0.10	-0.06	0.89	1.28	0.58	0.22	-3.23	-3.73
May 14, 1996													
Census + temp*	3.41	3.15	1.39	3.21	2.90	3.25	4.16	2.09	2.63	2.91	2.83	0.61	2.72

* These data include non-permanent residents, and the 1996 data also include temporary residents not enumerated from the 1991 Census.

Census: For 1971,1976 and 1991, the census data refer to the enumerated population; for 1981 and 1986, to the estimated population as of June 1.

Adjusted census: Data include non-permanent residents and are adjusted for net undercoverage.

Estimates: Data include non-permanent residents and returning Canadians; base population is the preceding census adjusted for net undercoverage.

Source: See Appendix 1, Table 1.1.

2.3 Population growth according to censuses and postcensal estimates, 1971-1976 to 1991-1996

Chart 2.1 illustrates population growth according to the following sources:

For 1971-1976 to 1986-1991

- censuses not adjusted for net undercoverage (without non-permanent residents);
- censuses adjusted for net undercoverage (with non-permanent residents);
- postcensal estimates with adjustment for net undercoverage (with non-permanent residents).

For 1991-1996

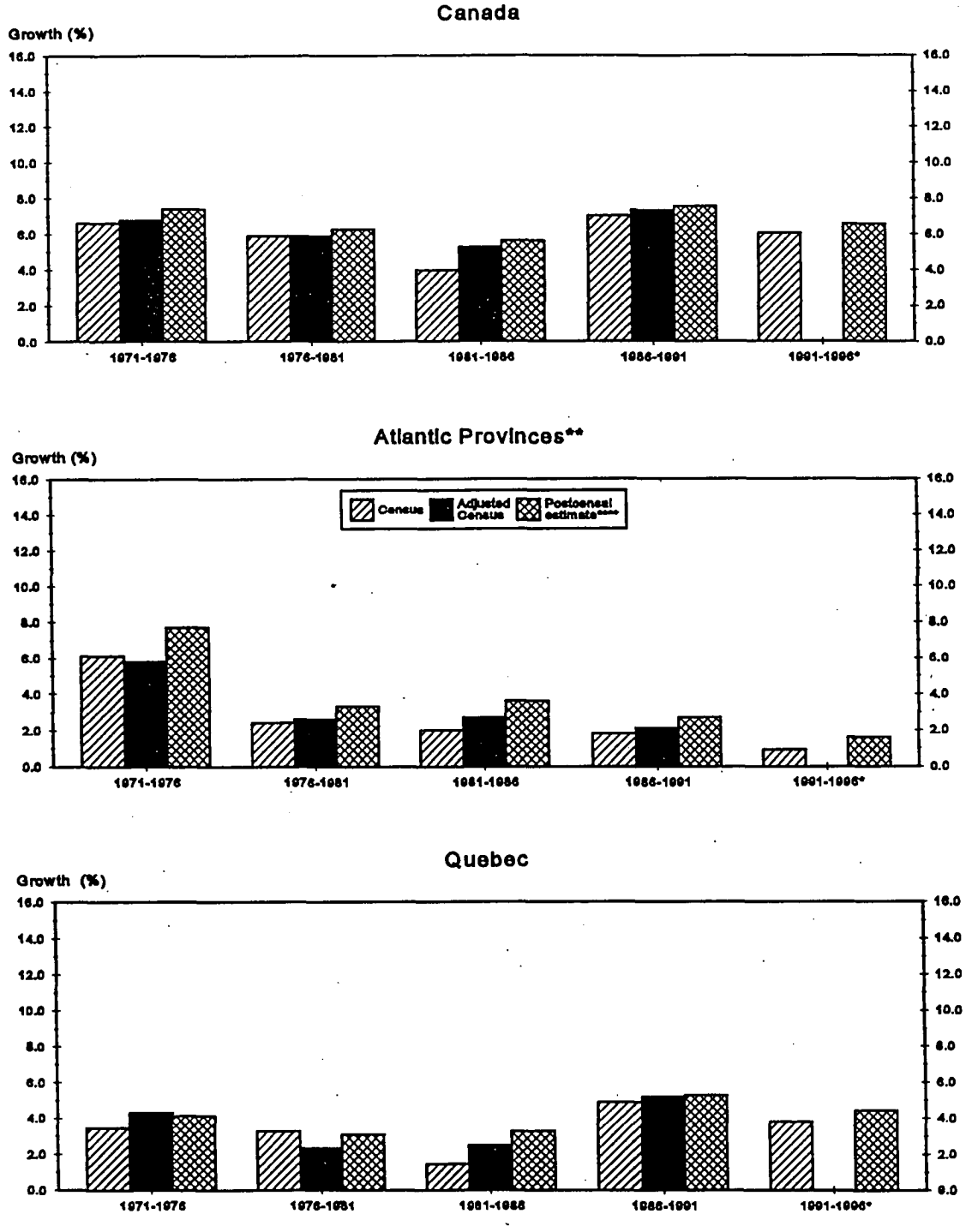
- censuses not adjusted for net undercoverage (with non-permanent residents);
- postcensal estimates with adjustment for net undercoverage (with non-permanent residents).

At the national level, for the periods 1971-1976 to 1986-1991, the population increases in the non-adjusted censuses are lower than those in the adjusted censuses, with differences varying from 0 percentage points in 1976-1981 to 1.3 percentage points in 1981-1986. The latter quite substantial difference for the 1981-1986 increase may be explained by the increase in net undercoverage from 2.0% in 1981 to 3.2% in 1986. The population increases in the adjusted censuses are also lower than those in the postcensal estimates, with differences varying from 0.2 to 0.6 percentage points. It may further be noted that these three sources follow the same, U-shaped trend, with the low point being the 1981-1986 increase and the high point being the 1986-1991 increase.

Similarly, for Canada and the 1991-1996 interval, the population increase in the censuses (not adjusted but including both temporary and non-permanent residents) is lower than the increase in the postcensal estimates, with a difference of 2.5 percentage points. The two series of increases between 1991 and 1996 exhibit the same pattern as the preceding periods 1971-1991, although it is less pronounced.

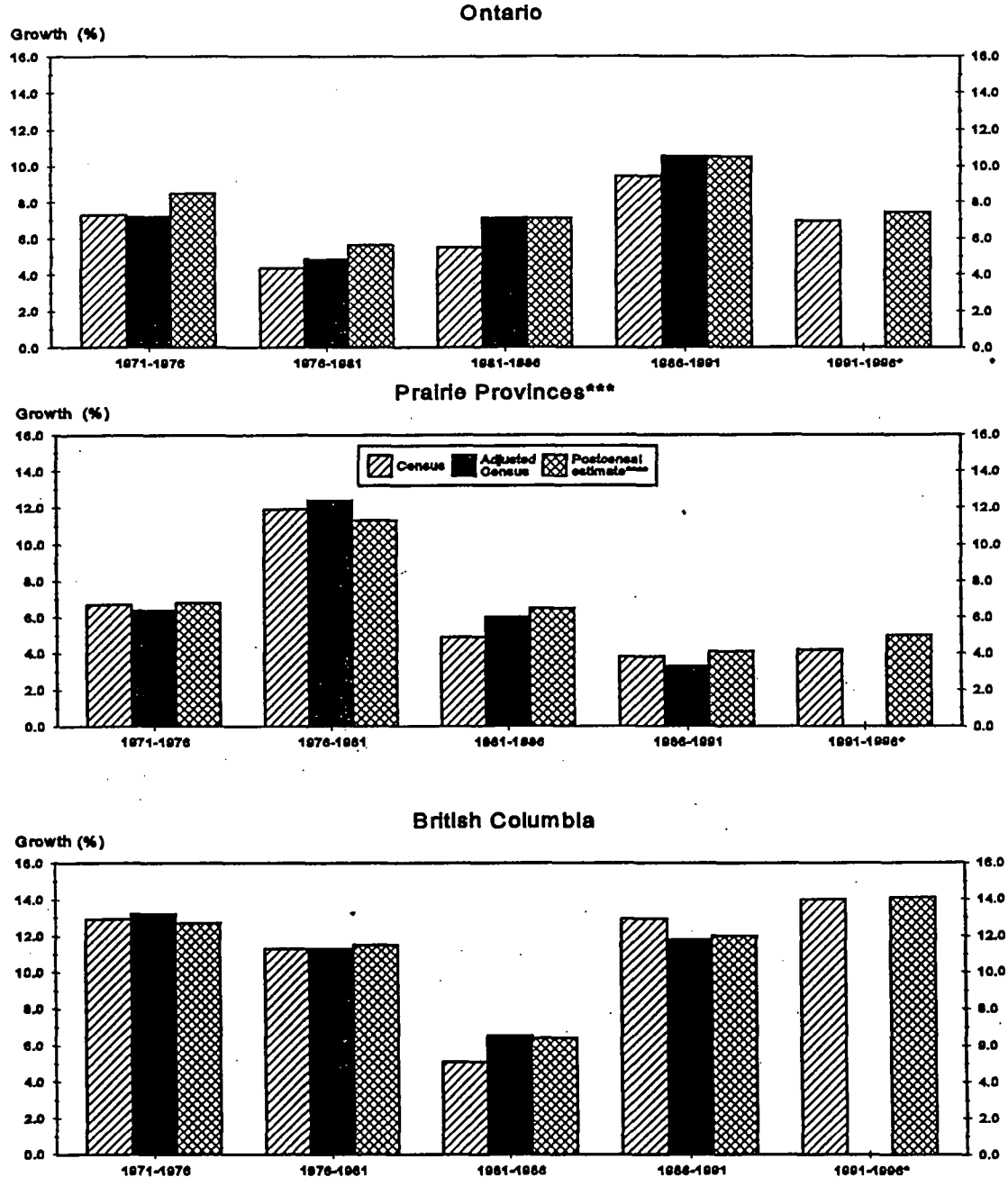
At the provincial level, it is difficult to discern trends between the different series, since the increases vary from one province to another. However, during the period studied, the greatest increases are in British Columbia, Ontario and the Prairies (1976-1981). For each region and for the period 1991-1996, the increase in the postcensal estimates is greater than the one in the censuses not adjusted for net undercoverage.

Chart 2.1: Percentage growth in population according to various sources, Canada and selected regions, 1971-1976 to 1991-1996



See note on following page.

Chart 2.1: Percentage growth in population according to various sources, Canada and selected regions, 1971-1976 to 1991-1996 - end



* For 1991-1996, the population growth registered by the censuses includes non-permanent residents and temporary residents from 1991. For this period, there are no census data adjusted for net undercoverage.

** The Atlantic provinces include Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick.

*** The Prairie provinces include Manitoba, Saskatchewan and Alberta.

**** The growth in the postcensal estimates is calculated as follows:
Postcensal estimates (t+5) - census (t) / adjusted census (t).

Source: See Appendix 1, Table 1.2.

2.4 Census coverage in relation to postcensal estimates, 1991 and 1996

Net undercoverage rates prior to the 1996 Census increased over time from 1.6% in 1971 to 2.8% in 1991. If the postcensal estimates were error-free, the difference between the postcensal estimates and the census would equal net undercoverage. But this is not the case, since we note errors of closure (end of period errors) ranging from 0.6% (1976) to 0.2% (1991). Thus the census data, like the postcensal estimates, are not perfect data sources, but they are nevertheless close to reality.

We use the term apparent net undercoverage to designate the difference between the postcensal estimates (for which the base census is adjusted for net undercoverage) and the census data. The apparent net undercoverage rate is the difference between these two data sources, expressed as a percentage of the postcensal population estimate. According to Table 2.4, the apparent net undercoverage rate for Canada for 1996 is 3.3% (986,900), whereas it was 3.0% in 1991 (846,200). The difference between these two apparent net undercounts is 140,700, or 0.3 percentage points.

At the provincial level, the apparent net undercoverage rate for 1996 is higher than for 1991 for Nova Scotia, Quebec, Ontario, Alberta and the Northwest Territories. It may also be noted that Ontario has the highest apparent net undercoverage rate (4.0%) in 1996, as it also did in 1991 (3.5%). Also noteworthy is a pronounced drop in this rate for Prince Edward Island (3.0% in 1991 to 1.4% in 1996), as well as a sizable increase for Nova Scotia (2.4% in 1991 to 3.1% in 1996) and for Quebec (2.6% in 1991 to 3.2% in 1996) (Lachapelle, 1996).

Even though the net undercoverage for the 1996 Census is not yet known,[2] it is possible to gain an idea of its magnitude by conducting simulations. Knowing the apparent net undercoverage rate, we can, using certain hypotheses, derive the net undercoverage rate and the error of closure for 1996 according to the following relationship[3] (Lachapelle, 1996):

$(1-a) = (1 - n)/(1 + c)$ where: a = apparent net undercoverage rate,
(postcensal estimates - census / postcensal estimates)
n = net undercoverage rate,
(undercoverage rate - overcoverage rate)
c = error of closure rate,
(postcensal estimates - census corrected for net undercoverage / census corrected for net undercoverage).

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2 The results of the Reverse Record Check on the coverage of the 1996 Census should be known in May 1998.

3 See Appendix 2 for the details of the relationships established.

Table 2.4: Apparent net undercoverage rate, net undercoverage rate and error of closure for the 1991 and 1996 censuses according to scenarios I and II, Canada, provinces and territories

Province or territory	1991								1996											
	Estimate adjusted for NU	Census June 4, 1991	Apparent net undercoverage		Net undercoverage		Error of closure		Estimate adjusted for NU	Census with temporary residents	Apparent net undercoverage		Scenario I*				Scenario II**			
													Net undercoverage		Error of closure		Error of closure		Net undercoverage	
	No.	No.	No.	%	No.	%	No.	%	No.	No.	No.	%	No.	%	No.	%	No.	%	No.	%
	(1)	(2)	(1)-(2)=(3)	(3)/(1)*100=(4)	(5)	(6)	(1)-(2+5)=(7)	(7/2+5)*100=(8)	(9)	(10)	(9-10)=(11)	(11/9)*100=(12)	(13)****	(6)=(14)	(15)****	(16)****	(17)****	(6)=(18)	(19)****	(20)****
Nfld.	587,540	568,474	19,066	3.25	11,380	1.96	7,686	1.33	571,874	554,413	17,461	3.05	11,084	1.96	6,377	1.13	7,481	1.33	9,980	1.77
P.E.I.	133,799	129,765	4,034	3.01	1,221	0.93	2,813	2.15	136,753	134,880	1,873	1.37	1,266	0.93	607	0.45	2,875	2.15	1,002	-0.75
N.S.	921,882	899,942	21,940	2.38	17,192	1.87	4,748	0.52	942,248	912,965	29,283	3.11	17,398	1.87	11,885	1.28	4,853	0.52	24,430	2.61
N.B.	746,783	723,900	22,883	3.06	24,157	3.23	-1,274	-0.17	782,100	740,592	21,508	2.82	24,720	3.23	-3,212	-0.42	-1,300	-0.17	22,808	2.99
Que.	7,062,419	6,895,963	166,456	2.83	179,793	2.54	6,863	0.09	7,387,708	7,155,257	232,451	3.15	188,480	2.54	45,971	0.63	6,950	0.09	225,501	3.06
Ont.	10,451,150	10,084,885	366,265	3.50	373,990	3.58	-7,725	-0.07	11,232,738	10,784,493	448,245	3.99	400,420	3.56	47,825	0.43	-8,303	-0.07	456,548	4.06
Man.	1,122,229	1,091,942	30,287	2.70	20,338	1.83	9,949	0.89	1,141,359	1,117,996	23,363	2.05	20,841	1.83	2,522	0.22	10,119	0.89	13,244	1.17
Sask.	1,019,720	988,928	30,792	3.02	17,720	1.76	13,072	1.30	1,021,254	995,045	26,209	2.57	17,827	1.76	8,382	0.83	13,092	1.30	13,117	1.30
Alta.	2,611,772	2,545,553	66,219	2.54	51,262	1.97	14,957	0.58	2,786,605	2,707,918	78,687	2.82	54,418	1.97	24,269	0.88	15,958	0.58	62,729	2.26
B.C.	3,378,858	3,282,061	96,797	2.86	90,019	2.67	6,778	0.20	3,845,673	3,739,830	105,843	2.75	102,593	2.67	3,250	0.08	7,714	0.20	98,129	2.56
Yukon	29,035	27,797	238	0.85	1,148	3.97	-910	-3.14	31,302	31,111	191	0.61	1,286	3.97	-1,095	-3.38	-1,016	-3.14	1,207	3.73
N.W.T.	58,825	57,649	1,176	2.00	3,192	5.23	-2,018	-3.31	66,612	64,845	1,767	2.65	3,579	5.23	-1,812	-2.65	-2,283	-3.31	4,050	5.88
Sum of provinces***	28,143,012	27,296,859	846,153	3.01	791,412	2.82	54,741	0.19	29,926,226	28,939,345	986,881	3.30	841,910	2.83	144,971	0.49	56,140	0.19	930,741	3.11

* Scenario I: Hypothesis that the net undercoverage rate is the same as for 1991.

** Scenario II: Hypothesis that the error of closure is the same as for 1991.

*** Rates were calculated taking account of the effect of aggregation.

****If a= the apparent net undercoverage rate, n= the net undercoverage rate and f= the error of closure rate, then:

(13) = (((10)/(1-n)-)10

(15) = (9)-(((10)/(1-n)))

(16) = (1-n)/(1-a)

(17) = (9)-(((10)/(1-n)))

(19) = (((10)/(1-n)-)10

(20) = ((1-a) (1+f))-1

NU: net undercoverage.

Source: Statistics Canada, censuses of population and Demography Division, Demographic Estimates Section.

According to this relationship, if we assume that the 1996 net undercoverage rate for Canada is identical to the rate observed in 1991 (2.8%), this would result in an error of closure rate of 0.5% (see Scenario 1, Table 2.4). The value of this rate would be much higher than the one observed not only in 1991 (0.2%) but also in 1986 (0.3%) and in 1981 (0.4%). With a rate of closure higher than previous census rates, questions arise concerning the quality of certain demographic components to which a part of the error is attributed. The quality of the demographic components will be examined in section 3.0 of this report.

And conversely, if the error of closure rate for 1996 were the same as the one for 1991 (0.2%), the result would be a net undercoverage rate of 3.1% (see Scenario 2, Table 2.4). This rate would correspond to a slight increase compared to 1991 (2.8%). In this case, the census would be disadvantaged in relation to the postcensal estimates, since its error would increase slightly.

The situation at the level of the provinces is more complex, owing to the sometimes major variations in the net undercoverage rate and the error of closure rate from one census to another. Under Scenario 1, which assumes a net undercoverage rate for 1996 equivalent to the one for 1991, four provinces would register a higher closure rate in 1996 than in 1991: Nova Scotia (1.3% vs 0.5%), Quebec (0.6% vs 0.1%), Ontario (0.4% vs -0.1%) and Alberta (0.8% vs 0.6%).

In the event that the error of closure rate for 1996 were the same as for 1991, five provinces and territories would exhibit higher net undercoverage rates in 1996 than in 1991: Nova Scotia (2.6% vs 1.9%), Quebec (3.1% vs 2.5%), Ontario (4.1% vs 3.6%), Alberta (2.3% vs 2.0%) and the Northwest Territories (6.2% vs 5.2%). Also, if this hypothesis proved accurate, Prince Edward Island would have a net overcoverage rate of 0.8%.

2.5 Conclusion

The differences observed between the two main data sources – the census and the postcensal estimates for 1996 – could be explained by several factors: an error in the estimate of net undercoverage for 1991, biases arising from the components of demographic change that were used to produce the postcensal estimates, the net undercoverage for the 1996 census, or, of course, a combination of these factors.

For Canada as a whole, with a slightly greater apparent net undercoverage in 1996 than in 1991 and with the results of the two different simulations produced for net undercoverage and error of closure, it is probable that the net undercoverage for 1996 will be similar to the figure for the 1991 census or slightly higher.

For the provinces the situation is harder to evaluate, given the major variations in the rates of net undercoverage and error of closure from one census to another. Nevertheless, using simulations carried out on the error of closure rate and the net undercoverage rate, four provinces would quite probably post higher net undercoverage rates and/or higher error of closure rates in 1996 than in 1991, namely Nova Scotia, Quebec, Ontario and Alberta.

3.0 Quality of data in postcensal estimates

As noted in the last section, the postcensal estimates are subject to with a certain margin of error that comes from the components of demographic change. Since the census data are basically compared to the data drawn from the estimates, we must also evaluate the postcensal estimates of the population. Thus we will compare the increase between 1991 and 1996 in the population enumerated by the census with the population increase derived by estimating the different components for the same period.

According to Table 3.1, the population increase between the last two censuses is 1,642,500. This figure is much lower than the one derived by estimating the components, namely 1,840,900; the difference yields an error of closure of 198,400, representing 0.7% of the population enumerated in 1996. Indeed, the table shows that for nine provinces/territories out of 12, the estimated change is greater than the change registered by the censuses. Among these nine cases, four provinces exhibit differences of at least 0.9 percentage points between the increase according to the census and the increase based on the components: Newfoundland (-2.5% vs -1.4% respectively), Nova Scotia (1.5% vs 2.7% respectively), Saskatchewan (0.6% vs 1.5% respectively) and Alberta (6.4% vs 7.3% respectively).

Conversely, compared to the census , three provinces/territories are underestimated regarding the change in the demographic components of growth: New Brunswick (2.3% vs 1.9%), Yukon (11.9% vs 8.2%) and the Northwest Territories (12.5% vs 9.2%).

For all provinces except New Brunswick, the increase estimated from the components is greater than the one based on the difference between the census counts. It should nevertheless be noted that the opposite is observed for the two territories, where it is still difficult to estimate with precision the balance of migration with the rest of the country. The error of closure is therefore negative for both territories and New Brunswick, but remains positive for each of the other nine provinces. It exceeds 1% of the enumerated population in two provinces: Nova Scotia and Newfoundland.

A positive error of closure may be due to various factors: an increase in net undercoverage, overestimates of some components of demographic change, imperfect comparability between the two census, or a combination of the above factors (Lachapelle, 1996).

In the sections that follow, we will examine the quality of the data for each of the demographic components taken into account in producing postcensal estimates of the population from June 1, 1991 to May 14, 1996.

Table 3.1: Comparison between intercensal change in population and change obtained by aggregating the components of population growth, Canada, provinces and territories, 1991 and 1996

Prov. or terr.	Census of population May 14, 1996 (1)	Temporary residents from 1991 (2)	1996 Census data corrected for 1991 temporary residents (1)-(2)=(3)	Census of population June 4, 1991* (without NU) (4)	Census of population June 1, 1991 (with NU) (5)	Census change		Estimated change		Error of closure		Components of demographic change in population from June 1, 1991 to May 14, 1996							
						No. (3)-(4)=(6)	% (6)/(4)*100=(7)	No. (14)-(20)=(8)	% (8)/(3)*100=(9)	No. (3)-(5)=(10)	% (10)/(3)=(11)	Births **** (12)	Deaths **** (13)	Natural increase ** (14)	Imm. **** (15)	Emig. (16)	Net I.P.M. **** (17)	Net Flow of N.P.R.s (18)	R.C.s (19)	Net migr. *** (20)
Nfld.	551,792	2,621	554,413	568,474	579,869	-14,061	-2.47	-7,995	-1.38	8,068	1.09	31,855	19,505	12,350	3,445	1,358	-23,347	220	695	-20,345
P.E.I.	134,557	323	134,680	129,765	130,981	5,115	3.94	5,772	4.41	657	0.49	6,840	5,644	3,196	777	365	1,762	240	182	2,576
N.S.	909,282	3,683	912,965	899,942	917,090	13,023	1.45	25,158	2.74	12,135	1.33	56,157	37,881	18,276	14,661	4,094	-5,363	-159	1,637	8,882
N.B.	738,133	2,459	740,592	723,900	746,035	16,692	2.31	14,065	1.88	-2,627	-0.35	44,822	28,826	15,996	3,404	4,649	-3,125	204	2,235	-1,931
Que.	7,138,795	16,462	7,155,257	6,895,963	7,075,207	259,294	3.76	312,501	4.42	53,207	0.74	454,238	253,069	201,169	190,825	30,735	-46,524	-17,598	15,364	111,332
Ont.	10,753,573	30,920	10,784,493	10,084,885	10,457,280	699,608	6.94	775,458	7.42	75,850	0.70	733,520	379,579	353,941	619,481	96,071	-45,865	-103,964	47,936	421,517
Man.	1,113,898	4,098	1,117,996	1,091,942	1,112,246	26,054	2.39	29,113	2.62	3,059	0.27	61,845	45,921	35,924	22,234	10,972	-23,658	259	5,326	-6,811
Sask.	990,237	4,808	995,045	968,928	1,006,683	6,117	0.62	14,571	1.45	8,454	0.85	70,679	40,824	29,855	11,360	4,824	-24,667	513	2,334	-15,284
Alta.	2,696,826	11,092	2,707,918	2,545,553	2,596,536	162,365	6.38	190,069	7.32	27,704	1.02	200,400	76,310	124,090	64,257	38,194	5,924	-4,681	18,673	65,979
B.C.	3,724,500	15,330	3,739,830	3,282,061	3,371,435	457,769	13.95	474,238	14.07	16,469	0.44	230,380	127,100	103,280	213,937	34,475	165,974	8,753	16,769	370,958
Yukon	30,766	345	31,111	27,797	28,940	3,314	11.92	2,362	8.16	-952	-3.06	2,467	650	1,817	521	328	230	-38	160	545
N.W.T.	64,402	443	64,845	57,649	61,020	7,196	12.48	5,592	9.16	-1,604	-2.47	7,839	1,237	6,602	647	374	-1,341	-123	181	-1,010
Canada	28,846,761	92,584	28,939,345	27,296,859	28,065,322	1,842,486	6.02	1,840,904	6.55	198,418	0.69	1,923,042	1,016,546	906,496	1,165,549	226,459	0	-116,374	111,692	934,408

*Statistics Canada, 1991 Census, Cat No. 93-301.

**Natural increase = Births - Deaths

***Total net migration = Immigration - Emigration + Net interprovincial migration (I.P.M.) + Flow of Non Permanents Residents (N.P.R.s) + Returning Canadians (R.C.)

****These data contain an estimate of the final data for 1995-1996.

NU : Net undercoverage.

Source: Statistics Canada, Census of Population, Demography Division, Health Statistics Division and Citizenship and Immigration Canada.

3.1 Births and deaths

Births and deaths are the two components of natural increase used to produce estimates of the postcensal population. The birth and death data used to estimate the postcensal population for 1996 are the final data from June 1, 1991 to December 31, 1995 and the preliminary data from January 1 to May 14, 1996.

3.1.1 Data sources and methodology

The final statistics on births and deaths are obtained from the national data bank administered by the Health Statistics Division of Statistics Canada.[4] This data bank is created from the vital statistics files that each province is required to provide to Statistics Canada. Since the registration of births and deaths is compulsory, it follows that the coverage and quality of the final data should not pose a problem. According to a study currently being conducted by the Demography Division (Morissette, 1997), the completeness rate for the registration of births is estimated to be very nearly 100% for the period 1986-1991. However, delays in the registration of births and deaths, which vary in magnitude over time and from one region to another, result in minor regional variations in the quality of the data (Statistics Canada, 1987).

The preliminary statistics on births and deaths are based on an estimation model. The model developed by the Health Statistics Division uses fertility and mortality rates by age according to the province or territory of residence. Calculated on the basis of the most recent data, the observed fertility and mortality rates are applied to the population estimates (available by age, sex and province or territory) to obtain data on births and deaths. The advantage of this method is that it is simple and fairly precise, given the slow change in these demographic phenomena. In addition, this model takes account of the differential age structure of the most recent population estimated for the provinces and territories.

3.1.2 Quality of preliminary data

One way to assess the accuracy of the statistics on births and deaths is to make a comparison between the preliminary and final data for the most recent calendar years, namely 1994 and 1995. These comparisons are made in Table 3.1.1 for births and Table 3.1.2 for deaths. According to these tables, the preliminary data overestimate the final data.

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4 Since 1995, Statistics Canada has been publishing the estimates of Quebec births and deaths supplied by the Bureau de la statistique du Québec.

Table 3.1.1: Comparison between preliminary and final data on births, Canada, provinces and territories, January-December, 1994 and 1995

Province or territory	1994				1995			
			Difference				Difference	
	P	F	No. P - F	% (P- F)/F*100	P	F	No. P- F	% (P- F)/F*100
Nfld.	6,330	6,337	-7	-0.11	6,170	5,859	311	5.31
P.E.I.	1,685	1,716	-31	-1.81	1,715	1,754	-39	-2.22
N.S.	11,380	11,099	281	2.53	11,025	10,726	299	2.79
N.B.	8,920	8,978	-58	-0.65	8,770	8,563	207	2.42
Que.	91,295	90,578	717	0.79	89,100	87,417	1,683	1.93
Ont.	147,155	147,068	87	0.06	147,050	146,263	787	0.54
Man.	16,580	16,480	100	0.61	16,350	16,113	237	1.47
Sask.	14,025	14,038	-13	-0.09	13,860	13,499	361	2.67
Alta.	39,810	39,796	14	0.04	39,430	38,914	516	1.33
B.C.	47,115	46,998	117	0.25	47,640	46,820	820	1.75
Yukon	485	442	43	9.73	460	470	-10	-2.13
N.W.T.	1,570	1,580	-10	-0.63	1,575	1,613	-38	-2.36
Canada	386,350	385,110	1,240	0.32	383,145	378,011	5,134	1.36

P : Preliminary data
F : Final data
Source : Health Statistics Division and Demography Division, Demographic Estimates Section

Table 3.1.2: Comparison between preliminary and final data on deaths, Canada, provinces and territories, January-December, 1994 and 1995

Province or territory	1994				1995			
			Difference				Difference	
	P	F	No. P- F	% (P- F)/F*100	P	F	No. P- F	% (P- F)/F*100
Nfld.	4,035	4,050	-15	-0.37	4,145	3,935	210	5.34
P.E.I.	1,200	1,114	86	7.72	1,125	1,153	-28	-2.43
N.S.	7,650	7,770	-120	-1.54	8,115	7,687	428	5.57
N.B.	5,940	5,917	23	0.39	6,015	5,938	77	1.30
Que.	53,545	51,366	2,179	4.24	52,160	52,734	-574	-1.09
Ont.	77,865	77,487	378	0.49	80,120	78,479	1,641	2.09
Man.	9,425	9,148	277	3.03	9,350	9,658	-308	-3.19
Sask.	8,305	8,308	-3	-0.04	8,300	8,495	-195	-2.30
Alta.	15,895	15,613	282	1.81	16,060	15,895	165	1.04
B.C.	27,325	25,939	1,386	5.34	27,215	26,375	840	3.18
Yukon	120	124	-4	-3.23	140	157	-17	-10.83
N.W.T.	230	241	-11	-4.56	245	227	18	7.93
Canada	211,535	207,077	4,458	2.15	212,990	210,733	2,257	1.07

P : Preliminary data
F : Final data
Source : Health Statistics Division and Demography Division, Demographic Estimates Section

At the national level, preliminary figures on births overestimated the final figures by 0.3% in 1994 and 1.4% in 1995. At the level of the provinces and territories, the differences ranged between -2.4% (1995) and 9.7% (1994). In general, it is the smaller jurisdictions such as Yukon that are subject to the greatest fluctuations, because the numbers are smaller than for the larger provinces. For all provinces, the differences for 1995 are greater than those for 1994. In 1995, Newfoundland exhibited the greatest difference, with 5.3%, whereas the smallest difference was in Ontario with 0.5%.

For deaths, at the national level, the difference between preliminary and final data was 2.2% (1994) and 1.1% (1995). At the provincial and territorial levels, differences ranged between -10.8% and 7.9%. As with births, the percentage change between preliminary and final numbers of death are highly sensitive to small numbers. In 1994, four provinces registered variations greater than those of Canada as a whole: Prince Edward Island (7.7%), Quebec (4.2%), Manitoba (3.0%) and British Columbia (5.3%). In 1995, Newfoundland and Nova Scotia had the greatest difference (5.3% and 5.6%, respectively), while Quebec and Alberta registered the smallest difference (-1.0% and 1.04%, respectively).

3.1.3 Conclusion

The components of natural increase represent 49% of the total increase for Canada as a whole. It should be noted that the final data for the period from June 1, 1991 to December 31, 1995 and the preliminary data for the period from January 1 to May 14, 1996 were used to produce the postcensal population estimates. If the preliminary data from January 1 to May 14, 1996 are replaced with estimated final data,[5] there is no impact on the total increase, as may be seen from Table 3.1.3. Even though the difference between the figures used to produce the postcensal estimates and the estimated final data is roughly 1,000, this does not change the total percentage increase, which remains at 6.6%. It may therefore be concluded that the data on births and deaths used to produce the postcensal estimates are of relatively good quality and that the total error attributable to these components is quite minimal.

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[5] Estimates based on the ratio of final data to preliminary data for 1995 applied to births and deaths from January to May 1996.

Table 3.1.3: Comparison between components of population growth used to obtain postcensal estimates and growth obtained by adjusting births and deaths, Canada, provinces and territories, from June 1991 to May 14, 1996

Prov. or terr.	Census of population June 4, 1996 (with NU) (1)	Data used to obtain postcensal estimates from June 1, 1991 to May 14, 1996*						Estimates obtained if preliminary births and deaths from January to May 1996 are replaced by estimated final data** June 1, 1991 to May 14, 1996					
		Total growth		Births	Deaths	Natural increase	Total net migration	Total growth		Births	Deaths	Natural increase	Total net migration***
		No. (5)+(7)=(2)	% (2)/(1)*100=(3)	(4)	(5)	(4)-(5)=(6)	(7)	No. (12)+(13)=(8)	% (8)/(1)*100=(9)	(10)	(11)	(10)-(11)=(12)	(7)=(13)
Nfld.	579,869	-7,995	-1.38	31,855	19,505	12,350	-20,345	-8,020	-1.38	31,745	19,420	12,325	-20,345
P.E.I.	130,981	5,772	4.41	8,840	5,644	3,196	2,576	5,776	4.41	8,855	5,655	3,200	2,576
N.S.	917,090	25,158	2.74	56,157	37,881	18,276	6,882	25,218	2.75	56,049	37,713	18,336	6,882
N.B.	748,035	14,065	1.88	44,822	28,826	15,996	-1,931	14,018	1.87	44,744	28,795	15,949	-1,931
Que.	7,075,207	312,501	4.42	454,238	253,069	201,169	111,332	311,682	4.41	453,642	253,292	200,350	111,332
Ont.	10,457,280	775,458	7.42	733,520	379,579	353,941	421,517	775,831	7.42	733,235	378,921	354,314	421,517
Man.	1,112,246	29,113	2.62	81,845	45,921	35,924	-6,811	28,909	2.60	81,759	46,039	35,720	-6,811
Sask.	1,006,683	14,571	1.45	70,679	40,824	29,855	-15,284	14,358	1.43	70,544	40,902	29,642	-15,284
Alta.	2,596,536	190,069	7.32	200,400	76,310	124,090	65,979	189,944	7.32	200,209	76,244	123,965	65,979
B.C.	3,371,435	474,238	14.07	230,380	127,100	103,280	370,958	474,259	14.07	230,076	126,775	103,301	370,958
Yukon	28,940	2,362	8.16	2,467	650	1,817	545	2,359	8.15	2,471	657	1,814	545
N.W.T.	61,020	5,592	9.16	7,839	1,237	6,602	-1,010	5,614	9.20	7,854	1,230	6,624	-1,010
Canada	28,085,322	1,840,904	6.55	1,923,042	1,016,546	906,496	934,408	1,839,948	6.55	1,921,183	1,015,643	905,540	934,408

* See Table 3.1 of report.

** Estimates based on ratio of final data to preliminary data for 1995 applied to births and deaths from January to May 1996.

*** Data used to obtain postcensal estimates; see Table 3.1 of report.

Source: Statistics Canada, Health Statistics Division and Demography Division, Demographic Estimates Section.

3.2 Interprovincial migration

Interprovincial migration affects only the population of the provinces and territories, since for Canada as a whole, the sum of migratory exchanges is nil. Data on interprovincial migration are obtained indirectly, from administrative files. To produce estimates of the postcensal population, the final data on net migration from June 1, 1991 to June 30, 1995 were used with an estimate of the final data from July 1, 1995 to May 14, 1996. The latter estimates were obtained by applying to the 1995-1996 preliminary data the ratio of the final data to the preliminary data for 1994-1995.

3.2.1 Data sources and methodology

The preliminary data are produced monthly by the Demography Division of Statistics Canada. Until June 1993, preliminary data were generated using family allowance data. The latter had the reputation of being of very good quality (Bédard, 1994). Indeed, with respect to coverage of child migration, family allowances offered a quite satisfactory (very high) degree of completeness. In addition, these data were available shortly after the reference period.

Since January 1993, the family allowance program administered by Health and Welfare Canada has been replaced by the child tax benefit (CTB) program administered by Revenue Canada. Since this new plan, unlike its predecessor, is not universal, the degree of completeness of the data obtained from it is insufficient. According to Table 3.2.1, the total completeness rate for children (0-17 years of age) receiving benefits under the CTB program averaged 80% in 1995 and 1996. At the level of the provinces and territories for the same period, the completeness rate varies from 71.2% to 89.4%.

Table 3.2.1 Rate of completeness of data on children enumerated from child tax benefit files in relation to demographic estimates, Canada, provinces and territories, July 1, 1995 and 1996

Province or territory	Completeness rate (%)	
	1995	1996
Newfoundland	87.45	86.83
Prince Edward Island	86.69	89.37
Nova Scotia	84.61	85.84
New Brunswick	86.70	86.95
Quebec	81.14	82.18
Ontario	74.70	74.99
Manitoba	86.49	86.24
Saskatchewan	87.42	86.94
Alberta	79.46	80.28
British Columbia	75.98	77.62
Yukon	71.23	72.25
Northwest Territories	72.34	72.39
Canada	78.77	79.39

Source: Revenue Canada, Child tax benefit files and Statistics Canada, Demography Division, Demographic Estimates Section.

To remedy this problem, two major adjustments are made to the CTB data: the first is intended to correct the coverage of data on migrant children by G_j[6] factors (Bédard, 1994), and the second, to estimate the adult migrant population using F_{jk} [7]factors (Bédard and Michalowski, 1994).

As to **the final data**, they are estimated annually on the basis of data from the taxation files of Revenue Canada by the Small Area and Administrative Data Division (SAADD) of Statistics Canada. The estimation of migrants using the taxation files is based on postal address changes between two consecutive years at the time the taxfiler completes his or her return (generally in April). The address reported may in some cases not represent the residential address as such (e.g., work address, etc.). In addition, tax data are generally sensitive to fluctuations resulting from changes made to tax laws. The methodology on internal migration is therefore subject to continual revisions (either major or minor), such as changes in imputation rules.

The estimation of interprovincial migration on the basis of taxation data involves four main stages:

- geographic coding of taxation files;
- estimation of the number of migrants on the basis of address changes between two consecutive years;
- estimation of the number of dependents (primarily children and spouses);
- adjustment of the data to reflect the total population[8] (Montgomery and Standish, 1995).

3.2.2 Quality of final data

Table 3.2.2 shows the rate of completeness of the total population for taxation data in relation to population estimates. For 1995 and for Canada as a whole, the rate is 95.9%, whereas for the provinces, it varies from 95.0% to 98.4%. While the reliability of the taxation data is good, the main weaknesses that may affect the provincial/territorial population count are the following:

(a) the hypothesis that dependents follow taxfilers when they move; and

(b) the corrections made to the coverage of the data (Montgomery and Standish, 1995).

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6 Gj = adjustment factor by province of origin j for the CTB- based migration rate of children.

7 Fjk = adult migration estimation factor calculated by origin j and destination k.

8 With the implicit assumption that on average, the population not covered by the tax system exhibits the same mobility as the population coverd.

Table 3.2.2 Rate of completeness (%) of taxation data, Canada, provinces and territories, 1995

Province or territory	1995
Newfoundland	98.40
Prince Edward Island	97.41
Nova Scotia	96.69
New Brunswick	97.69
Quebec	96.08
Ontario	95.09
Manitoba	98.29
Saskatchewan	97.73
Alberta	96.89
British Columbia	95.03
Yukon	95.63
Northwest Territories	95.30
Canada	95.90

* Percentage representing 1994 taxation data in relation to 1995 population estimates.

Source: Statistics Canada, Small Area and Administrative Data Division.

(a) Hypothesis that dependents follow taxfilers when they move:

In addition to estimating the number of dependents, we also hypothesize when a taxfiler moves, his or her dependents follow. In most cases, this hypothesis is true, since the dependents are children or a spouse. However, the hypothesis can cause data coverage problems in cases of separation or divorce or in the case of older dependents who form their own household. In such cases, the children may be misassigned. The hypothesis may also prove false in cases of short-term relocations, in which only the taxfiler moves, temporarily leaving his or her family (Montgomery and Standish, 1995).

(b) Corrections made to data coverage:

An important step in the development of tax migration estimates is the adjustment of the data to the total population. This adjustment takes into account the population that does not file income tax returns for two consecutive years. Since the coverage adjustment is a simple weighting of the estimated taxfilers and their dependents to the total population, bias is introduced if the taxfilers and their dependents migrate at a rate substantially different from the overall average (Montgomery et Standish, 1995).

In Table 3.2.3, the final estimates (taxation data) of the total number of migrants are compared to the preliminary estimates (child tax benefit data). This table shows that there are significant differences between these two sources of administrative data. For 1993-1994 and 1994-1995, the preliminary estimates exceed the final data by ratios of roughly 1.3.

Table 3.2.3 Comparison of final and preliminary estimates of total number of migrants, 1993-1994 and 1994-1995

Period***	Final* (F)	Preliminary** (P)	Difference (P-F)	Ratio (P÷F)
1993-1994	288,908	371,712	82,804	1.29
1994-1995	284,968	374,478	89,510	1.31

* Final estimates are derived from migration statistics. The latter are based on Revenue Canada's taxation file and are provided by the Small Area and Administrative Data Division.
** Preliminary estimates are based on the child tax benefit files.
*** These data cover the period from June to May.
Source: Statistics Canada, Demography Division, Demographic Estimates Section.

Tables 3.2.4 and 3.2.5 compare the final data to the preliminary data on the total number of migrants and child migrants (0-17 years of age) in terms of in-, out- migrants and net migration by province or territory for the years 1993-1994 and 1994-1995. First, according to Table 3.2.4, it may be seen that for all provinces and territories, the preliminary data exceed the final data. The ratios of the preliminary data to the final data confirm this: they vary from 1.1 to 1.6 for the data on in- and out-migrants. As regards net migration, two provinces exhibit a different pattern between the preliminary data and the final data: Ontario for 1994-1995 (-1,740 vs 4,602 respectively) and New Brunswick for 1993-1994 (-641 vs 224 respectively). There is also greater variation in the net migration ratios (from 0.3 to 8.2) than for arrivals and departures.

As regards data on child migrants aged 0-17, the preliminary data also exceed the final data, with ratios for in- and out-migrants varying from 1.0 to 1.4 (Table 3.2.5). The net migration ratios vary much less from one region to another (0.6 to 1.8).

In addition to weaknesses in the taxfile mentioned previously, the differences observed may be explained by the following factors (see Appendix 3 for further details):

- the fact that CTB data are collected on a monthly basis, whereas taxation data are collected on an annual basis;
- the method used to calculate the factors F_{jk} based on taxfile data;
- the adjustment of the coverage of the CTB data using the Gj factor;
- determination of address changes in the CTB file and the taxfile.

Table 3.2.4: Comparison between final and preliminary data on total number of in-, out- and net migration, by province or territory, 1993-1994 and 1994-1995

Province or territory	1993-94						1994-95					
	In		Out		Net		In		Out		Net	
	F	P	F	P	F	P	F	P	F	P	F	P
Nfld.	6,466	10,529	11,711	15,037	-5,245	-4,508	6,832	10,457	14,062	18,867	-7,230	-8,410
P.E.I.	2,674	2,973	2,007	2,337	667	636	2,569	3,498	2,281	2,623	288	875
N.S.	15,003	19,422	17,154	20,245	-2,151	-823	15,927	19,883	18,482	22,700	-2,555	-2,817
N.B.	10,678	15,189	11,319	14,965	-641	224	11,444	15,297	12,133	16,130	-689	-833
Que.	23,800	31,356	31,798	43,884	-7,998	-12,528	23,651	27,758	32,697	43,042	-9,046	-15,284
Ont.	64,259	88,110	74,486	99,174	-10,227	-11,064	68,567	90,211	70,307	85,609	-1,740	4,602
Man.	15,570	21,351	19,670	25,997	-4,100	-4,646	16,410	23,286	19,480	25,448	-3,070	-2,162
Sask.	16,988	24,560	22,220	27,500	-5,232	-2,940	17,549	23,522	20,929	27,689	-3,380	-4,167
Alta.	51,480	65,668	53,811	70,393	-2,331	-4,725	51,806	62,649	52,305	66,727	-499	-4,078
B.C.	77,413	95,388	38,803	53,767	38,610	41,621	70,333	87,542	42,459	55,130	27,874	32,412
Yukon	1,574	1,969	2,657	2,845	-1,083	-876	2,162	2,383	1,874	2,289	288	94
N.W.T.	3,176	4,073	3,445	4,444	-269	-371	3,184	4,141	3,425	4,373	-241	-232

Province or territory	Difference between preliminary and final data						Ratio between preliminary and final data					
	1993-94			1994-95			1993-94			1994-95		
	In	Out	Net	In	Out	Net	In	Out	Net	In	Out	Net
	P-F	P-F	P-F	P-F	P-F	P-F	P÷F	P÷F	P÷F	P÷F	P÷F	P÷F
Nfld.	4,063	3,326	737	3,625	4,805	-1,180	1.63	1.28	0.86	1.53	1.34	1.16
P.E.I.	299	330	-31	929	342	587	1.11	1.16	0.95	1.36	1.15	3.04
N.S.	4,419	3,091	1,328	3,956	4,218	-262	1.29	1.18	0.38	1.25	1.23	1.10
N.B.	4,511	3,646	865	3,853	3,997	-144	1.42	1.32	-0.35	1.34	1.33	1.21
Que.	7,556	12,086	-4,530	4,107	10,345	-6,238	1.32	1.38	1.57	1.17	1.32	1.69
Ont.	23,851	24,688	-837	21,644	15,302	6,342	1.37	1.33	1.08	1.32	1.22	-2.64
Man.	5,781	6,327	-546	6,876	5,968	908	1.37	1.32	1.13	1.42	1.31	0.70
Sask.	7,572	5,280	2,292	5,973	6,760	-787	1.45	1.24	0.56	1.34	1.32	1.23
Alta.	14,188	16,582	-2,394	10,843	14,422	-3,579	1.28	1.31	2.03	1.21	1.28	8.17
B.C.	17,975	14,964	3,011	17,209	12,671	4,538	1.23	1.39	1.08	1.24	1.30	1.16
Yukon	395	188	207	221	415	-194	1.25	1.07	0.81	1.10	1.22	0.33
N.W.T.	897	999	-102	957	948	9	1.28	1.29	1.38	1.30	1.28	0.96

Note: The preliminary estimates are based on child tax benefit data, whereas the final data are estimated from the taxation files of Revenue Canada.

Source: Statistics Canada, Demography Division, Population Estimates Section and Small Area and Administrative Data Division.

Table 3.2.5: Comparison between final and preliminary data on in-, out-, and net migration of child migrants (0-17 years of age), by province or territory, 1993-1994 and 1994-1995

Province or territory	1993-94						1994-95					
	In		Out		Net		In		Out		Net	
	F	P	F	P	F	P	F	P	F	P	F	P
Nfld.	2,568	2,664	3,395	3,461	-827	-797	1,882	2,648	3,487	4,124	-1,605	-1,476
P.E.I.	755	771	591	609	164	162	677	889	522	660	155	229
N.S.	4,675	4,745	4,799	4,890	-124	-145	4,157	4,831	4,658	5,426	-501	-595
N.B.	3,725	3,847	3,553	3,645	172	202	3,058	3,856	3,067	3,851	-9	5
Que.	6,942	7,028	9,428	9,658	-2,486	-2,630	5,692	6,244	7,985	9,525	-2,293	-3,281
Ont.	20,788	21,270	22,912	23,338	-2,124	-2,068	17,772	21,576	17,081	20,350	691	1,226
Man.	5,804	6,015	6,852	7,031	-1,048	-1,016	4,837	6,545	5,358	6,862	-521	-317
Sask.	7,376	7,542	7,552	7,756	-176	-214	5,605	7,147	5,984	7,745	-379	-598
Alta.	17,494	17,818	19,491	19,959	-1,997	-2,141	13,956	16,693	15,058	18,845	-1,102	-2,152
B.C.	22,144	22,635	13,269	13,548	8,875	9,087	16,937	20,668	11,339	13,585	5,598	7,083
Yukon	490	492	799	814	-309	-322	597	595	493	610	104	-15
N.W.T.	1,015	1,041	1,135	1,159	-120	-118	821	1,055	959	1,164	-138	-109

Province or territory	Difference between preliminary and final data						Ratio between preliminary and final data					
	1993-94			1994-95			1993-94			1994-95		
	In	Out	Net	In	Out	Net	In	Out	Net	In	Out	Net
	P-F	P-F	P-F	P-F	P-F	P-F	P÷F	P÷F	P÷F	P÷F	P÷F	P÷F
Nfld.	96	66	30	766	637	129	1.04	1.02	0.96	1.41	1.18	0.92
P.E.I.	16	18	-2	212	138	74	1.02	1.03	0.99	1.31	1.26	1.48
N.S.	70	91	-21	674	768	-94	1.01	1.02	1.17	1.16	1.16	1.19
N.B.	122	92	30	798	784	14	1.03	1.03	1.17	1.26	1.26	-0.56
Que.	86	230	-144	552	1,540	-988	1.01	1.02	1.06	1.10	1.19	1.43
Ont.	482	426	56	3,804	3,269	535	1.02	1.02	0.97	1.21	1.19	1.77
Man.	211	179	32	1,708	1,504	204	1.04	1.03	0.97	1.35	1.28	0.61
Sask.	166	204	-38	1,542	1,761	-219	1.02	1.03	1.22	1.28	1.29	1.58
Ata.	324	468	-144	2,737	3,787	-1,050	1.02	1.02	1.07	1.20	1.25	1.95
B.C.	491	279	212	3,731	2,246	1,485	1.02	1.02	1.02	1.22	1.20	1.27
Yukon	2	15	-13	-2	117	-119	1.00	1.02	1.04	1.00	1.24	-0.14
N.W.T.	26	24	2	234	205	29	1.03	1.02	0.98	1.29	1.21	0.79

Note: Preliminary estimates are based on child tax benefit data, whereas final data are estimated from the taxation files of Revenue Canada.

Source: Statistics Canada, Demography Division, Population Estimates Section and Small Area and Administrative Data Division.

There are significant differences between taxfiles, the census and the family allowance data for 1990-1991 net interprovincial migration (see table, 3.2.6). Compared to the tax data, census figures differ with ratios (census / taxation) ranging between 0.1 (Newfoundland) to 2.1 (Ontario). The difference between these data sets were considerably lower among the western provinces with ratios ranging between 0.8 and 1.1 (Alberta, Saskatchewan and British Columbia). When we compare Family allowance data with Tax data, large discrepancies can be observed in the Atlantic Provinces with ratios (family allowance / taxation) ranging from -0.7 to 3.8. For the rest of the provinces, there seems to be better consistency between the administrative data.

3.2.3 Conclusion

The internal migration data that were used to produce postcensal estimates for the period from June 1 1991 to May 14, 1996 are basically final data from the taxation file (except in the 1995-1996, when the final data were estimated). While the quality of the data from the taxation file is satisfactory, it is not error-free. The internal migration estimates are based on administrative files that are not primarily intended for the measurement of internal migration.

The major differences observed in 1990-1991 for various provinces between three data sources – the taxation file, the census and family allowances – suggest that both the administrative data and the census data have a certain margin of error. It is therefore advisable to review the quality of the internal migration estimates derived from the taxation file by comparing them with estimates from other data sources, including the 1996 Census (based on the mobility question).

3.3 Immigration

As with the data on births and deaths, registration of the data on landed immigrants is compulsory. Under the Immigration Act, any immigrant wishing to settle permanently in Canada must hold an immigrant visa. The immigration data used to produce the postcensal estimates are the final data from June 1, 1991 to June 30, 1995 and the more recent data (comparable to the final data) from July 1, 1995 to May 14, 1996.

3.3.1 Data sources and methodology

The data on immigrants come directly from the landed immigrant database managed by Citizenship and Immigration Canada (CIC). Generally, the province in which an immigrant intends to settle is known. If in fact the province of destination differs from the one reported, there is no way of evaluating this bias, since the necessary information is unavailable (Statistics Canada, 1987). The immigrant database is updated on an ongoing basis.

Table 3.2.6: Interprovincial net migration according to various sources, Canada, provinces and territories, 1990-1991

Province or territory	Sources			Ratio	
	Taxation	Census*	Family allowance	Cenus / Taxation	Family allowance / Taxation
Nfld.	-930	-126	-3,433	0.14	3.69
P.E.I.	-325	-391	-914	1.20	2.81
N.S.	-162	213	-607	-1.31	3.75
N.B.	923	200	-630	0.22	-0.68
Que.	-11,325	-7,690	-12,341	0.68	1.09
Ont.	-11,627	-22,301	-9,852	1.92	0.85
Man.	-7,540	-4,609	-8,171	0.61	1.08
Sask.	-12,176	-9,941	-12,314	0.82	1.01
Alta.	8,983	7,502	7,782	0.84	0.87
B.C.	34,053	37,620	40,540	1.10	1.19
Yukon	243	88	368	0.36	1.51
N.W.T.	-117	0	-428	0.00	3.66

*Established on the basis of the mobility question from the 1991 census (where did this person live one year ago).

Source: Statistics Canada, Demography Division, Demographic Estimates Section and Small Area and Administrative Data Division.

3.3.2 Data quality

Table 3.3.1 compares the preliminary and final data for the calendar years 1994 and 1995. The data in Table 3.3.2 refer to intercensal years (July-June). These are the data used in producing the postcensal population estimates for 1996.

Contrary to what was observed for the natural increase and internal migration components, the preliminary data on immigration are generally lower than the final data (Table 3.3.1). For 1994 and 1995, the differences at the national level between the preliminary and the final data are of the order of 6,400 (-2.9%) and 3,100 (-1.5%). At both the national and the provincial levels, the preliminary data underestimate the final data.

If we examine the provincial distribution, the figures in tables 3.3.1 and 3.3.2 indicate that this distribution is relatively constant over time. In Table 3.3.1, the differences in percentage points between the preliminary and the final data are minimal for the two years observed.

During the period 1991-1996, Ontario received over half of all immigrants (53.2%), followed by British Columbia (18.5%), Quebec (16.2%) and Alberta (7.2%), with the other provinces and territories attracting much smaller numbers (Table 3.3.2). It may also be noted that British Columbia, during the period 1991-1996, registers constant gains as to the proportion of immigrants heading for that province: in 1991-1992, 14.2% of immigrants chose to settle in British Columbia, whereas in 1995-1996, 21.8% did so. For Quebec, the opposite effect is observed: in 1991-1992, 21.1% of immigrants headed for Quebec, whereas in 1995-1996, only 13.5% did so. For the other provinces, including Ontario, the level of immigrants is constant over the period.

3.3.3 Conclusion

Even though immigration accounts for a major share of total net migration, the errors attributable to this component are minimal, since like vital statistics, immigration data are subject to compulsory registration. Thus, the immigration data from Citizenship and Immigration Canada are of relatively very good quality, particularly since it is the final data or the more recent data that were used to estimate the postcensal population for 1996. However, at the provincial/territorial level, data on the distribution of immigrants may be subject to certain minor weaknesses. In particular, the immigration data are based on the place of destination envisaged by immigrants, rather than their real or actual destination. However, in reality almost all immigrants settle in the region that they choose.

Table 3.3.1: Comparison between preliminary and final data on number of immigrants, Canada, provinces and territories, January-December 1994 and 1995

Province or territory	1994						1995					
	P	F	Difference		Provincial distribution		P	F	Difference		Provincial distribution	
			No. P - F	% (P-F)/F*100	P	F			No. P - F	% (P-F)/F*100	P	F
Nfld.	522	566	-44	-7.77	0.24	0.25	597	622	-25	-4.02	0.29	0.29
P.E.I.	160	160	0	0.00	0.07	0.07	159	166	-7	-4.22	0.08	0.08
N.S.	3,372	3,466	-94	-2.71	1.55	1.55	3,716	3,801	-85	-2.24	1.77	1.79
N.B.	615	627	-12	-1.91	0.28	0.28	616	647	-31	-4.79	0.29	0.30
Que.	27,548	28,017	-469	-1.67	12.67	12.52	25,790	27,105	-1,315	-4.85	12.32	12.76
Ont.	113,085	117,254	-4,169	-3.56	52.03	52.40	114,405	115,168	-763	-0.66	54.64	54.20
Man.	3,986	4,121	-135	-3.28	1.83	1.84	3,443	3,612	-169	-4.68	1.64	1.70
Sask.	2,183	2,251	-68	-3.02	1.00	1.01	1,876	1,955	-79	-4.04	0.90	0.92
Alta.	17,417	17,982	-565	-3.14	8.01	8.04	14,638	14,607	31	0.21	6.99	6.87
B.C.	48,197	49,049	-852	-1.74	22.18	21.92	43,976	44,589	-613	-1.37	21.00	20.99
Yukon	112	117	-5	-4.27	0.05	0.05	86	89	-3	-3.37	0.04	0.04
N.W.T.	147	149	-2	-1.34	0.07	0.07	96	109	-13	-11.93	0.05	0.05
Canada	**217,344**	**223,759**	**-6,415**	**-2.87**	**100.00**	**100.00**	**209,398**	**212,470**	**-3,072**	**-1.45**	**100.00**	**100.00**

P : Preliminary data
F : Final data
Source : Citizenship and Immigration Canada.

Table 3.3.2: Number of Immigrants and provincial distribution, July-June 1991 - 1992 to 1995 - 1996

Province or territory	1991 - 1996		1991 - 1992		1992 - 1993		1993 - 1994		1994 - 1995 *		1995 - 1996 *	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Nfld.	3,445	0.29	710	0.29	802	0.30	707	0.30	625	0.28	601	0.28
P.E.I.	791	0.07	164	0.07	163	0.06	137	0.06	199	0.09	128	0.06
N.S.	15,079	1.28	1,923	0.80	2,602	0.98	3,075	1.31	3,726	1.69	3,753	1.73
N.B.	3,479	0.30	800	0.33	742	0.28	586	0.25	674	0.31	677	0.31
Que.	191,130	16.21	51,057	21.11	48,261	18.18	35,851	15.29	26,722	12.13	29,239	13.48
Ont.	627,208	53.21	128,282	53.05	144,962	54.62	119,624	51.02	119,412	54.22	114,928	52.99
Man.	22,344	1.90	4,781	1.98	5,405	2.04	4,527	1.93	3,815	1.73	3,816	1.76
Sask.	11,403	0.97	2,518	1.04	2,561	0.96	2,281	0.97	2,191	0.99	1,852	0.85
Alta.	84,815	7.19	16,907	6.99	18,920	7.13	18,159	7.75	16,493	7.49	14,336	6.61
B.C.	217,943	18.49	34,439	14.24	40,706	15.34	49,266	21.01	46,162	20.96	47,370	21.84
Yukon	527	0.04	114	0.05	127	0.05	105	0.04	98	0.04	83	0.04
N.W.T.	654	0.06	115	0.05	154	0.06	139	0.06	137	0.06	109	0.05
Canada	1,178,818	100.00	241,810	100.00	265,405	100.00	234,457	100.00	220,254	100.00	216,892	100.00

*For 1995 and 1996, the data are not final; they are drawn from the update of January 30, 1997.
Source : Citizenship and Immigration Canada.

3.4 Emigration

Emigration is the most uncertain component, since there is no systematic record of it. The number of emigrants must therefore be estimated indirectly, using incomplete administrative data. To produce postcensal estimates of the 1996 population, we used the final data from June 1, 1991 to June 30, 1993 and the preliminary data from July 1, 1993 to May 14, 1996.

3.4.1 Data sources and methodology

From 1980 to December 1992, the family allowance file was used to estimate the emigration of Canadians. The preliminary emigration estimates were based on data on child migrants, drawn from family allowance files, estimates on the child population, immigration data from the United States (U.S. Department of Justice), an adjustment factor Fc and preliminary estimates of the total population. The final data, for their part, were obtained by using, as the total population and the child population, the final estimates.

Since the replacement of the family allowance program by the child tax benefit program, new measures have been taken to obtain preliminary estimates of emigration. However, the CTB data have not replaced the family allowance data in the calculation of emigration estimates. In the absence of recent data for estimating child emigration, the data since 1993-1994 have been preliminary. For the years following 1992-1993 for Canada as a whole, the estimates have been made using a linear regression based on data from the years 1987-1988 to 1991-1992. These data are then distributed by month according to the monthly distribution of emigrants for the period from July 1991 to June 1992 and are distributed by province or territory according to the average of the distributions observed in 1989-1990 and 1991-1992. The average for these two years was used in order to reduce the impact of nil numbers and because of the unusual provincial/territorial monthly distribution observed in 1990-1991. Like for the data for the period 1991-1993, this method for emigrants utilizes data on Canadians immigrating to the United States. Another point worth noting is that the Fc factor that is applied to child emigration rates, to obtain the number of emigrating adults, remains fixed at 1.1 over the entire period studied.

3.4.2 Data quality

Comparing the preliminary data to the final data for the period 1991-1992 and 1992-1993, we observe that the preliminary figures are higher than the final figures (Table 3.4.1). For Canada, the differences between the preliminary and final data are 2,900 (a spread of 6.3%) for 1991-1992 and 2,400 (a spread of 5.6%) for the following year. If we assume that the preliminary data overestimate the final data by 2,000 persons per censal year, at the end of the period 1993-1996, there would be 6,000 persons who had not been counted as leaving the country! Is it reasonable to think that there is overestimation when we know that part of this emigration is offset by returning Canadians? It would seem so. Indeed, the number of emigrants might be higher.

At the level of the provinces, the differences are greater for the smaller provinces than for the larger ones, owing to the effect of very small numbers. It should be emphasized that it is in British Columbia that the relative spreads between the preliminary and final data are the smallest (1.3% in 1991-1992 vs 0.5% in 1992-1993). Everywhere else, the spreads vary from -31.3% to 43.3%.

Turning now to the provincial/territorial distribution of emigrants (Table 3.4.1), we note that for 1991-1992, these distributions are nearly stable for the preliminary and final data. For the period 1991-1992 and 1992-1993, Ontario is the province with the highest proportion of emigrants is higher (43%), followed by Alberta (17%), British Columbia (15%) and Quebec (14%).

Up to now, we have seen that the error attributable to the natural increase and immigration components is small, since we know that internal net migration does not affect the total population count. In the past, when end-of-period census data were available, all the residual error (equivalent to the error of closure) was assigned to the emigration component, because of all the demographic components, emigration is the most uncertain and the most difficult to estimate.

Table 3.4.2 shows the different estimates of emigration calculated according to the residual method, the postcensal method (described in Section 3.4.1) and the estimates obtained from the Reverse Record Check (RRC). According to this table, for the intercensal periods from 1961-1966 to 1991-1996, the estimation of post-censal emigration is smaller than the residual estimate, either without corrections for net undercoverage or with corrections for net undercoverage (including returning Canadians), as well as the estimate obtained from the RRC. Up to the intercensal period 1981-1986, the RRC estimates are lower than those obtained using the residual method (with adjustment for net undercoverage). However, for the period 1986-1991, the estimates based on the RRC are higher by 10,800. For 1986-1991, regardless of whether returning Canadians are taken into account, residual emigration is higher than the postcensal estimate. If the adjustment of net undercoverage for 1991 is taken into account in estimating residual emigration for the period 1991-1996, emigration would vary between 318,000 (minimum value) and 424,600 (maximum value), with differences with the postcensal estimate ranging from 92,000 to 198,000. Thus, judging from these results, the postcensal emigration estimates would appear to be far too low for 1991-1996.

Table 3.4.1: Comparison between preliminary and final data on emigrants, Canada, provinces and territories, 1991-1992 and 1992-1993

Province or territory	1991-1992						1992-1993					
			Difference		Provincial distribution				Difference		Provincial distribution	
	P	F	No. P- F	% (P- F)/F*100	P	F	P	F	No. P- F	% (P- F)/F*100	P	F
Nfld.	317	296	21	7.09	0.65	0.65	316	258	58	22.48	0.68	0.59
P.E.I.	103	89	14	15.73	0.21	0.20	96	67	29	43.28	0.21	0.15
N.S.	984	946	38	4.02	2.03	2.07	947	784	163	20.79	2.04	1.78
N.B.	864	915	-51	-5.57	1.78	2.01	805	914	-109	-11.93	1.73	2.08
Que.	6,637	6,211	426	6.86	13.68	13.61	6,222	5,930	292	4.92	13.40	13.48
Ont.	20,766	19,462	1,304	6.70	42.80	42.65	19,942	18,635	1,307	7.01	42.94	42.36
Man.	2,178	1,873	305	16.28	4.49	4.10	2,061	2,195	-134	-6.10	4.44	4.99
Sask.	875	906	-31	-3.42	1.80	1.99	822	947	-125	-13.20	1.77	2.15
Alta.	8,644	7,888	756	9.58	17.82	17.29	8,330	7,379	951	12.89	17.94	16.77
B.C.	7,017	6,927	90	1.30	14.46	15.18	6,773	6,740	33	0.49	14.59	15.32
Yukon	76	74	2	2.70	0.16	0.16	68	64	4	6.25	0.15	0.15
N.W.T.	58	46	12	26.09	0.12	0.10	55	80	-25	-31.25	0.12	0.18
Canada	48,519	45,633	2,886	6.32	100.00	100.00	46,437	43,993	2,444	5.56	100.00	100.00

P : Preliminary data
F : Final data
Source : Statistics Canada, Demography Division, Demographic Estimates Section.

Table 3.4.2: Emigration according to various sources, Canada, 1961-1966 to 1991-1996

Census years	Residual						Postcensal estimate	RRC
	Without adjustment for net undercoverage		With adjustment for net undercoverage					
	Without RCs	With RCs**	Without RCs	With RCs**				
1961-1966 *	280,815	N.A.	364,188	N.A.			377,700	N.A.
1966-1971*	426,297	N.A.	540,352	N.A.			317,200	N.A.
1971-1976	350,357	504,477	307,097	461,217			217,100	358,285
1976-1981	217,558	386,481	199,307	368,230			278,641	296,724
1981-1986	521,088	669,892	200,488	349,292			235,481	288,376
1986-1991	240,386	386,346	84,622	230,582			207,855	241,425
1991-1996***	313,185	424,877	259,738	318 259****	371,430	424 601*****	226,459	N.A.

* For 1961-1966 and 1966-1971, the undercoverage is gross and not net;

**For 1961-1966 to 1986-1991, the data are calculated on the basis of the census and family allowances.
For 1991-1996, the data for 1991-1993 are calculated on the basis of family allowances and the data for 1993-1996 are calculated using a regression method.

***According to the hypothesis that net undercoverage for 1996 is the same as for 1991.

****Minimum value obtained under the hypothesis that the standard error rate for 1996 is the same as for 1991 (with a confidence interval of 68%).

*****Maximum value obtained under the hypothesis that the standard error rate for 1996 is the same as for 1991 (with a confidence interval of 68%).

N.A.: Not available.

RCs : Returning Canadians.

RRC : Reverse Record Check.

Source: Statistics Canada, Demography Division, Demographic Estimates Section. (Updated version of table from paper presented to ACFAS in 1993 by R. Raby and M. Declos.)

3.4.3 Conclusion

Emigration is not only the most difficult component to estimate but also the most difficult to evaluate, since it is estimated indirectly from incomplete administrative data. Moreover, since 1993, estimates of emigrants have not been based on recent emigration data (such as family allowances), but rather on a regression model that uses data referring to earlier periods. Also, with respect to the methodology, it is necessary to make sure that the constant adjustment factor Fc is still valid for the period 1991-1996.

Judging from the results obtained from the estimation of residual emigration (an emigration level varying from 318,000 to 424,600), emigration for the period 1991-1996 would seem to be greatly underestimated at the national level. However, it will be necessary to wait for the results of the 1996 Reverse Record Check in order to evaluate the extent to which the emigration component is underestimated. Also, in order to be able to properly evaluate the emigration component, consideration should be given, in future studies, to conducting a comparison with other data sources such as the child tax benefit files, the change-of-address files of Canada Post Corporation and the provinces' health insurance files.

3.5 Non-permanent residents

With the 1991 Census, Statistics Canada began incorporating non-permanent residents into its population count. Since the census is the population estimate base, we must estimate the number of non-permanent residents as well. According to the 1991 Census, non-permanent residents are defined as holders of student authorizations, employment authorizations or Ministerial permits as well as refugee claimants and their dependents born while they were outside Canada.

3.5.1 Data source and methodology

The method used, called the stock method, draws on data from the Visitor Information Data System (VIDS) administered by Citizenship and Immigration Canada to derive estimates of the total number of non-permanent residents by province or territory. These data are then adjusted by an inflation factor to correct the coverage (Szabo, 1994). The inflation factor calculated is the same for all provinces and territories. This method has since been improved to take account of the provincial distribution of non-permanent residents. This approach is based on supplementary information on the province of residence, drawn from two other databases of Citizenship and Immigration Canada (Field Operations Support System and address file).

3.5.2 Data quality

Since immigration is controlled by legislation, the data on immigrants and non-permanent residents are systematically registered on their arrival in Canada. These data concern only "legal immigration" to Canada and are considered to be of good quality. However, biases may exist as to the province of destination: an immigrant's intended province of destination can differ from the one in which he or she will actually reside. In addition, the information supplied by the Visitor Information Data System is incomplete (for example, it says nothing about the age and sex of dependents or the province of residence for certain groups of permit holders).

As Table 3.5.1 shows, the number of non-permanent residents has decreased over time, falling from 381,000 (1991) to 258,400 (1995), representing a sizable drop of 32.2%. This trend is mainly observed in three of the largest provinces, namely Quebec (-26.9%), Ontario (-46.0%) and Alberta (-19.0%). British Columbia, on the other hand, saw its non-permanent residents increase by 2.8% between 1991 and 1995. For all other provinces, with the exception of Nova Scotia and North West Territories, the number of non-permanent residents rose between 1991 and 1995. When the distribution of the data on non-permanent residents is compared from year to year and from one province to another, it is seen to fluctuate but remain within the same range.

As with immigration, Ontario is the province with the most non-permanent residents (46.3% in 1995), followed by Quebec (19.5%), British Columbia (18.3%) and Alberta (7.9%).

Table 3.5.1 Stock of non-permanent residents, Canada, provinces and territories, July 1, 1991 to 1995

Province or territory	1991		1992		1993		1994		1995	
	No.	Dist. %	No.	Dist. %	No.	Dist. %	No.	Dist. %	No.	Dist. %
Nfld.	1,986	0.52	3,185	0.84	3,605	1.03	2,856	1.07	2,860	1.11
P.E.I.	207	0.05	256	0.07	261	0.07	268	0.10	304	0.12
N.S.	4,275	1.12	4,899	1.30	4,715	1.35	3,892	1.46	4,200	1.62
N.B.	2,143	0.56	2,726	0.72	2,735	0.78	2,345	0.88	2,401	0.93
Que.	68,876	18.08	64,889	17.15	62,484	17.91	48,121	18.10	50,348	19.48
Ont.	221,660	58.18	211,008	55.78	182,444	52.31	134,215	50.49	119,684	46.30
Man.	6,077	1.59	6,527	1.73	6,957	1.99	5,669	2.13	6,370	2.46
Sask.	4,239	1.11	4,959	1.31	5,038	1.44	4,052	1.52	4,497	1.74
Alb.	25,163	6.60	27,238	7.20	26,631	7.64	19,774	7.44	20,387	7.89
B.C.	45,962	12.06	52,138	13.78	53,428	15.32	44,336	16.68	47,265	18.28
Yukon	170	0.04	211	0.06	239	0.07	153	0.06	93	0.04
N.W.T.	259	0.07	251	0.07	253	0.07	148	0.06	102	0.04
Canada	381,017	100.00	378,287	100.00	348,790	100.00	265,829	100.00	258,511	100.00

Source: Citizenship and Immigration Canada and Demography Division, Demographic Estimates Section.

Now, if we compare the data on net flows[9] derived from the data on stocks in Table 3.5.2, we observe that the net flow data are more subject to variations than the stock data. Over time, these variations show that there are many shifts in the net flows of non-permanent residents, since these persons are holders of temporary permits in Canada. Also, the greatest variations were recorded in the four largest provinces, Ontario, Quebec, Alberta and British Columbia.

[9] The net flow of non-permanent residents is obtained by measuring the change in the number of non-permanent residents over two consecutive years. It is these data that are used in producing the postcensal estimates of the population.

3.5.3 Conclusion

The data on non-permanent residents are obtained from an administrative source for which the records gathered are incomplete. As noted above, various characteristics may be missing, such as the province of residence for some groups of permit holders. To remedy this situation, the coverage of the data on non-permanent residents is adjusted using a factor. This adjustment is made in order to reflect reality as closely as possible; however, it is undeniable that the data on non-permanent residents are more subject to error than the data on immigrants. Work is currently under way to improve the coverage of these data, and when this report was being produced, we lacked sufficient information to assess the scope of the error that could be created.

3.6 Returning Canadians

Returning Canadians are Canadian citizens who permanently emigrated in a given year and who then returned to settle permanently in Canada. The international geographic mobility of these persons is not included in immigration statistics, since Canadian citizens are not subject to the Immigration Act. Because there is a sizable number of them, returning Canadians are counted as a component of demographic change. In producing the postcensal population estimates, the final data from 1991-1992 to 1992-1993 were used, along with the preliminary data from 1993-1994 to 1995-1996.

3.6.1 Data sources and methodology

There is no direct source of quantitative data on Canadians returning to Canada. Persons arriving by air complete form E-311, administered by Customs and Excise. These data concern only a part of the flow, but they provide information about the length of stay outside Canada. This information has been used to estimate the total number of returning Canadians. Thus, on the basis of length-of-stay data from Customs and Excise files and according to the hypothesis that 50% of emigrants return to Canada over a 10-year period, the number of returning Canadians is estimated (Declos, 1994).

Table 3.5.2: Net flows of non-permanent residents, Canada, provinces and territories, 1991-1992 to 1995-1996 (July 1, 1991 to May 14, 1996)

Province or territory	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996
Nfld.	1,199	420	- 749	4	-654
P.E.I.	49	5	7	36	143
N.S.	624	-184	- 823	308	-84
N.B.	583	9	- 390	56	-54
Que.	-3,987	-2,405	- 14 363	2,227	930
Ont.	-10,652	-28,564	- 48 229	-14,531	-1,988
Man.	450	430	- 1 288	701	-34
Sask.	720	79	- 986	445	255
Alta.	2,075	-607	- 6 857	613	95
B.C.	6,176	1,290	- 9 092	2,929	7,450
Yukon	41	28	- 86	-60	39
N.W.T.	-8	2	- 105	-46	34
Canada	-2,730	-29,497	- 82 961	-7,318	6,132

Source: Citizenship and Immigration Canada and Demography Division, Demographic Estimates Section

Accordingly, using annual emigration data for each province and territory, the number of returning Canadians is estimated, based on hypotheses regarding the proportion of emigrants returning to Canada and the length of their stay outside the country. The data on returning Canadians are then apportioned among the different months according to the monthly distribution of emigrants. Lastly, the figures for each province and territory are added together to obtain the number of returning Canadians for Canada as a whole.[10]

According to Declos (1994), the weaknesses of this method are as follows:

- the method relies on a hypothesis based on a survey conducted in the 1970s: it should be checked to make sure that it is still valid;

- the probability of return is based on a subpopulation of emigrants, namely those who immigrated to the United States, and the probability of emigrants in general returning to Canada might actually be greater or less than 50%;

- since the hypotheses on the proportion of emigrants returning to Canada and the length of their stay outside the country apply to each province and territory, any geographic variation in the flow could result in an error in the estimate of this component;

- the lengths of stay calculated on the basis of the Customs and Excise file (form E-311) cover both persons who have left Canada temporarily and those who have left permanently;

- the data in the Customs and Excise file (form E-311) do not include returns by sea or land.

3.6.2 Data quality

Like the emigration data, the data on returning Canadians in Table 3.6.1 tell us that the final data for 1992-1993 are lower than the preliminary data at the national level (2,1%, that is, by 400). At the level of the provinces, the final data are also slightly lower than the preliminary data with the exception of the following regions: New Brunswick (-0.7%), Manitoba (-0.8%), Saskatchewan (-0.9%) and the Northwest Territories (-8.3%). The differences for some provinces seem sizable, but this is not really the case, since they are influenced by the effect of small numbers, owing to the fact that the impact on total demographic change is only slight.

An examination of the provincial distribution shows that there are no great differences between the final and preliminary data on returning Canadians.

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[10] See Declos (1994) for details on methodology.

Table 3.6.1: Comparison between preliminary and final data on returning Canadians, Canada, provinces and territories, 1992-1993

Province or territory	P	F	Difference		Provincial distribution	
			No.	%	P	F
			P-F	(P-F)/F*100	%	%
Nfld.	150	139	11	7.91	0.66	0.62
P.E.I.	39	36	3	.8.33	0.17	0.16
N.S.	384	356	28	7.87	1.69	1.60
N.B.	439	442	-3	-0.68	1.93	1.98
Que.	3,149	3,080	69	2.24	13.86	13.83
Ont.	9,787	9,597	190	1.98	43.06	43.10
Man.	1,034	1,042	-8	-0.77	4.55	4.68
Sask.	457	461	-4	-0.87	2.01	2.07
Alta.	3,845	3,723	122	3.28	16.92	16.72
B.C.	3,378	3,324	54	1.62	14.86	14.93
Yukon	33	32	1	3.13	0.15	0.14
N.W.T.	33	36	-3	-8.33	0.15	0.16
Canada	22,728	22,268	460	2.07	100.00	100.00

P : Preliminary data
F : Final data
Source: Statistics Canada, Demography Division, Demographic Estimates Section.

3.6.3 Conclusion

The returning Canadians component is strongly influenced by the emigration data, since it is based on the hypothesis that half of emigrants eventually return to Canada over the space of ten years. Thus, any error in the emigration estimates lead to errors in the estimation of returning Canadians. As already noted, the method of estimating emigration should be reviewed, and hence so should the method of estimating returning Canadians as regards the hypotheses on the proportion of emigrants who return to Canada and the length of stay outside the country.

4.0 Conclusion

Does the 1996 Census have better coverage than the preceding ones? The spread between the postcensal estimates and the census increased slightly in 1996 in relation to 1991, which leads us to rule out the possibility of a reduction in the net census coverage in 1996. It seems likely that the net undercoverage of the 1996 Census will be within the same range as in 1991 or slightly higher. This is only a hypothesis, and it will be necessary to wait for the results of the Reverse Record Check in order to confirm it.

The situation at the level of the provinces is more complex, owing to sizable variations from one census to another in the net undercoverage rate and the error of closure rate.

While the net undercoverage rate for 1996 is similar to the one for 1991, the error attributable to the components of the postcensal population would appear to be greater. At the national level, of all the components of demographic change, those that contribute the least to this error are natural increase (births and deaths) and immigration, since these components have a relatively good coverage.

For the other demographic components such as emigration, returning Canadians and non-permanent residents, the coverage could be improved. The latter components, which are often indirectly obtained from incomplete administrative files, might contribute more heavily to the error.

It is emigration that is undoubtedly subject to the greatest error, since it is the most uncertain component. The estimate of returning Canadians is in turn strongly linked to the emigration estimate, since it is based on the hypothesis that half of emigrants eventually return to Canada over the space of ten years. For these two components, the methodology should be reviewed. In addition, a comparison with other data sources, including the data from the child tax benefit file, should make it possible to better evaluate these data.

With regard to non-permanent residents, it is difficult to determine the impact that this component might have on postcensal estimates in general, since at the moment, we lack the information needed to quantify the error associated with it. There have been recent improvements in the coverage of these data, and they should be compared to those used in the production of the postcensal estimates.

Internal migration could be another component that contributes to the error, although solely at the provincial/territorial level. While the quality of the taxation data is considered to be good, it would nevertheless be advisable to review the quality of these administrative data by comparing them to other sources, including the mobility data from the 1996 Census.

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Appendixes

Table 1.1: Population according to different sources, Canada, provinces and territories 1971, 1976, 1981, 1986, 1991and 1996

Source	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon	N.W.T.
June 1, 1971													
Census	21,568,311	522,104	111,641	788,960	634,557	6,027,764	7,703,108	988,247	926,242	1,627,874	2,184,621	18,388	34,807
Adjusted census	22,001,124	532,313	112,772	798,828	643,751	6,151,131	7,856,838	999,836	934,105	1,669,872	2,246,248	18,974	36,456
June 1, 1976													
Census	22,992,603	557,725	118,229	828,571	677,249	6,234,445	8,264,465	1,021,506	921,323	1,838,037	2,466,608	21,836	42,609
Adjusted census	23,488,646	563,270	118,590	835,859	690,801	6,414,616	8,422,140	1,033,195	932,742	1,867,986	2,542,459	22,517	44,471
Postcensal estimates	23,623,933	576,079	121,925	851,634	699,746	6,403,174	8,522,968	1,043,911	939,073	1,867,290	2,532,275	22,072	43,786
June 1, 1981													
Census	24,341,701	567,670	122,501	847,421	696,382	6,438,180	8,624,712	1,026,236	968,262	2,237,286	2,744,163	23,151	45,737
Adjusted census	24,869,868	576,743	123,714	856,410	708,201	6,564,309	8,829,251	1,037,649	977,204	2,294,286	2,830,613	23,874	47,614
Postcensal estimates	24,957,339	581,573	123,320	862,719	713,508	6,611,365	8,896,008	1,054,513	979,425	2,231,688	2,835,556	21,791	45,873
June 1, 1986													
Census	25,308,274	568,348	126,642	873,148	709,428	6,532,358	9,101,172	1,062,976	1,009,568	2,365,684	2,883,215	23,504	52,231
Adjusted census	26,177,297	578,638	128,969	891,692	727,307	6,728,292	9,460,031	1,094,396	1,032,357	2,439,715	3,015,712	24,665	55,523
Postcensal estimates	26,260,070	589,160	129,308	894,716	734,332	6,778,735	9,455,279	1,092,467	1,031,809	2,464,897	3,012,717	23,199	53,451
June 1, 1991													
Census*	27,296,859	568,474	129,765	899,942	723,900	6,895,963	10,064,885	1,091,942	988,928	2,545,553	3,282,061	27,797	57,649
Census **	27,073,463	567,647	129,643	898,238	722,544	6,851,991	9,958,726	1,087,919	986,053	2,531,469	3,254,029	27,708	57,496
Adjusted census	28,085,322	579,869	130,981	917,090	748,035	7,075,207	10,457,280	1,112,246	1,006,683	2,596,536	3,371,435	28,940	61,020
Postcensal estimates	28,143,012	587,540	133,799	921,882	746,783	7,082,419	10,451,150	1,122,229	1,019,720	2,611,772	3,378,858	28,035	58,825
Health insurance****	..	..	..	..	..	7,042,311	..	1,133,117	1,010,526	2,615,448	3,151,982	..	..
May 14, 1996													
Census*	28,846,761	551,792	134,557	909,282	738,133	7,138,795	10,753,573	1,113,898	990,237	2,696,826	3,724,500	30,766	64,402
Census+temp***	28,939,345	554,413	134,880	912,965	740,592	7,155,257	10,784,493	1,117,996	995,045	2,707,918	3,739,830	31,111	64,645
Postcensal estimates	29,926,226	571,874	136,753	942,248	762,100	7,387,708	11,232,738	1,141,359	1,021,254	2,786,605	3,845,673	31,302	66,612
Health insurance****	..	..	..	..	..	7,357,632	..	1,144,643	1,027,551	2,742,333	3,633,971	33,303	..

* Starting in 1991, the census universe includes non-permanent residents.

** These data exclude non-permanent residents.

*** These data include temporary residents from the 1991 Census.

****Data from the health insurance file for New Brunswick are dated May 14; for Quebec, July 1; for Manitoba, Alberta and Yukon, June 1; for Saskatchewan, June 30; and for British Columbia, March 31.

Census: For 1971,1976 and 1991, the census data refer to the enumerated population; for 1981 and 1996, the enumerated population adjusted on June 1.

Adjusted census: Data include non-permanent residents and are adjusted for net undercoverage.

Postcensal estimates: Data include non-permanent residents and returning Canadians; base population is the census adjusted for net undercoverage.

Source: Statistics Canada, censuses of population and Demography Division, Demographic Estimates Section.

Table 1.2: Percentage population increase according to various sources, Canada, provinces and territories 1971-1976 to 1991-1996

Source	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon	N.W.T.
1971-1976													
Census	6.60	6.82	5.90	5.02	6.73	3.43	7.29	3.37	-0.53	12.91	12.91	18.75	22.42
Adjusted census	6.76	5.82	5.16	4.64	7.31	4.28	7.20	3.34	-0.15	11.86	13.19	18.67	21.99
Postcensal estimates	7.38	8.22	8.12	6.61	8.70	4.10	8.48	4.41	0.53	11.82	12.73	16.33	20.11
1976-1981													
Census	5.87	1.78	3.61	2.28	2.83	3.27	4.36	0.46	5.09	21.72	11.25	6.02	7.34
Adjusted census	5.88	2.39	4.32	2.46	2.52	2.33	4.83	0.43	4.77	22.82	11.33	6.03	7.07
Postcensal estimates	6.25	3.25	3.99	3.21	3.29	3.07	5.63	2.06	5.00	19.47	11.53	-3.22	3.15
1981-1986													
Census	3.97	0.12	3.38	3.04	1.87	1.46	5.52	3.58	4.27	5.74	5.07	1.52	14.20
Adjusted census	5.26	0.33	4.25	4.12	2.70	2.50	7.14	5.47	5.64	6.34	6.54	3.31	16.61
Postcensal estimates	5.59	2.15	4.52	4.47	3.69	3.27	7.09	5.28	5.59	7.44	6.43	-2.83	12.26
1986-1991													
Census*	7.86	0.02	2.47	3.07	2.04	5.57	10.81	2.72	-2.04	7.60	13.83	18.26	10.37
Census**	6.97	-0.12	2.37	2.87	1.85	4.89	9.42	2.35	-2.33	7.01	12.86	17.89	10.08
Adjusted census	7.29	0.21	1.56	2.85	2.85	5.16	10.54	1.63	-2.49	6.43	11.80	17.33	9.90
Postcensal estimates	7.51	1.54	3.75	3.39	2.68	5.26	10.48	2.54	-1.22	7.05	12.04	13.66	5.95
1991-1996													
Census*	5.68	-2.93	3.69	1.04	1.97	3.52	6.63	2.01	0.13	5.94	13.48	10.68	11.71
Census + temp***	6.02	-2.47	3.94	1.45	2.31	3.76	6.94	2.39	0.62	6.38	13.95	11.92	12.48
Postcensal estimates	6.55	-1.38	4.41	2.74	1.88	4.42	7.42	2.62	1.45	7.32	14.07	8.16	9.16
Health insurance****	..	..	..	..	..	4.48	..	1.02	1.68	4.85	15.29	..	..

* Starting in 1991, the census universe includes non-permanent residents.

** These data exclude non-permanent residents.

*** These data include temporary residents from the 1991 Census.

****Data from the health insurance file for New Brunswick are dated May 14; for Quebec, July 1; for Manitoba, Alberta and Yukon, June 1; for Saskatchewan, June 30; and for British Columbia, March 31.

Census: For 1971,1976 and 1991, the census data refer to the enumerated population; for 1981 and 1986, to the enumerated population adjusted on June 1.

Adjusted census: Data include non-permanent residents and are adjusted for net undercoverage.

Postcensal estimates: Data include non-permanent residents and returning Canadians; base population is the preceding census adjusted for net undercoverage.

Source: Statistics Canada, censuses of population and Demography Division, Demographic Estimates Section.

Appendix 2

According to

$(1-a) = (1 - n)/(1 + f)$ where : a = the apparent net undercoverage rate
n = the net undercoverage rate
c = the error of closure rate

The relationships below are as follows:

Let:
D = the enumerated population
E = the estimated population corrected for net undercoverage
C = the census population corrected for net undercoverage

and by definition:

$n = (C - D)/ C$ then $n = (C/ C) - (D / C)$
and $n =1 - (D / C)$
thus $1 - n = (D / C)$

$a = (E - D)/ E$ then $a = (E / E) - (D / E)$
and $a =1 - (D / E)$
thus $1 - a = (D / E)$

$c = (E - C)/C$ then $c = (E / C) - (C / C)$
and $c = (E / C) - 1$
thus $1 + c = (E / C)$

therefore

$$1 - a = (D/E) = D/(C (1 + c)) = (1 - n) / (1 + c)$$

if $c = 0$ then $a = n$
$c \geq 0$ thus $1 + c \geq 1$ therefore $1 - a \leq 1 - n$ and $a \geq n$
$c \leq 0$ thus $1 + c \leq 1$ therefore $1 - a \geq 1 - n$ and $a \leq n$

Appendix 3

The differences observed between the preliminary data (CTB) and the final taxation data are as follows:

- Part of the differences observed may be explained by the fact that **the CTB data are collected on a monthly basis, while the taxation data are collected on an annual basis.** The estimates derived from the monthly files are superior to those drawn from the annual files, since **multiple migrations,** if they do not occur during the same month, are all counted in the monthly estimates according to the CTB files, whereas the taxation file registers only the resulting annual migration (Statistics Canada 1987).

- The **method used to calculate the F_{jk} factors** is another element that may explain the sizable differences between the preliminary and final data. Because of the very sizable variations in the F_{jk} factors from one year to the next, these factors are calculated (Appendix 3, Tables 2.1 to 2.3) by taking the average of the last three years (historical trends) according to the taxation data. It would be advisable to verify whether this correction is satisfactory. (Michalowski, 1996).

- The adjustment of the coverage provided by the CTB data using Gj factors (Appendix 3, table 2.4)) is another explanation for the differences. As noted in section 3.2.1, there is a considerable variation in the coverage from one region to another (71% to 87%). Consequently, it is possible that in relation to the final estimates established on the basis of Revenue Canada Taxfiles, the preliminary estimates based on CTB data are subject to more errors than those based on family allowance data (the quality of these data should be reviewed). (Michalowski, 1996).

- Is the determination of address changes in the CTB files and the taxation files the same? In theory, a migrant's address as it appears in the CTB file has the same meaning as in the taxation file. However, even though both files have the same source (Revenue Canada) and are linked, the CTB and taxfiles are separate and small differences can arise in the processing of these data. (Michalowski, 1996).

Table 2.1: Fjk factors for interprovincial migration (based on Revenue Canada Data from1990-1991 to 1992-1993)

	Destination											
Origin	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon	N.W.T.
Nfld.	0.0000	0.7347	1.1814	1.0280	1.2454	1.2633	1.1486	0.9632	1.1883	1.2143	1.1669	1.5288
P.E.I.	0.7956	0.0000	1.0610	0.9476	0.9639	1.1501	0.9276	0.7985	0.9374	1.1355	0.9894	0.6714
N.S.	0.9514	1.0299	0.0000	1.0392	0.9000	0.9847	0.8537	0.8566	0.9610	1.1041	1.2547	1.2828
N.B.	0.9434	0.9443	1.0565	0.0000	1.0415	0.9982	0.7137	1.0032	0.9599	1.0415	1.0835	2.0432
Que.	0.8826	1.0418	1.0652	0.9943	0.0000	1.0870	0.9072	1.1226	0.9871	1.2309	1.3115	0.8525
Ont.	0.9624	0.9316	0.9707	0.9219	1.1280	0.0000	0.7978	0.8281	0.8589	1.1608	1.2156	0.9188
Man.	0.8833	0.9704	0.8989	0.8110	0.9384	0.9237	0.0000	0.7763	0.9015	1.1253	1.0788	1.2040
Sask.	0.7695	0.6233	1.0000	1.0566	1.1000	1.1360	0.8775	0.0000	0.9345	1.1072	0.9756	1.0681
Alta.	0.9783	0.9529	0.9212	0.8793	1.1123	0.9171	0.8818	0.7522	0.0000	1.0496	1.0205	0.9065
B.C.	0.8770	0.9205	1.0142	0.8291	1.1313	1.0131	0.9076	0.8134	0.8349	0.0000	0.9109	0.8227
Yukon	1.0128	1.0268	0.6597	0.8659	1.0377	0.9658	1.0028	0.8371	0.9787	1.1008	0.0000	0.8189
N.W.T.	1.9559	1.1682	1.4325	1.7370	1.2141	1.7391	1.8688	1.7939	1.5811	1.7613	1.3648	0.0000

Source: Statistics Canada, Demography Division, Demographic Estimates Section.

Table 2.2: Fjk factors for interprovincial migration (based on Revenue Canada Data from1991-1992 to 1993-1994)

	Destination											
Origin	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon	N.W.T.
Nfld.	0.0000	0.7465	1.1565	0.9959	1.3790	1.1880	1.1762	0.8910	1.1395	1.2453	1.1386	1.5475
P.E.I.	0.8785	0.0000	1.1124	1.0425	1.1858	1.1917	0.9609	0.6482	0.8872	1.3457	1.0066	0.7321
N.S.	0.9380	0.9543	0.0000	0.9946	0.8257	0.9572	0.8026	0.7697	0.9642	1.1519	1.2799	1.4161
N.B.	1.0758	0.9674	1.0450	0.0000	1.0208	0.9685	0.6823	1.1010	0.9376	1.1581	1.3678	1.5905
Que.	0.9378	0.8968	1.0024	0.9642	0.0000	1.0239	0.8765	1.1600	0.9892	1.1765	1.0863	0.8091
Ont.	0.9351	0.9568	0.9609	0.9169	1.1387	0.0000	0.8307	0.8547	0.8861	1.1890	0.9897	1.0056
Man.	0.8206	1.2814	0.8916	0.7838	0.9152	0.9294	0.0000	0.7631	0.9147	1.1364	1.1583	1.1455
Sask.	0.9030	0.7367	1.0202	0.9030	1.0893	1.0953	0.8829	0.0000	0.9855	1.1029	1.1016	1.0914
Alta.	0.9723	1.0923	0.9354	0.9140	1.1111	0.9187	0.8268	0.7411	0.0000	1.0378	1.0350	0.9481
B.C.	0.8615	0.8515	1.0076	0.7662	1.1034	1.0040	0.8877	0.7919	0.8648	0.0000	0.9085	0.9307
Yukon	0.9642	1.4061	0.8663	0.6391	1.1019	1.1015	0.8354	0.9816	1.1592	1.2014	0.0000	0.7860
N.W.T.	2.0081	1.5302	1.5474	1.7309	1.3198	1.6738	1.6992	1.6988	1.5848	1.7796	1.3286	0.0000

Source: Statistics Canada, Demography Division, Demographic Estimates Section.

Table 2.3: Fjk factors for interprovincial migration (based on Revenue Canada Data from1992-1993 to 1994-1995)

	Destination											
Origin	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon	N.W.T.
Nfld.	0.0000	0.9017	1.1408	1.0081	1.3373	1.1721	1.0723	0.9306	1.1837	1.3375	1.0901	1.5072
P.E.I.	1.0690	0.0000	1.3695	1.0645	1.4128	1.2874	1.4227	0.7673	1.2885	1.4182	1.4416	1.2614
N.S.	0.9327	0.9718	0.0000	1.0017	0.8680	0.9512	0.7975	0.7496	0.9909	1.1752	1.5150	1.3496
N.B.	1.0652	1.0430	1.0786	0.0000	0.9890	0.9735	0.7535	0.9877	0.9254	1.2862	3.4658	1.6563
Que.	0.9104	0.9503	0.9513	0.9479	0.0000	0.9860	0.8601	1.0209	1.0371	1.1419	0.9346	1.0192
Ont.	0.9147	0.9910	0.9534	0.9163	1.1334	0.0000	0.8576	0.8629	0.9149	1.2395	1.0381	1.0723
Man.	0.8751	1.2746	0.9829	0.7486	0.8796	0.9314	0.0000	0.7570	0.9560	1.1774	1.8648	1.2063
Sask.	0.8628	0.6634	0.9924	0.7140	1.0463	1.0590	0.9002	0.0000	1.0655	1.1480	1.0057	1.0452
Alta.	0.9922	1.0124	0.9435	0.9443	1.1165	0.9582	0.8427	0.7450	0.0000	1.0467	1.0395	1.0308
B.C.	0.8820	0.8376	1.0059	0.7571	1.1242	0.9880	0.8552	0.7565	0.8884	0.0000	0.8982	0.9538
Yukon	0.9664	0.7875	0.7537	0.6300	1.0923	1.1531	0.8609	0.9138	1.1121	1.1904	0.0000	0.8739
N.W.T.	2.0145	1.2371	1.5021	1.7047	1.2265	1.6966	1.5733	1.5254	1.5182	1.7899	1.3977	0.0000

Source: Statistics Canada, Demography Division, Demographic Estimates Section.

Table 2.4: Gj factors for interprovincial child migration

Province or territory	1991-1992	1992-1993	1993-1994	1994-1995
Nfld.	0.998	0.997	0.972	0.989
P.E.I.	0.997	0.995	0.967	1.037
N.S.	1.013	1.004	1.030	1.001
N.B.	1.005	0.998	0.992	1.000
Que.	1.027	0.983	0.985	1.006
Ont.	0.952	0.947	0.934	0.966
Man.	1.004	0.997	0.984	1.003
Sask.	1.007	1.016	0.999	1.014
Alta.	0.958	0.921	0.924	0.962
B.C.	0.958	0.950	0.929	0.957
Yukon	0.979	0.963	0.996	0.981
N.W.T.	1.126	1.090	1.152	1.127

Source: Statistics Canada, Demography Division, Demographic Estimates Section, and Revenue Canada, Taxation.

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