10 DATA QUALITY REPORT

Introduction

The coefficient of variation of a statistic is largely a product of the total survey sample size and the importance of the sub-population in the total Canadian population. It also depends on the level of non-response and the particular sample design. For general purposes, this report includes a table on the sample sizes per province and a table of monthly response rates by province.

This chapter indicates how to obtain the approximate coefficient of variation for a statistic from the Approximate Sampling Variability Tables for the Canadian Travel Survey.

CTS Sample size

The following table shows the number of household members, in the LFS sampled rotations who were eligible for the Canadian Travel Survey supplement.

TABLE 6. ***Monthly sample sizes for intraprovincial trips by province, 1997***

	Jan	Feb	Mar	Apr	May	Jun
Nfld	304	286	317	299	296	315
P.E.I.	230	226	233	238	257	230
N.S.	558	556	557	565	554	594
N.B.	540	526	520	548	497	524
Que	1684	1658	1690	1679	1685	1726
Ont	2462	2519	2605	2589	2564	2588
Man	624	597	606	658	583	589
Sask	530	561	535	519	541	552
Alta	655	659	654	660	640	613
B.C.	782	742	748	748	790	741
Canada	8369	8330	8465	8503	8407	8472

TABLE 6. (continued) ***Monthly sample sizes for intraprovincial trips, by province, 1997***

	Jul	Aug	Sep	Oct	Nov	Dec
Nfld	306	297	325	330	322	322
P.E.I.	235	246	245	215	216	242
N.S.	574	605	554	554	586	537
N.B.	509	557	538	479	498	480
Que	1714	1820	1777	1725	1673	1574
Ont	2635	2666	2601	2552	2452	2445
Man	650	624	611	641	646	640
Sask	538	554	563	641	641	678
Alta	656	668	653	656	651	653
B.C.	823	761	761	785	798	783
Canada	8640	8798	8628	8578	8483	8354

Note: This sub-sample represents 1 rotation group of LFS Sample.

TABLE 6.1 **Monthly sample sizes for interprovincial trips by province, 1997**

	Jan	Feb	Mar	Apr	May	Jun
Nfld	940	901	936	892	935	915
P.E.I.	682	685	700	703	735	701
N.S.	1728	1648	1715	1699	1699	1744
N.B.	1609	1598	1584	1616	1561	1618
Que	5222	5182	5126	5089	5074	5099
Ont	7740	7767	7793	7792	7718	7801
Man	1850	1868	1857	1885	1860	1854
Sask	1641	1652	1628	1649	1635	1645
Alta	1934	2002	1975	1982	1970	1952
B.C.	2384	2295	2347	2259	2347	2267
Canada	25730	25598	25661	25566	25534	25596

TABLE 6.1 (continued) **Monthly sample sizes for interprovincial trips, by province, 1997**

	Jul	Aug	Sep	Oct	Nov	Dec
Nfld	921	913	927	931	962	936
P.E.I.	727	721	740	692	692	705
N.S.	1685	1788	1703	1768	1749	1700
N.B.	1527	1635	1552	1572	1547	1522
Que	5117	5311	5259	5354	5203	4941
Ont	7848	7981	7929	7913	7730	7731
Man	1849	1896	1860	1868	1914	1899
Sask	1610	1643	1657	1778	1752	1879
Alta	1947	1976	1998	1970	1992	1997
B.C.	2391	2284	2411	2334	2424	2361
Canada	25622	26148	26036	26180	25965	25671

Note: This sub-sample represents 3 rotation groups of the LFS sample.

CTS Response rates

The following tables summarize the response rates to the 1997 Canadian Travel Survey. The response rates shown in these tables reflect the proportion of people eligible for the Canadian Travel Survey who have reported information. These response rates are not cumulative, that is, they don’t take into account those people who would have been eligible for CTS but have been non-respondents to LFS. This is because those individuals who don’t respond to the LFS are not even asked if they would like to answer the Canadian Travel Survey. Thus they cannot be considered as non-respondents to the CTS.

TABLE 7. ***Monthly response rates by province, per cent, 1997***

	Jan	Feb	Mar	Apr	May	Jun
Nfld	91,8	90,6	92,8	92,4	92,5	91
P.E.I.	94,6	91,8	92,6	94,2	92,4	94,9
N.S.	92	91	90,9	91,3	91,5	89,9
N.B.	91,1	90,3	91	90	89	90,4
Que	91,6	92,2	92,6	93,2	91,4	91,6
Ont	88,2	87,9	89,3	87,4	85,4	88,5
Man	89	88,1	91	86,9	84,5	85,6
Sask	86,1	86,2	89,3	86,4	87,2	87,2
Alta	89,3	85,3	85,6	82,9	84	86,2
B.C.	88,1	89,7	89	87,6	90,3	87,3
Canada	89,6	89,2	90,2	88,9	88,1	89

TABLE 7. (continued) ***Monthly response rates by province, per cent, 1997***

	Jul	Aug	Sep	Oct	Nov	Dec
Nfld	92,7	92,8	89,9	89	88,7	90,1
P.E.I.	94,5	92,8	90,5	89,6	89,5	89,4
N.S.	91,6	92,2	90,4	87,9	88,9	87,2
N.B.	91,7	90,8	89,8	85,8	89,6	85,6
Que	94,3	93,9	92	90,5	90,9	89,9
Ont	89,5	90	85,7	85,8	86,3	79,8
Man	89,4	90,7	91,8	90,1	89,7	85,2
Sask	86,8	89	86,2	83,5	84,4	80,9
Alta	86,1	86,1	85	81,5	81,5	79,8
B.C.	90,5	89,4	87,1	85,5	88,2	82,8
Canada	90,6	90,8	88,4	86,9	87,7	84

Note: These responses rates correspond to Sample size on three rotation groups

Design effect

The next table shows the design effects, sample sizes and population counts by province which were used to produce the Approximate Sampling Variability Tables for person-weights. Note that although the CTS contains different sample and population sizes for each month, the design effects remain constant throughout the months. For this reason, the design effects, sample size, and population size for only one month are presented.

TABLE 8. ***Design effects for the three rotation groups, December 1997***

Province	Design effect	Sample size	Population
Nfld	1,99	843	448109
P.E.I.	1,64	630	107049
N.S.	1,87	1482	744970
N.B.	1,74	1303	604583
Que	2,41	4444	5947756
Ont	3,03	6171	9055307
Man	1,92	1617	860889
Sask	1,56	1521	762132
Alta	1,78	1593	2193323
B.C.	1,87	1956	3133986
Atlantic provinces	1,99	4258	1904711
Man & Sask	1,92	3138	1623021
Alta & B.C.	1,87	3549	5327309
Canada	2,84	21560	23858104

Release cut-off's for the CTS

The minimum size of the estimate (using person weights) at the provincial, regional and Canada levels are specified in the table below. Estimates smaller than the minimum size given in the Unacceptable column may not be released under any circumstances. Note that only one table of release cut-offs is presented below. This table represents the release cut-offs for December 1997.

TABLE 9. **Sample Table of Release Cut-offs, December 1997**

Province	Acceptable (0.0-16.5)	Marginal (16.6-25.0)	Confi-dential (25.1-33.3)	Unaccep-table (33.4 & >)
Nfld	36,000+	16,500-35,999	9,500-16,499	under 9,500
P.E.I.	9,500+	4,500-9,499	2,500-4,499	under 2,500
N.S.	33,000 +	14,500-32,999	8,500-14,499	under 8,500
N.B.	28,500 +	12,500-28,499	7,000-12,499	under 7,000
Que	116,000 +	51,000-115,999	29,000-50,999	under 29,000
Ont	160,500 +	70,500-160,499	40,000-70,499	under 40,000
Man	36,000 +	16,000-35,999	9,000-15,999	under 9,000
Sask	27,500 +	12,500-27,499	7,000-12,499	under 7,000
Alta	86,500 +	38,500-86,499	22,000-38,499	under 22,000
B.C.	106,500 +	47,000-106,499	27,000-46,999	under 27,000
Canada	115,000 +	50,000-114,999	28,500-49,999	under 28,500

Obtaining approximate CV's from the tables

Approximate coefficients of variation (CV's) are shown in the Approximate Sampling Variability Tables at the end of this section and on the CD-ROM. Before applying the criterion of the coefficient of variation, first follow the guidelines based on sample sizes described in Chapter 9 (Guidelines for release).

The following rules and examples should enable the user to determine the approximate coefficients of variation from the Sampling Variability Tables for estimates of the number of the surveyed population possessing a certain characteristic. The 'real life' examples are included to assist users in applying the rules. These examples use variables which require person weights in order to create estimates. The following rules and examples refer to the reference year 1996. The same principle can be applied to the 1997 reference year.

Rule 1: Estimates of Numbers Possessing a Characteristic (Aggregates)

The coefficient of variation depends only on the size of the estimate itself. On the Sampling Variability Table for the appropriate geographic area, locate the estimated number in the left-most column of the table (headed "Estimate") and follow the asterisks (if any) across to the first figure encountered. This figure is the approximate coefficient of variation.

Example using rule 1:

Suppose that a user estimates that 6,032,234 persons took at least one trip in March 1996. How does the user determine the coefficient of variation of this estimate?

- Refer to the CANADA CV table (Approximative Sampling Variability Tables - Person weights) at the end of this Chapter.

- The estimated aggregate (6,032,234) does not appear in the left-hand column (the 'Numerator of Percentage' column), so it is necessary to use the figure closest to it, namely 6,000,000.

- The coefficient of variation for an estimated aggregate is found by referring to the first non-asterisk entry on that row, namely, 2.3%.

- So the approximate coefficient of variation of the estimate is 2.3%. The finding that there were 6,032,234 persons who took at least one trip in March 1996 is publishable with no qualifications.

Rule 2: Estimates of Proportions or Percentages Possessing a Characteristic

The coefficient of variation of an estimated proportion or percentage depends on both the size of the proportion or percentage and the size of the total upon which the proportion or percentage is based. Estimated proportions or percentages are relatively more reliable than the corresponding estimates of the numerator of the proportion or percentage, when the proportion or percentage is based upon a sub-group of the population. For example, the proportion of "persons aged 15 or more who took at least one trip in the reference month" is more reliable than the estimated number of "persons aged 15 or more who took at least one trip in the reference month". (Note that in the tables the CV's decline in value reading from left to right).

When the proportion or percentage is based upon the total population of the geographic area covered by the table, the CV of the proportion or percentage is the same as the CV of the numerator of the proportion or percentage. In this case, Rule 1 can be used.

When the proportion or percentage is based upon a subset of the total population (e.g. those in a particular sex or age group), reference should be made to the proportion or percentage (across the top of the table) and to the numerator of the proportion or percentage (down the left side of the table). The intersection of the appropriate row and column gives the coefficient of variation.

Example using rule 2:

Suppose that the user estimates that 2,951,511/ 6,032,234=49% of those persons who travelled in March took at least one same-day trip.

How does the user determine the coefficient of variation of this estimate?

- Refer to the CANADA CV table . (Approximative Sampling Variability Tables - Person weights) at the end of this Chapter.

- Because the estimate is a percentage which is based on a subset of the total population (i.e., travellers who took at least one same-day trip in March), it is necessary to use both the percentage (49%) and the numerator portion of the percentage (2,951,511) in determining the coefficient of variation.

- The numerator, 2,951,511, does not appear in the left-hand column (the 'Numerator of Percentage' column) so it is necessary to use the figure closest to it, namely 3,000,000. Similarly, the percentage estimate does not appear as any of the column headings, so it is necessary to use the figure closest to it, 50.0%.

- The figure at the intersection of the row and column used, namely 2.8%, is the coefficient of variation to be used.

- So the approximate coefficient of variation of the estimate is 2.8%. The finding that 49% of persons who travelled in March and took at one same-day trip can be published with no qualifications.

Rule 3: Estimates of Differences Between Aggregates or Percentages

The standard error of a difference between two estimates is approximately equal to the square root of the sum of squares of each standard error considered separately. That is, the standard error of a difference ($\hat{d} = \hat{X}_1 - \hat{X}_2$) is:

$$\sigma_{\hat{d}} = \sqrt{(\hat{X}_1 \alpha_1)^2 + (\hat{X}_2 \alpha_2)^2}$$

where $\hat{X}_1$ is estimate 1, $\hat{X}_2$ is estimate 2, and α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively. The coefficient of variation of $\hat{d}$ is given by $\sigma_{\hat{d}}/\hat{d}$. This formula is accurate for the difference between separate and uncorrelated characteristics, but is only approximate otherwise.

Example using rule 3:

Suppose that a user estimates that 2,951,511/ 6,032,234=49% of persons who travelled in March took at least one same-day trip, while 3,998,785/ 6,032,234=66.3% of persons who travelled in March took at least one overnight trip. (Note that a person could take both a same-day trip and an overnight trip in the same month, hence the estimates overlap). How does the user determine the coefficient of variation of the difference between these two estimates?

- Using the CANADA CV table in the same manner as described in example 2 gives the CV of the estimate for travellers who took at least one same-day trip as 2.8%, and the CV of the estimate for travellers who took at least one overnight trip as 2.1%.

- Using rule 3, the standard error of a difference ($\hat{d} = \hat{X}_1 - \hat{X}_2$) is:

$$\sigma_{\hat{d}} = \sqrt{(\hat{X}_1 \alpha_1)^2 + (\hat{X}_2 \alpha_2)^2}$$

  where $\hat{X}_1$ is estimate 1, $\hat{X}_2$ is estimate 2, and α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively.

  That is, the standard error of the difference $\hat{d}$ = (.663 - .490) = .173 is:

$$\sigma_{\hat{d}} = \sqrt{[(.49)(.028)]^2 + [(.660)(.021)]^2}$$

$$= \sqrt{(.00001882384) + (.0001920996)}$$

$$= .0195022$$

- The coefficient of variation of $\hat{d}$ is given by $\sigma_{\hat{d}}/\hat{d}$ = .019/.173 = 0.11.

- So the approximate coefficient of variation of the difference between the estimates is 11%. This estimate can be released without restrictions.

Rule 4: Estimates of Ratios

In the case where the numerator is a subset of the denominator, the ratio should be converted to a percentage and Rule 2 applied. This would apply, for example, to the case where the denominator is the number of persons who took at least one trip in the reference month and the numerator is the number of "persons who took at least one business trip in the reference month".

In the case where the numerator is not a subset of the denominator, as for example, the ratio of the number of "persons who took at least one business trip in the reference month" as compared to the number of "persons who took at least one trip for pleasure during the reference month", the standard deviation of the ratio of the estimates is approximately equal to the square root of the sum of squares of each coefficient of variation considered separately multiplied by R. That is, the standard error of a ratio ($\hat{R} = \hat{X}_1 / \hat{X}_2$) is:

$$\sigma_{\hat{R}} = \hat{R}\sqrt{\alpha_1^{\,2} + \alpha_2^{\,2}}$$

where α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively.

The coefficient of variation of $\hat{R}$ is given by $\sigma_{\hat{R}}/\hat{R}$. The formula will tend to overstate the error, if $\hat{X}_1$ and $\hat{X}_2$ are positively correlated and understate the error if $\hat{X}_1$ and $\hat{X}_2$ are negatively correlated.

Example using rule 4:

Suppose that the user estimates that 3,998,785 March travellers took at least one overnight trip, while 2,951,511 March travellers took at least one same-day trip. The user is interested in comparing the estimate of overnight travellers versus that of same-day travellers in the form of a ratio. How does the user determine the coefficient of variation of this estimate?

- First of all, this estimate is a ratio estimate, where the numerator of the estimate (= $\hat{X}_1$) is the number of March travellers who took at least one overnight trip. The denominator of the estimate (= $\hat{X}_2$) is the number of March travellers who took at least one same-day trip.

- Refer to the CANADA CV table. (Approximative Sampling Variability Tables - Person weights) at the end of this Chapter.

- The numerator of this ratio estimate is 3,998,785. The figure closest to it is 4,000,000. The coefficient of variation for this estimate is found by referring to the first non-asterisk entry on that row, namely, 3.1%.

- The denominator of this ratio estimate is 2,951,511. The figure closest to it is 3,000,000. The coefficient of variation for this estimate is found by referring to the first non-asterisk entry on that row, namely, 3.6%.

- So the approximate coefficient of variation of the ratio estimate is given by rule 4, which is,

$$\alpha_{\hat{R}} = \sqrt{\alpha_1^{\,2} + \alpha_2^{\,2}}$$

  where α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ and $\hat{X}_2$ respectively.

That is ,

$$\alpha_{\hat{R}} = \sqrt{(.031)^2 + (.036)^2}$$
$$= 0.047$$

- The obtained ratio of March 1996 travellers who took at least one overnight trip versus March 1996 travellers who took at least one sameday trip is 3,998,785/2,951,511 which is 1.35:1. The coefficient of variation of this estimate is 4.7%, which is releasable with no qualifications.

Rule 5: Estimates of Differences of Ratios

In this case, Rules 3 and 4 are combined. The CV's for the two ratios are first determined using Rule 4, and then the CV of their difference is found using Rule 3.

Using C.V. tables to obtain confidence limits

Although coefficients of variation are widely used, a more intuitively meaningful measure of sampling error is the confidence interval of an estimate. A confidence interval constitutes a statement on the level of confidence that the true value for the population lies within a specified range of values. For example a 95% confidence interval can be described as follows:

If sampling of the population is repeated indefinitely, each sample leading to a new confidence interval for an estimate, then in 95% of the samples the interval will cover the true population value.

Using the standard error of an estimate, confidence intervals for estimates may be obtained under the assumption that under repeated sampling of the population, the various estimates obtained for a population characteristic are normally distributed about the true population value. Under this assumption, the chances are about 68 out of 100 that the difference between a sample estimate and the true population value would be less than one standard error, about 95 out of 100 that the difference would be less than two standard errors, and about 99 out 100 that the differences would be less than three standard errors. These different degrees of confidence are referred to as the confidence levels.

Confidence intervals for an estimate, $\hat{X}$, are generally expressed as two numbers, one below the estimate and one above the estimate, as ($\hat{X}$-k, $\hat{X}$+k) where k is determined depending upon the level of confidence desired and the sampling error of the estimate.

Confidence intervals for an estimate can be calculated directly from the Approximate Sampling Variability Tables by first determining from the appropriate table the coefficient of variation of the estimate $\hat{X}$, and then using the following formula to convert to a confidence interval CI:

$$CI_X = [\hat{X} - t\hat{X}\alpha_{\hat{X}} \ , \ \hat{X} + t\hat{X}\alpha_{\hat{X}}]$$

where $\alpha_{\hat{X}}$ is the determined coefficient of variation of $\hat{X}$, and

t = 1 if a 68% confidence interval is desired
t = 1.6 if a 90% confidence interval is desired
t = 2 if a 95% confidence interval is desired
t = 3 if a 99% confidence interval is desired.

Note: Release guidelines which apply to the estimate also apply to the confidence interval. For example, if the estimate is not releasable, then the confidence interval is not releasable either.

Example of using C.V. tables to obtain confidence limits

A 95% confidence interval for the estimated proportion of persons who travelled in March and took at least one same-day trip (from example using rule 2, chapter 10) would be calculated as follows.

$\hat{X}$ = 49% (or expressed as a proportion = .49)

t = 2

$\alpha_{\hat{X}}$ = 2.8% (.028 expressed as a percentage) is the coefficient of variation of this estimate as determined from the tables.

$CI_X = \{.49 - (2)(.49)(.028), .49 + (2)(.49)(.028)\}$

$CI_X = \{.49 - .027, .49 + .027\}$

$CI_X = \{.463, .517\}$

With 95% confidence it can be said that between 46.3% and 51.7% of persons who travelled in March took at least one same-day trip.

Using C.V. tables to do t-tests

Standard errors may also be used to perform hypothesis testing, a procedure for distinguishing between population parameters using sample estimates. The sample estimates can be numbers, averages, percentages, ratios, etc. Tests may be performed at various levels of significance, where a level of significance is the probability of concluding that the characteristics are different when, in fact, they are identical.

Let $\mathbf{X_1}$ and $\mathbf{X_2}$ be sample estimates for two characteristics of interest. Let the standard error on the difference $\hat{X}_1 - \hat{X}_2$ be $\sigma_{\hat{d}}$.

If $t = \frac{\hat{X}_1 - \hat{X}_2}{\sigma_{\hat{d}}}$ is between -2 and 2, then no conclusion about the difference between the characteristics is justified at the 5% level of significance. If however, this ratio is smaller than -2 or larger than +2, the observed difference is significant at the 0.05 level. That is to say that the characteristics are significant.

Example of using C.V. tables to do a t-test

Let us suppose we wish to test, at 5% level of significance, the hypothesis that there is no difference between the proportion of travellers in March who took at least one same-day trip and the proportion of travellers in March who took at least one overnight trip. From the example using rule 3, the standard error of the difference between these two estimates was found to be = .019. Hence ,

$$t = \frac{\hat{X}_1 - \hat{X}_2}{\sigma_{\hat{d}}} = \frac{.49 - .663}{.019} = \frac{-.173}{.019} = -9.10.$$

Since t = -9.10 is less than -2, it must be concluded that there is a significant difference between the two estimates at the 0.05 level of significance.

CVs for quantitative estimates

For quantitative estimates, special tables would have to be produced to determine their sampling error. Since most of the variables for the Canadian Travel Survey are primarily categorical in nature, this has not been done. These tables are included in the documentation and may be used with the analysis of variables that use person-trip weights, household-trip weights, person-night weights and expenditures weights.

As a general rule, the coefficient of variation of a quantitative total will be larger than the coefficient of variation of the corresponding category estimate (i.e., the estimate of the number of persons contributing to the quantitative estimate). Note that if the corresponding category estimate is not releasable, the quantitative estimate will not be either. For example, the coefficient of variation of the total number of trips taken in December would be greater than the coefficient of variation of the corresponding proportion of persons who took at least one trip in December. Hence if the coefficient of variation of the proportion is not releasable, then the coefficient of variation of the corresponding quantitative estimate will also not be releasable.

Coefficients of variation of such estimates can be derived as required for a specific estimate using a technique known as pseudo replication. This involves dividing the records on the microdata files into subgroups (or replicates) and determining the variation in the estimate from replicate to replicate. Users wishing to derive coefficients of variation for quantitative estimates may contact Statistics Canada for advice on the allocation of records to appropriate replicates and the formulae to be used in these calculations.

Pratical use of CV Tables relating to travel

Structure of approximate CV tables

The section of this document entitled CV Tables provides users with a qualitative measure of estimates for the Canadian Travel Survey. Tables of monthly, quarterly and annual estimates are produced for Canada as a whole, by province and by region. These 84 tables are divided into two distinct sets: 42 estimated CV tables for intraprovincial and total travel and 42 others for interprovincial travel. Note that the number of CV tables for 1997 is twice that for 1996, since two different sample sizes were used in the later year depending on whether travel did or did not occur within a single province. For more details on the sample, see **Chapter 3 of this guide.**

Use of provincial or infraprovincial CV tables

Coefficients of variation for estimates relating to a specific province or geographic entity(Tourism region, Census Division, Census Metropolitan Area or Census Agglomeration) within that province may be obtained from CVs in tables identified with the province.

In the case of tabulations in which the origin and destination of travel are in two different provinces, CVs for the destination province should be used.

Varieties of coefficients of variation

Coefficients of variation appearing in the CV tables are related to the following units of measure: household-trips, person-trips, person-nights and household-expenditures. Estimates having person-visits as unit of measure should use CVs relating to person-trips; those having person-visit-nights as unit of measure should use CVs relating to person-nights.

How to find the correct coefficient using CV tables from the CV TABLES section of this guide

Example 1

We desire the approximate coefficient of variation of an *annual* estimate of 10,000,000 person-trips or person-visits, including all trips carried out in *Ontario* in 1997

- Look in the CV Tables section of the guide
- Find the ONTARIO, ANNUAL, TOTAL TRIPS & INTRAPROVINCIAL table.
- Find the CV corresponding to the person-trip column and 10,000,000 level on the left scale, ie, *4.8%*

If the CV desired in this example had been for a value of 10,000,000 dollars instead of 10,000,000 peson-trips, the CV would have been found using the right-hand scale. In this case the CV would have been *34.0%*.

Assume that the value in example 1 is 12,000,000 person-trips instead of 10,000,000 person-trips. As this value does not appear directly in the table, the CV must be derived as follows:

Quick method: use the CV for the value closest to that desired. In this case, the CV closest to 12,000,000 is that associated with 10,000,000 or *4.8%*.

Exact method: use the following formula:
A= CV1   B=CV2
CV_X= (EST_X-A)/(B-A)(CV1-CV2)+CV2*

10,000,000 lower   CV= 4.8
15,000,000 upper   CV= 4.2

and you want to associate a CV with a value of 12,000,000 :
CV_X= (12,000,000-10,000,000)/ (15,000,000-10,000,000)*(4.8-4.2)+4.2=*4.44%*

Example 2

We desire the approximate coefficient of variation for a *quarterly* estimate of 10,000,000 household-trips including only intraprovincial trips carried out in *Ontario* in 1997 for a given quarter.

- Look in the CV Tables section of the guide

- Find the Ontario, QUARTERLY, TOTAL & INTRAPROVINCIAL table.

- Find the CV corresponding to the household-trip column and 10,000,000 level on the left scale,ie, *5.9%*.

If the estimate for which a CV is required does not appear in the table, one of the two methods described in example 1 may be used.

Example 3

We desire the approximate coefficient of variation for a monthly estimate of 10,000,000 person-nights for interprovincial trips carried out in Ontario in a given month of 1997.

- Look in the CV Tables section of the guide.

- Find the Ontario, MONTHLY, INTERPROVINCIAL table.

- Find the CV corresponding to the person-nights column and 10,000,000 level on the left scale, ie, *8.2%*.

If the estimate for which a CV is required does not appear in the table, one of the two methods described in example 1 may be used.

Approximate Sampling Variability Tables - Person weight
Canadian Travel Survey - Standard Monthly - 1996
Canada

Numerator of Percentage ('000)	Estimated Percentage 0.1%	1.0%	2.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	50.0%	70.0%	90.0%
1	216.3	215.3	214.2	210.9	205.3	199.5	193.5	187.4	181	174.5	167.6	153	118.5	68.4
2	152.9	152.2	151.5	149.1	145.2	141.1	136.9	132.5	128	123.4	118.5	108.2	83.8	48.4
3	124.9	124.3	123.7	121.8	118.5	115.2	111.7	108.2	104.5	100.7	96.8	88.3	68.4	39.5
4	108.1	107.7	107.1	105.5	102.6	99.8	96.8	93.7	90.5	87.2	83.8	76.5	59.3	34.2
5	96.7	96.3	95.8	94.3	91.8	89.2	86.6	83.8	81	78	75	68.4	53	30.6
6	88.3	87.9	87.5	86.1	83.8	81.4	79	76.5	73.9	71.2	68.4	62.5	48.4	27.9
7	81.7	81.4	81	79.7	77.6	75.4	73.2	70.8	68.4	65.9	63.4	57.8	44.8	25.9
8	76.5	76.1	75.7	74.6	72.6	70.5	68.4	66.3	64	61.7	59.3	54.1	41.9	24.2
9	72.1	71.8	71.4	70.3	68.4	66.5	64.5	62.5	60.3	58.2	55.9	51	39.5	22.8
10	68.4	68.1	67.7	66.7	64.9	63.1	61.2	59.3	57.3	55.2	53	48.4	37.5	21.6
11	65.2	64.9	64.6	63.6	61.9	60.2	58.4	56.5	54.6	52.6	50.5	46.1	35.7	20.6
12	62.4	62.2	61.8	60.9	59.3	57.6	55.9	54.1	52.3	50.4	48.4	44.2	34.2	19.8
13	60	59.7	59.4	58.5	56.9	55.3	53.7	52	50.2	48.4	46.5	42.4	32.9	19
14	57.8	57.5	57.3	56.4	54.9	53.3	51.7	50.1	48.4	46.6	44.8	40.9	31.7	18.3
15	55.8	55.6	55.3	54.5	53	51.5	50	48.4	46.7	45	43.3	39.5	30.6	17.7
16	54.1	53.8	53.6	52.7	51.3	49.9	48.4	46.9	45.3	43.6	41.9	38.3	29.6	17.1
17	52.5	52.2	52	51.2	49.8	48.4	46.9	45.5	43.9	42.3	40.7	37.1	28.7	16.6
18	51	50.7	50.5	49.7	48.4	47	45.6	44.2	42.7	41.1	39.5	36.1	27.9	16.1
19	49.6	49.4	49.1	48.4	47.1	45.8	44.4	43	41.5	40	38.5	35.1	27.2	15.7
20	48.4	48.1	47.9	47.2	45.9	44.6	43.3	41.9	40.5	39	37.5	34.2	26.5	15.3
21	47.2	47	46.7	46	44.8	43.5	42.2	40.9	39.5	38.1	36.6	33.4	25.9	14.9
22	46.1	45.9	45.7	45	43.8	42.5	41.3	40	38.6	37.2	35.7	32.6	25.3	14.6
23	45.1	44.9	44.7	44	42.8	41.6	40.4	39.1	37.8	36.4	35	31.9	24.7	14.3
24	*******	43.9	43.7	43.1	41.9	40.7	39.5	38.3	37	35.6	34.2	31.2	24.2	14
25	*******	43.1	42.8	42.2	41.1	39.9	38.7	37.5	36.2	34.9	33.5	30.6	23.7	13.7
30	*******	39.3	39.1	38.5	37.5	36.4	35.3	34.2	33.1	31.9	30.6	27.9	21.6	12.5
35	*******	36.4	36.2	35.7	34.7	33.7	32.7	31.7	30.6	29.5	28.3	25.9	20	11.6
40	*******	34	33.9	33.3	32.5	31.5	30.6	29.6	28.6	27.6	26.5	24.2	18.7	10.8
45	*******	32.1	31.9	31.4	30.6	29.7	28.9	27.9	27	26	25	22.8	17.7	10.2
50	*******	30.4	30.3	29.8	29	28.2	27.4	26.5	25.6	24.7	23.7	21.6	16.8	9.7
55	*******	29	28.9	28.4	27.7	26.9	26.1	25.3	24.4	23.5	22.6	20.6	16	9.2
60	*******	27.8	27.7	27.2	26.5	25.8	25	24.2	23.4	22.5	21.6	19.8	15.3	8.8
65	*******	26.7	26.6	26.2	25.5	24.7	24	23.2	22.5	21.6	20.8	19	14.7	8.5
70	*******	25.7	25.6	25.2	24.5	23.8	23.1	22.4	21.6	20.9	20	18.3	14.2	8.2
75	*******	24.9	24.7	24.4	23.7	23	22.3	21.6	20.9	20.1	19.4	17.7	13.7	7.9
80	*******	24.1	24	23.6	23	22.3	21.6	21	20.2	19.5	18.7	17.1	13.3	7.7
85	*******	23.4	23.2	22.9	22.3	21.6	21	20.3	19.6	18.9	18.2	16.6	12.9	7.4
90	*******	22.7	22.6	22.2	21.6	21	20.4	19.8	19.1	18.4	17.7	16.1	12.5	7.2
95	*******	22.1	22	21.6	21.1	20.5	19.9	19.2	18.6	17.9	17.2	15.7	12.2	7
100	*******	21.5	21.4	21.1	20.5	20	19.4	18.7	18.1	17.4	16.8	15.3	11.9	6.8
125	*******	19.3	19.2	18.9	18.4	17.8	17.3	16.8	16.2	15.6	15	13.7	10.6	6.1
150	*******	17.6	17.5	17.2	16.8	16.3	15.8	15.3	14.8	14.2	13.7	12.5	9.7	5.6
200	*******	15.2	15.1	14.9	14.5	14.1	13.7	13.3	12.8	12.3	11.9	10.8	8.4	4.8
250	*******	********	13.5	13.3	13	12.6	12.2	11.9	11.5	11	10.6	9.7	7.5	4.3
300	*******	********	12.4	12.2	11.9	11.5	11.2	10.8	10.5	10.1	9.7	8.8	6.8	4
350	*******	********	11.5	11.3	11	10.7	10.3	10	9.7	9.3	9	8.2	6.3	3.7
400	*******	********	10.7	10.5	10.3	10	9.7	9.4	9.1	8.7	8.4	7.7	5.9	3.4
450	*******	********	10.1	9.9	9.7	9.4	9.1	8.8	8.5	8.2	7.9	7.2	5.6	3.2
500	*******	********	********	9.4	9.2	8.9	8.7	8.4	8.1	7.8	7.5	6.8	5.3	3.1
750	*******	********	********	7.7	7.5	7.3	7.1	6.8	6.6	6.4	6.1	5.6	4.3	2.5
1000	*******	********	********	6.7	6.5	6.3	6.1	5.9	5.7	5.5	5.3	4.8	3.7	2.2
1500	*******	********	********	********	5.3	5.2	5	4.8	4.7	4.5	4.3	4	3.1	1.8
2000	*******	********	********	********	4.6	4.5	4.3	4.2	4	3.9	3.7	3.4	2.7	1.5
3000	*******	********	********	********	********	3.6	3.5	3.4	3.3	3.2	3.1	2.8	2.2	1.2
4000	*******	********	********	********	********	********	3.1	3	2.9	2.8	2.7	2.4	1.9	1.1
5000	*******	********	********	********	********	*********	*******	2.7	2.6	2.5	2.4	2.2	1.7	1
6000	*******	********	********	********	********	*********	*********	******	2.3	2.3	2.2	2	1.5	0.9
7000	*******	********	********	********	********	*********	*********	********	******	2.1	2	1.8	1.4	0.8
8000	*******	********	********	********	********	*********	*********	********	******	2	1.9	1.7	1.3	0.8
9000	*******	********	********	********	********	*********	*********	********	******	********	1.8	1.6	1.2	0.7
10000	*******	********	********	********	********	*********	*********	********	******	********	********	1.5	1.2	0.7
12500	*******	********	********	********	********	*********	*********	********	******	********	********	********	1.1	0.6
15000	*******	********	********	********	********	*********	*********	********	******	********	********	********	1	0.6