

# Canadian Community Health Survey Results

## Influenza Immunization Coverage

### Notes

#### **Influenza Immunization Data, Canadian Community Health Survey**

##### **DATA SOURCE**

Public Use Microdata File for the Canadian Community Health Survey, 2003, 2005 and 2007/08

##### **YEARS**

2003, 2005, 2007/08

##### **NOTES**

###### **1. Survey Methods**

The Canadian Community Health Survey (CCHS) is a cross-sectional survey that collects information related to the health status, health care utilization and health determinants of the Canadian population. The target population is persons aged 12 years or older, living in private dwellings.

The CCHS used three sampling frames to select the sample of households: 48-49% of the sample came from an area frame, 50% came from a list frame of telephone numbers and 1-2% came from a Random Digit Dialing sampling frame. Sample units selected from the telephone list frame were interviewed from centralized call centres. Units selected from the area frame were interviewed by decentralized field interviewers. In some situations, field interviewers completed some interviews or part of an interview by telephone.

Prior to 2007/08, data collection occurred every two years on an annual period. Data are available for the 2001, 2003 and 2005 periods. In 2007, major changes were made to the survey design with the goal of improving its effectiveness and flexibility through data collection on an ongoing basis. Data collection now occurs every year, rather than every two years. Data are released every two years.

Information about the CCHS is available on the [Statistics Canada website](#).

###### **2. Weights**

The CCHS was not a census of all Canadians, rather a probability sample was used to obtain a representative sample of Canadians. Each individual in the probability sample "represents", besides himself or herself, several other persons not in the sample. Each respondent was assigned a sampling weight indicating the number of individuals they represent. For estimates produced from the survey data to be representative of the covered population and not just the sample, estimates using CCHS data are derived by identifying the records of individuals in the sample with the specific characteristic(s) of interest and summing the weights entered in those records.

###### **3. Numerator**

People with High-Risk Conditions:

CCHS respondents who were under 65 years of age, indicated that they had one or more select high-risk condition(s) and indicated that they received the flu shot less than 1 year ago.

Community-Based Population Aged 65 Years and Over:

CCHS respondents who were age 65 years or older and indicated that they received the flu shot less than 1 year ago.

###### **4. Denominator**

People with High-Risk Conditions:

CCHS respondents who were under 65 years of age and indicated that they had one or more select high-risk condition(s).

Community-Based Population Aged 65 Years and Over:

CCHS respondents who were age 65 years or older.

###### **5. Calculation of Influenza Immunization Coverage**

Weighted Numerator ÷ Weighted Denominator x 100%

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##### **6. Data Quality**

In 2007/08, the combined response rate in British Columbia was 74.2% and in the Health Service Delivery Areas ranged from 67.8% to 79.2%. In 2005, the combined response rate in British Columbia was 77.3% and in the Health Service Delivery Areas ranged from 68.3% to 86.2%. In 2003, the combined response rate in British Columbia was 81.2% and in the Health Service Delivery Areas ranged from 76.5% to 90.2%.

The sampling error of the estimates from the CCHS can be quantified by the coefficient of variation. Approximate coefficients of variation for the influenza vaccine coverage results were identified using the CCHS Microdata File's Approximate Sampling Variability Tables.

95% Confidence intervals (95% CI) for the immunization coverage estimates were calculated using the coefficients of variation as outlined in the CCHS User Guide for the Public Use Microdata File.

In 2007/08, the coefficient of variation for influenza coverage for individuals under the age of 65 with emphysema or COPD was 19.0% and the coefficient of variation for influenza coverage in individuals aged 65 and over in the Northwest and Northeast Health Service Delivery Areas was 17.4%; in 2005, the coefficient of variation for influenza immunization coverage for individuals under the age of 65 with cancer was 20.9%; in 2003, the coefficient of variation for influenza immunization coverage for individuals under the age of 65 with emphysema or COPD was 16.6%. These coefficients of variation indicated that the estimates had high sampling variability. All other coefficients of variation were between 0.0 and 16.5%, indicating that the estimates of influenza immunization vaccine coverage had acceptable degrees of variation.

##### **7. Exclusions from the Sampling Frame**

Individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Armed Forces and residents of certain remote regions were excluded from the CCHS sampling frame. The CCHS covers approximately 98% of the Canadian population aged 12 years and over.

Due to the exclusion of individuals living on Reserves and residents in certain remote regions, estimates for the Northern Health Authority may not be as representative of the Health Authority's population as estimates for other Health Authorities.

##### **8. For Further Information about the CCHS**

For further information about the CCHS methods or limitations, please see the Canadian Community Health Survey 2003 / 2005 / 2007/08 User Guide for the Public Use Microdata File or the [Statistics Canada website](#).

##### **9. High Risk Conditions**

Influenza immunization is recommended for individuals who have conditions that place them at a higher risk of severe morbidity or mortality if infected with influenza. These conditions include:

- Anatomic or functional asplenia
- Sickle cell disease
- Immunosuppressant related to disease or therapy
- HIV positive adult
- Hematopoietic stem cell transplant recipient
- Solid organ transplant recipient or awaiting transplant
- Chronic cardio-respiratory disease
- Chronic liver disease
- Chronic hepatitis B
- Chronic hepatitis C
- Chronic renal disease
- Diabetes
- Cystic fibrosis

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The CCHS does not include questions about all of these conditions. These analyses are limited to conditions included in the CCHS. Relevant conditions included in the CCHS are:

Asthma requiring medical attention

Answered yes to: "In the past 12 months, have you taken any medicine for asthma such as inhalers, nebulizers, pills, liquids or injections?"

Diabetes

Answered yes to: "Do you have diabetes?"

Heart disease

Answered yes to: "Do you have heart disease?"

Cancer

Answered yes to: "Do you have cancer?"

Chronic bronchitis

Answered yes to: "Do you have chronic bronchitis?"

Emphysema or COPD

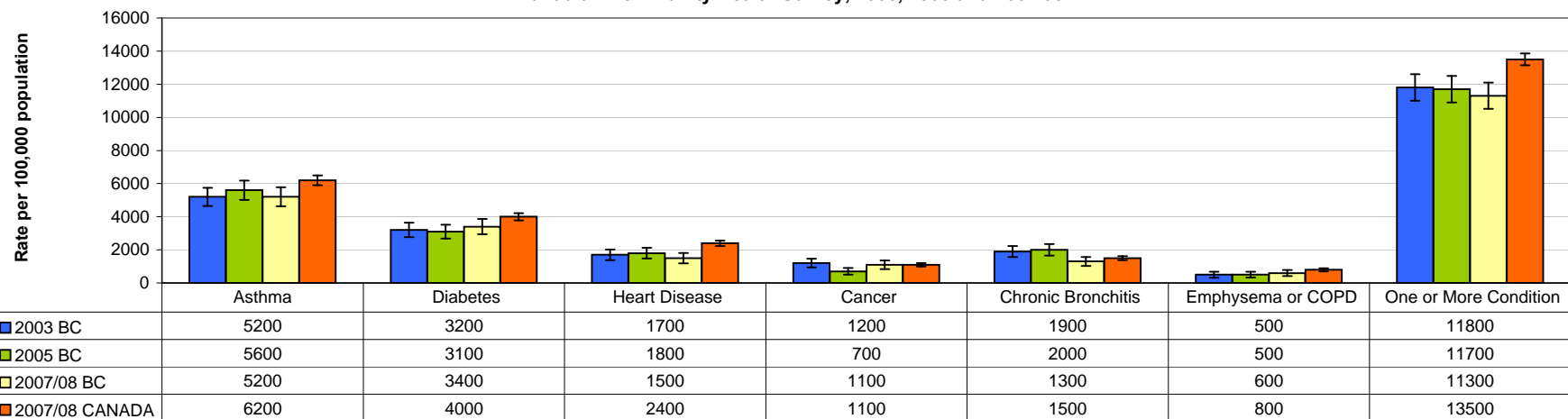
In 2005 and 2007/08, answered yes to "Do you have emphysema?" and/or answered yes to "Do you have chronic obstructive pulmonary disease (COPD)?" In 2003, answered yes to: "Do you have emphysema or chronic obstructive pulmonary disease (COPD)?"

### Canadian Community Health Survey Results Influenza Immunization Coverage

**Rates of Conditions that Place People at High Risk if Infected with Influenza, People Aged 12-64 Years**

High-Risk Condition	2003 BC		2005 BC		2007/08 BC		2007/08 Canada	
	Rate (Per 100,000)	95% CI	Rate (Per 100,000)	95% CI	Rate (Per 100,000)	95% CI	Rate (Per 100,000)	95% CI
Asthma requiring medical attention	5200	4700 - 5800	5600	5000 - 6100	5200	4700 - 5800	6200	5900 - 6500
Diabetes	3200	2700 - 3600	3100	2700 - 3500	3400	2900 - 3800	4000	3800 - 4200
Heart disease	1700	1400 - 2100	1800	1400 - 2100	1500	1200 - 1900	2400	2200 - 2600
Cancer	1200	900 - 1400	700	500 - 900	1100	900 - 1400	1100	1000 - 1200
Chronic bronchitis	1900	1500 - 2200	2000	1600 - 2300	1300	1000 - 1500	1500	1400 - 1600
Emphysema or chronic obstructive pulmonary disease	500	400 - 700	500	400 - 700	600	400 - 800	800	700 - 900
<b>One or more of the above conditions</b>	<b>11800</b>	<b>11000 - 12600</b>	<b>11700</b>	<b>10900 - 12500</b>	<b>11300</b>	<b>10500 - 12100</b>	<b>13500</b>	<b>13100 - 13800</b>

**Rate of High Risk Conditions for People Aged 12-64 Years  
Canadian Community Health Survey, 2003, 2005 and 2007/08**



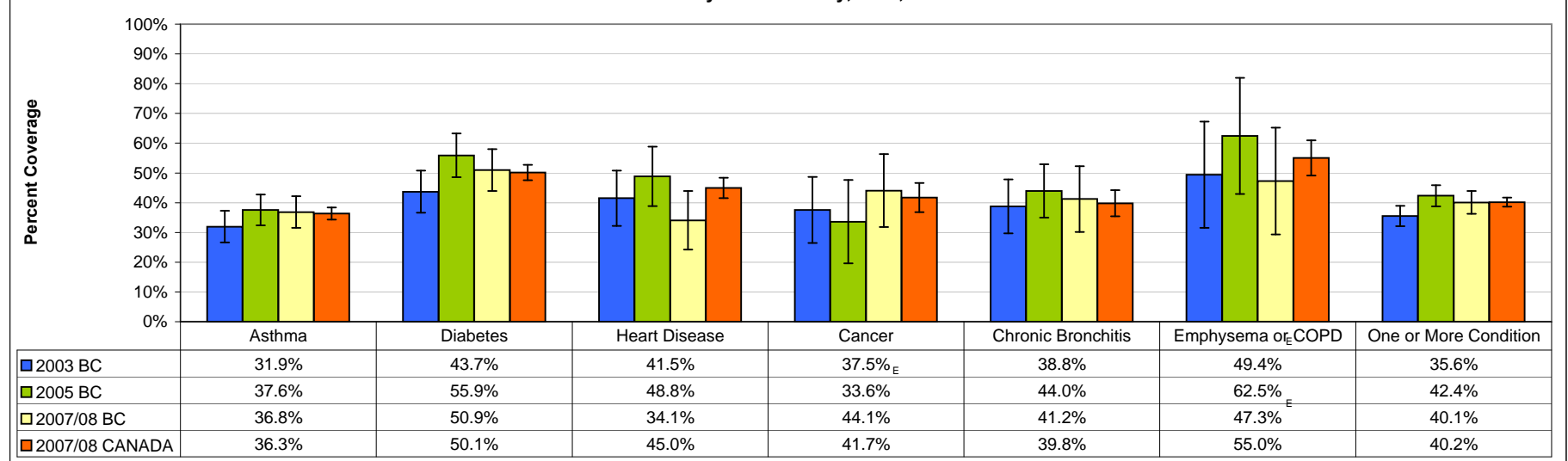
See data sources and notes on accompanying cover pages.

## Canadian Community Health Survey Results Influenza Immunization Coverage

**Influenza Immunization Coverage, People Aged 12-64 Years with Select High-Risk Conditions for Influenza**

High-Risk Condition	2003 BC		2005 BC		2007/08 BC		2007/08 Canada	
	% Coverage	95% CI	% Coverage	95% CI	% Coverage	95% CI	% Coverage	95% CI
Asthma requiring medical attention	31.9%	26.6% - 37.2%	37.6%	32.4% - 42.8%	36.8%	31.5% - 42.1%	36.3%	34.3% - 38.4%
Diabetes	43.7%	36.6% - 50.8%	55.9%	48.5% - 63.3%	50.9%	43.9% - 58.0%	50.1%	47.5% - 52.7%
Heart Disease	41.5%	32.2% - 50.8%	48.8%	38.9% - 58.8%	34.1%	24.2% - 44.0%	45.0%	41.5% - 48.4%
Cancer	37.5%	26.4% - 48.6%	33.6% <sup>E</sup>	19.6% - 47.7%	44.1%	31.8% - 56.3%	41.7%	36.8% - 46.7%
Chronic bronchitis	38.8%	29.7% - 47.9%	44.0%	35.0% - 52.9%	41.2%	30.2% - 52.3%	39.8%	35.4% - 44.2%
Emphysema or chronic obstructive pulmonary disease	49.4% <sup>E</sup>	31.5% - 67.3%	62.5%	43.0% - 81.9%	47.3% <sup>E</sup>	29.3% - 65.2%	55.0%	49.1% - 61.0%
<b>One or more of the above conditions</b>	<b>35.6%</b>	<b>32.1% - 39.0%</b>	<b>42.4%</b>	<b>42.4% - 42.4%</b>	<b>40.1%</b>	<b>36.2% - 43.9%</b>	<b>40.2%</b>	<b>38.6% - 41.7%</b>

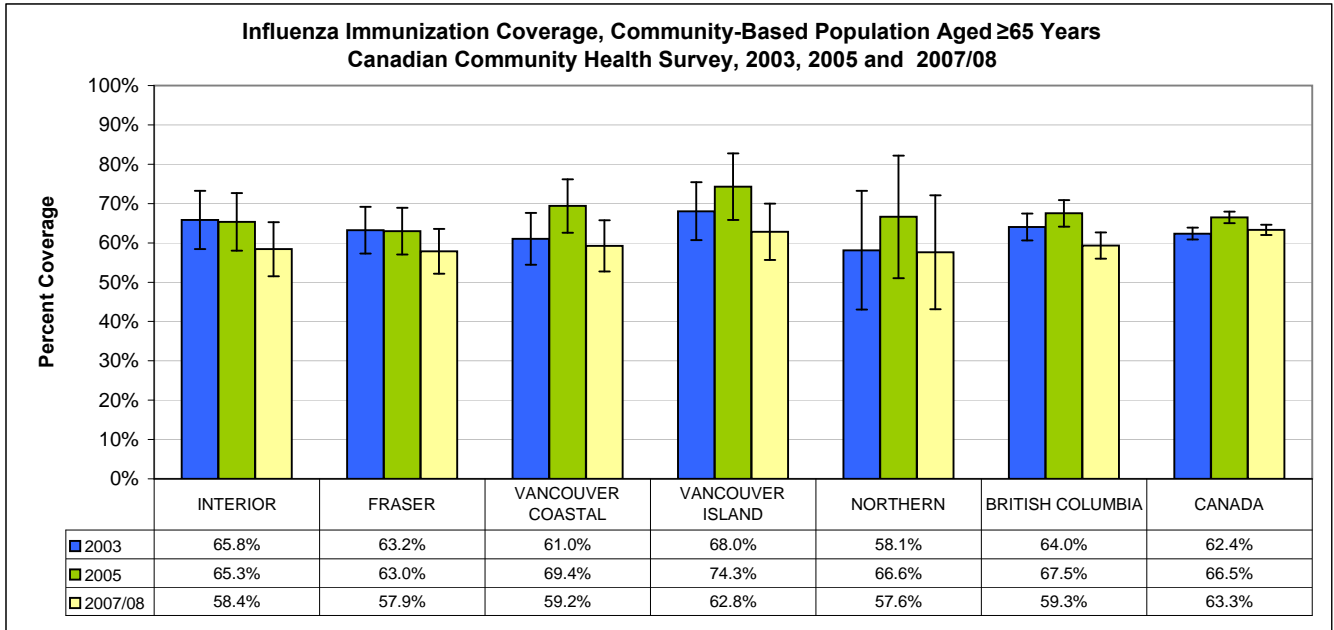
**Influenza Immunization Coverage for People Aged 12-64 Years with Select High-Risk Conditions for Influenza  
Canadian Community Health Survey, 2003, 2005 and 2007/08**



<sup>E</sup> - The user is advised that this estimate has high sampling variability.  
See data sources and notes on accompanying cover pages.

**Canadian Community Health Survey Results  
Influenza Immunization Coverage**

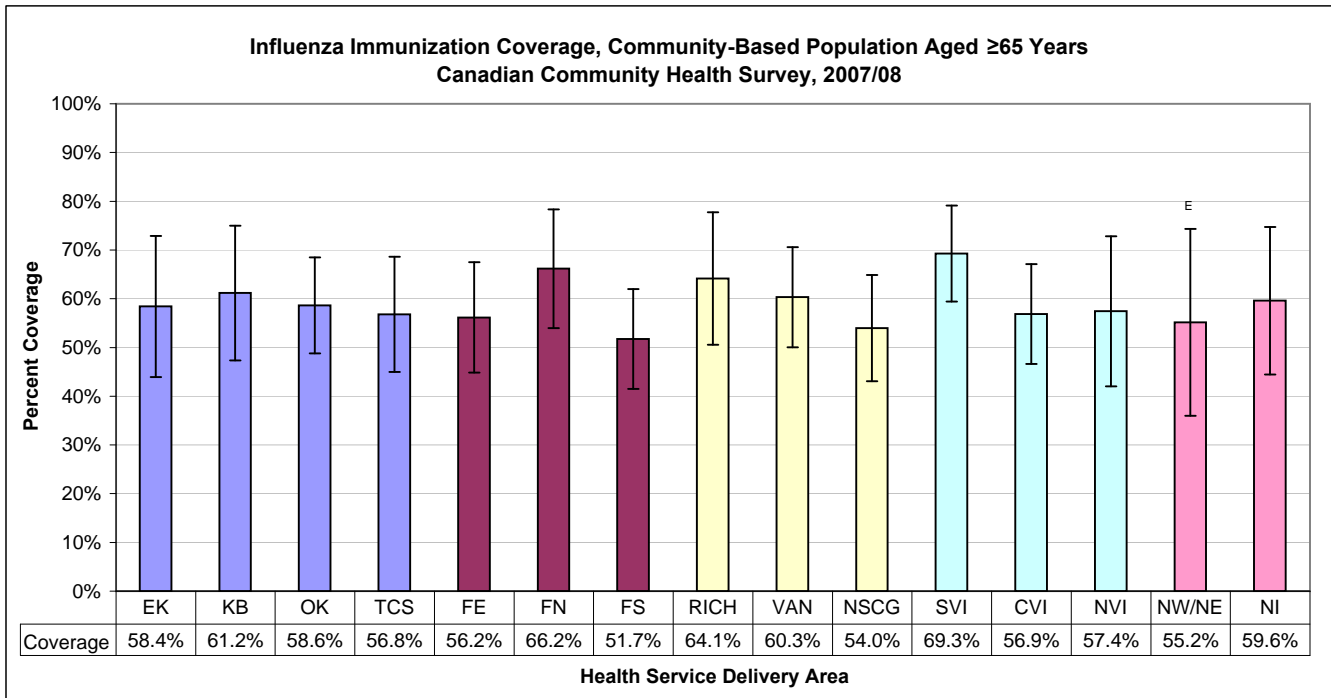
<b>Influenza Immunization Coverage, Community-Based Population Aged 65 Years and Over</b>						
Health Region	2003		2005		2007/08	
	% Coverage	95% CI	% Coverage	95% CI	% Coverage	95% CI
<b>INTERIOR</b>	65.8%	58.4% - 73.2%	65.3%	58.0% - 72.7%	58.4%	51.5% - 65.3%
East Kootenay	71.3%	57.1% - 85.4%	63.7%	47.4% - 80.0%	58.4%	43.9% - 72.9%
Kootenay Boundary	62.1%	46.0% - 78.3%	57.2%	42.2% - 72.2%	61.2%	47.3% - 75.0%
Okanagan	63.5%	54.1% - 72.9%	68.5%	57.5% - 79.4%	58.6%	48.8% - 68.5%
Thompson Cariboo Shuswap	70.0%	60.2% - 79.8%	63.2%	50.3% - 76.2%	56.8%	45.0% - 68.6%
<b>FRASER</b>	63.2%	57.3% - 69.2%	63.0%	57.0% - 68.9%	57.9%	52.2% - 63.5%
Fraser East	59.5%	47.5% - 71.6%	62.9%	50.8% - 75.0%	56.2%	44.8% - 67.5%
Fraser North	63.9%	52.7% - 75.2%	63.4%	52.2% - 74.5%	66.2%	54.0% - 78.3%
Fraser South	64.4%	52.9% - 75.8%	62.6%	51.7% - 73.5%	51.7%	41.5% - 62.0%
<b>VANCOUVER COASTAL</b>	61.0%	54.5% - 67.6%	69.4%	62.6% - 76.2%	59.2%	52.7% - 65.8%
Richmond	55.9%	41.7% - 70.2%	69.7%	54.8% - 84.6%	64.1%	50.5% - 77.7%
Vancouver	64.5%	53.9% - 75.1%	68.5%	57.8% - 79.2%	60.3%	50.1% - 70.6%
North Shore / Coast Garibaldi	57.0%	45.6% - 68.4%	70.9%	61.0% - 80.8%	54.0%	43.1% - 64.9%
<b>VANCOUVER ISLAND</b>	68.0%	60.7% - 75.4%	74.3%	65.8% - 82.8%	62.8%	55.7% - 70.0%
South Vancouver Island	67.3%	57.1% - 77.5%	73.7%	66.0% - 81.3%	69.3%	59.4% - 79.1%
Central Vancouver Island	68.9%	54.7% - 83.1%	74.7%	65.6% - 83.8%	56.9%	46.6% - 67.1%
North Vancouver Island	68.5%	51.5% - 85.5%	75.4%	59.6% - 91.3%	57.4%	42.1% - 72.8%
<b>NORTHERN</b>	58.1%	43.0% - 73.2%	66.6%	51.0% - 82.2%	57.6%	43.1% - 72.1%
Northwest & Northeast	48.3%	32.8% - 63.9%	67.9%	51.5% - 84.4%	55.2% <sup>E</sup>	36.0% - 74.4%
Northern Interior	66.3%	48.2% - 84.5%	65.5%	47.6% - 83.5%	59.6%	44.5% - 74.7%
<b>BRITISH COLUMBIA</b>	64.0%	60.6% - 67.5%	67.5%	64.2% - 70.9%	59.3%	56.0% - 62.6%
<b>CANADA</b>	62.4%	60.9% - 63.8%	66.5%	65.0% - 67.9%	63.3%	62.0% - 64.6%



E - The user is advised that this estimate has high sampling variability.  
See data sources and notes on accompanying cover pages.

**Canadian Community Health Survey Results  
Influenza Immunization Coverage**

**Influenza Immunization Coverage, Community-Based Population Aged 65 Years and Over**



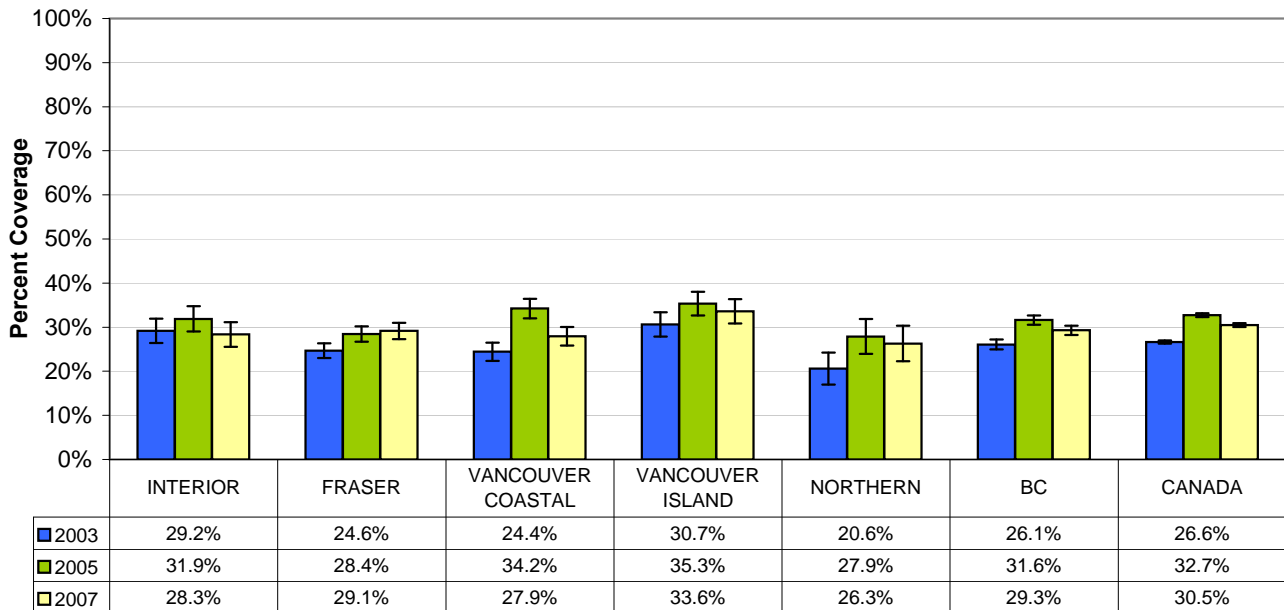
E - The user is advised that this estimate has high sampling variability.  
See data sources and notes on accompanying cover pages.

## Canadian Community Health Survey Results Influenza Immunization Coverage

### Influenza Immunization Coverage, Population Aged 12 Years and Over

Health Region	2003		2005		2007/08	
	%	95% CI	%	95% CI	%	95% CI
<b>INTERIOR</b>	29.2%	26.4% - 31.9%	31.9%	29.0% - 34.8%	28.3%	25.6% - 31.1%
East Kootenay	32.4%	27.1% - 37.7%	26.2%	21.3% - 31.2%	26.9%	22.3% - 31.5%
Kootenay Boundary	23.4%	18.5% - 28.3%	29.9%	24.6% - 35.2%	29.1%	24.2% - 34.1%
Okanagan	29.5%	26.0% - 33.1%	34.0%	30.1% - 37.9%	28.9%	25.3% - 32.6%
Thompson Cariboo Shuswap	29.7%	25.8% - 33.6%	31.7%	27.2% - 36.2%	27.6%	23.5% - 31.7%
<b>FRASER</b>	24.6%	23.0% - 26.3%	28.4%	26.7% - 30.2%	29.1%	27.3% - 31.0%
Fraser East	25.9%	21.9% - 29.8%	29.4%	25.5% - 33.3%	26.5%	22.5% - 30.4%
Fraser North	24.6%	21.5% - 27.8%	26.6%	23.6% - 29.5%	31.0%	27.5% - 34.5%
Fraser South	24.2%	21.2% - 27.1%	29.7%	26.6% - 32.9%	28.6%	25.1% - 32.0%
<b>VANCOUVER COASTAL</b>	24.4%	22.4% - 26.5%	34.2%	32.0% - 36.4%	27.9%	25.8% - 30.0%
Richmond	20.3%	16.6% - 24.0%	32.6%	27.9% - 37.4%	26.8%	22.4% - 31.3%
Vancouver	25.1%	22.1% - 28.2%	35.4%	31.7% - 39.2%	29.5%	26.2% - 32.7%
North Shore / Coast Garibaldi	25.6%	21.8% - 29.4%	32.5%	28.7% - 36.3%	25.0%	21.3% - 28.7%
<b>VANCOUVER ISLAND</b>	30.7%	27.9% - 33.4%	35.3%	32.6% - 38.0%	33.6%	30.9% - 36.4%
South Vancouver Island	31.8%	28.4% - 35.2%	34.2%	30.9% - 37.6%	35.8%	32.1% - 39.4%
Central Vancouver Island	31.0%	26.1% - 35.9%	37.5%	33.5% - 41.4%	32.9%	28.8% - 37.0%
North Vancouver Island	26.3%	21.6% - 31.1%	34.0%	27.7% - 40.4%	28.4%	22.5% - 34.4%
<b>NORTHERN</b>	20.6%	17.0% - 24.2%	27.9%	23.9% - 31.8%	26.3%	22.3% - 30.4%
Northwest & Northeast	16.5%	13.5% - 19.5%	25.0%	21.0% - 28.9%	26.1%	19.8% - 32.4%
Northern Interior	24.2%	19.6% - 28.8%	30.5%	25.7% - 35.3%	26.5%	22.2% - 30.7%
<b>BC</b>	26.1%	25.0% - 27.2%	31.6%	30.5% - 32.7%	29.3%	28.2% - 30.4%
<b>CANADA</b>	26.6%	26.2% - 27.0%	32.7%	32.3% - 33.2%	30.5%	30.1% - 30.9%

**Influenza Immunization Coverage, Population Aged 12 Years and Over  
Canadian Community Health Survey, 2003, 2005 and 2007/08**

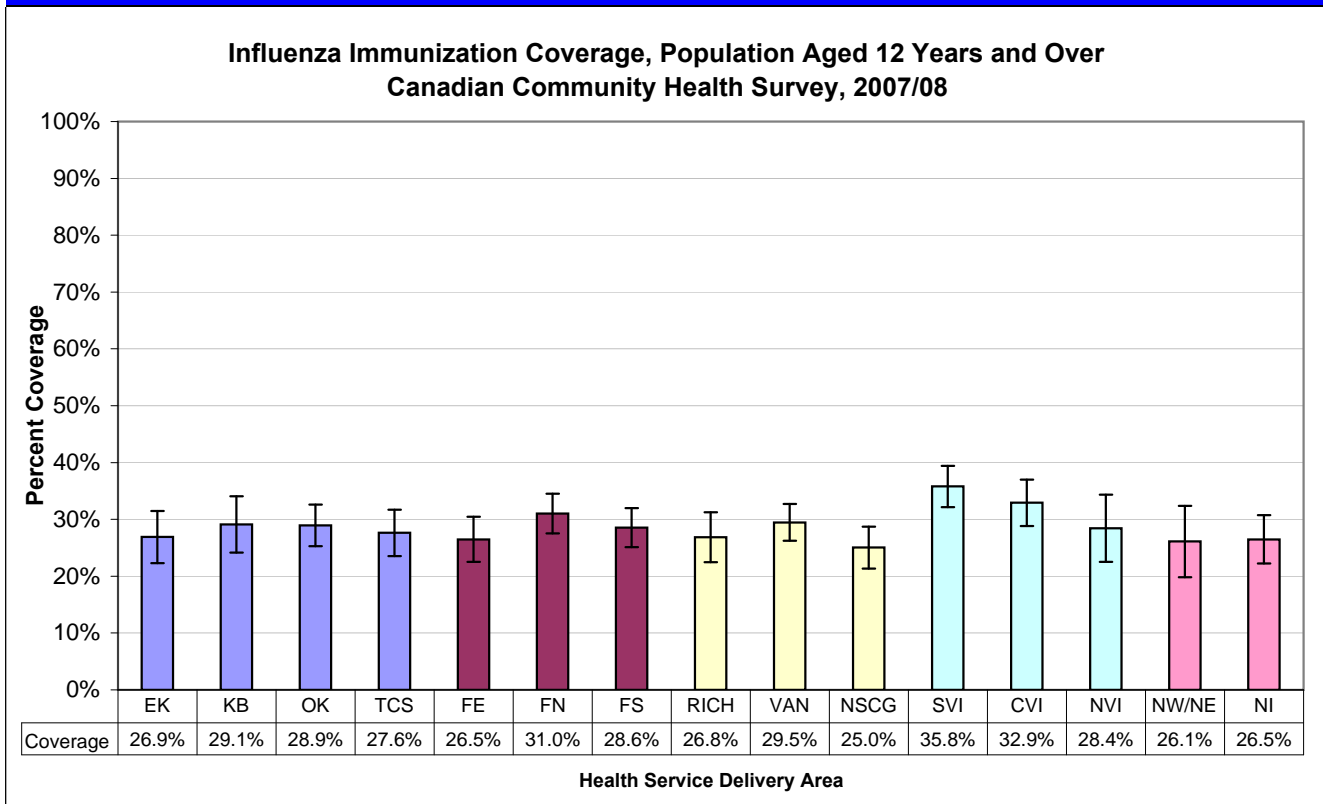


See data sources and notes on accompanying cover pages.



## Canadian Community Health Survey Results Influenza Immunization Coverage

### Influenza Immunization Coverage, Population Aged 12 Years and Over



See data sources and notes on accompanying cover pages.

Based on the CCHS results for 2007/08, an estimated 1,101,000 people aged 12 years and over living in British Columbia were immunized against influenza in the past year. Since the CCHS question about influenza immunization refers to influenza immunization "less than 1 year ago", the 2007/08 CCHS data could reflect influenza immunization status from the 2006/07, 2007/08 or 2008/09 influenza season, depending on the date each interview was conducted.

Of the 1,101,000 people aged 12 years and over immunized, approximately 348,000 were aged 65 years and over and 144,000 were 12-64 years of age with one or more of the high-risk conditions included in the CCHS.

Other populations eligible for publicly-funded influenza immunization in BC are either not included in the CCHS (e.g. children under 12 years of age with high-risk conditions, healthy children aged 6-23 months, residents of residential care facilities) or are not identifiable using the CCHS data (e.g., people over 12 years of age with some high-risk conditions, household contacts of people at high-risk of complications if infected with influenza, health care workers, emergency responders, pregnant women).

The estimated net number of publicly-funded influenza vaccine doses distributed was ~1,011,000 in 2006/07, ~967,000 in 2007/08 and ~964,000 in 2008/09.

The number of people immunized against influenza within the past year exceeds the estimated net number of influenza vaccine doses distributed through the publicly-funded program in BC, despite incomplete capture of eligible populations in the CCHS. Potential explanations for this difference include the following:

Influenza vaccine is available for private purchase in BC to individuals not eligible for the publicly-funded program. In addition, some people eligible for publicly funded vaccine, may obtain privately purchased vaccine (e.g. through immunization programs at their work place). The CCHS estimates include all people reporting influenza immunization; the doses distributed data only included publicly-funded vaccine.

## Canadian Community Health Survey Results Influenza Immunization Coverage

### *Influenza Immunization Coverage, Population Aged 12 Years and Over*

Cross-sectional surveys, such as the CCHS, can be prone to the following systematic biases:

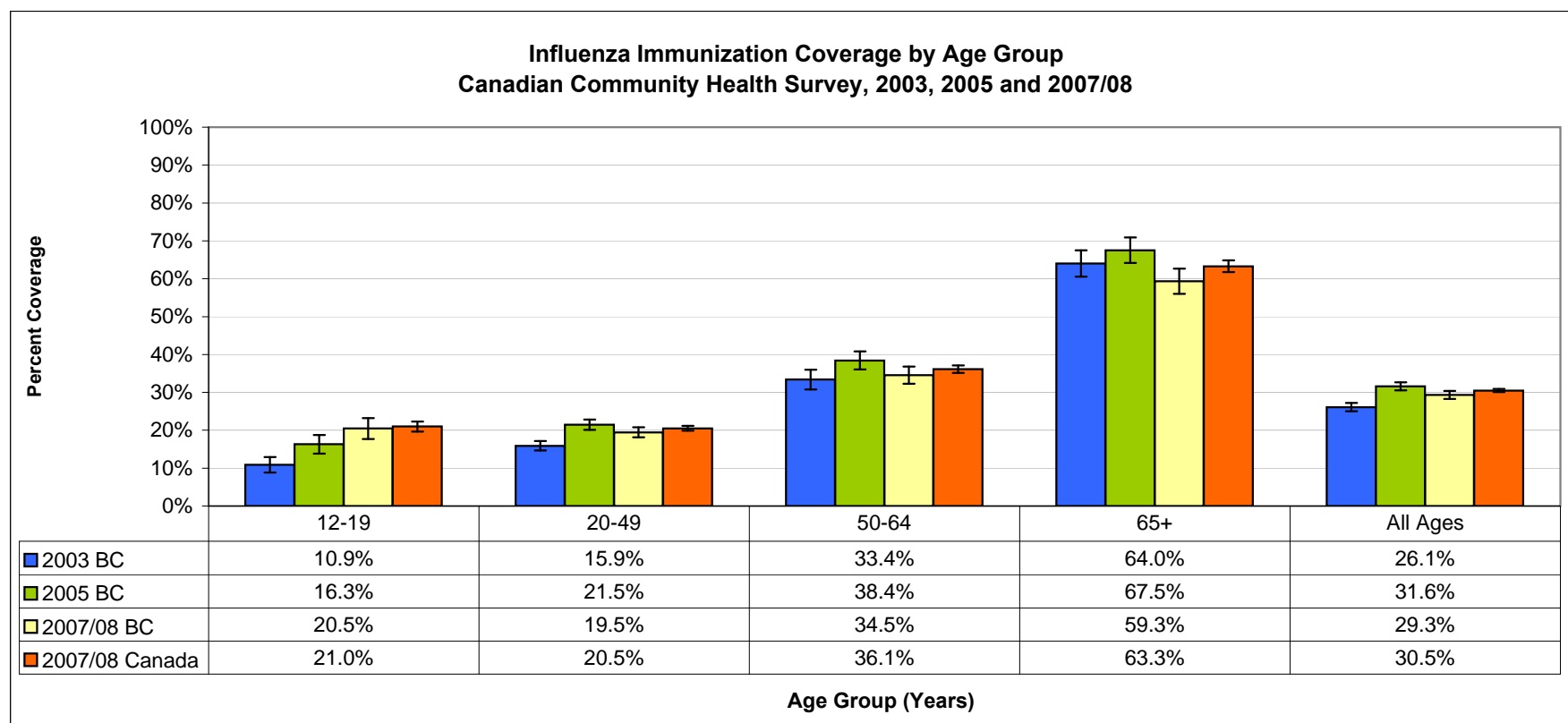
*Selection bias* - those who are selected for the study differ from those who are not selected (people in the CCHS sampling frames may be more likely to be immunized against influenza than people not included in the CCHS sampling frames).

*Response bias* - those who choose or volunteer to take part in a study differ from those who do not (people who agree to participate in the CCHS may be more likely to be immunized against influenza than people who do not agree to participate).

*Social desirability bias* - people reply in a way that will be viewed favourably by others (CCHS respondents may over-report influenza immunization).

## Canadian Community Health Survey Results Influenza Immunization Coverage

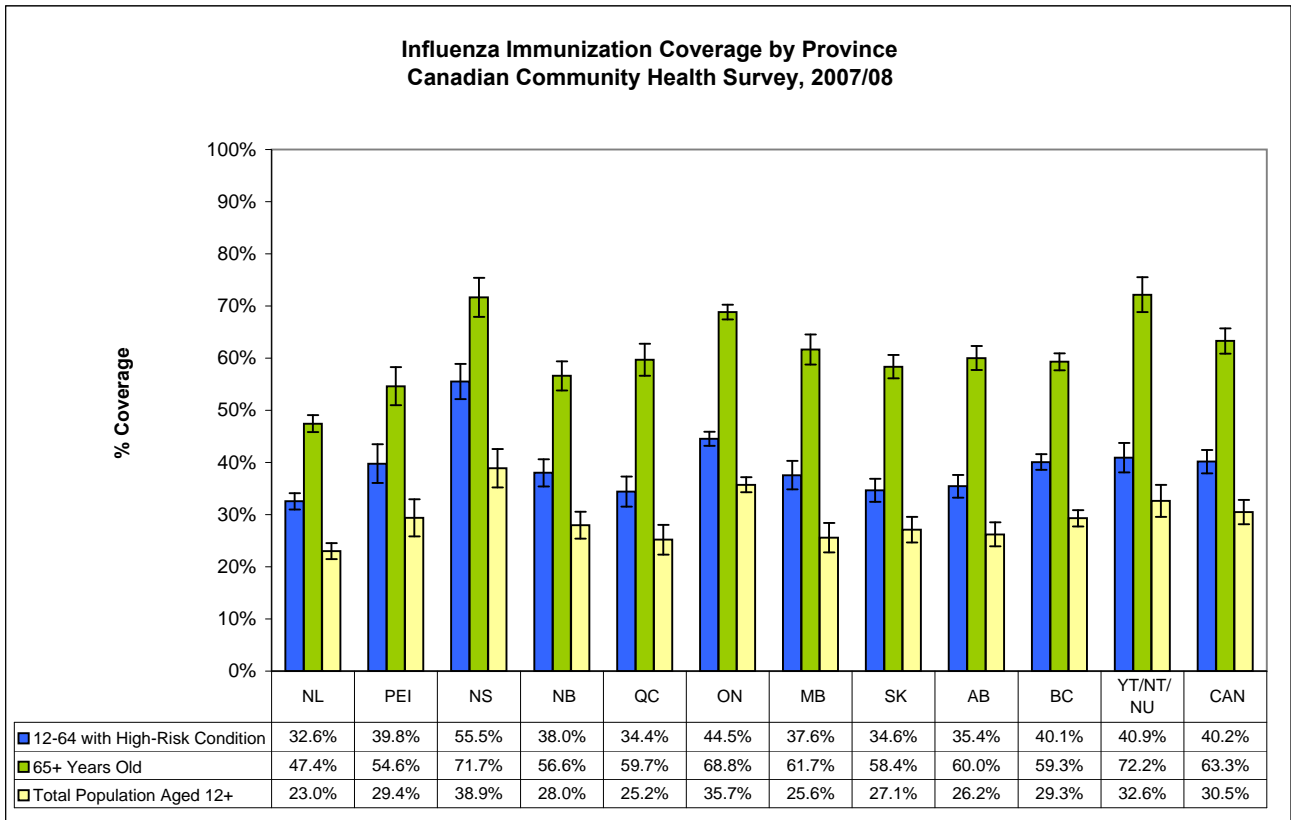
<b>Influenza Immunization Coverage by Age Group</b>								
Age Group (Years)	2003 BC		2005 BC		2007/08 BC		2007/08 Canada	
	% Coverage	95% CI	% Coverage	95% CI	% Coverage	95% CI	% Coverage	95% CI
12-19	10.9%	8.8% - 12.9%	16.3%	13.8% - 18.8%	20.5%	17.7% - 23.2%	21.0%	19.7% - 22.3%
20-49	15.9%	14.6% - 17.1%	21.5%	20.1% - 22.9%	19.5%	18.1% - 20.8%	20.5%	19.9% - 21.1%
50-64	33.4%	30.8% - 36.0%	38.4%	36.0% - 40.8%	34.5%	32.2% - 36.8%	36.1%	35.1% - 37.1%
65+	64.0%	60.6% - 67.5%	67.5%	64.2% - 70.9%	59.3%	56.0% - 62.6%	63.3%	61.8% - 64.8%
All Ages	26.1%	25.0% - 27.2%	31.6%	30.5% - 32.7%	29.3%	28.2% - 30.4%	30.5%	30.1% - 30.9%



See data sources and notes on accompanying cover pages.

## Canadian Community Health Survey Results Influenza Immunization Coverage

<b>Influenza Immunization Coverage by Province, 2007/08</b>						
Province	People 12-64 Years Old with Select High-Risk Conditions		Community-Based Population Aged 65+ Years		Total Population Aged 12+ Years	
	%	95% CI	%	95% CI	%	95% CI
Newfoundland and Labrador (NL)	32.6%	26.8% - 38.3%	47.4%	41.6% - 53.3%	23.0%	21.3% - 24.8%
Prince Edward Island (PEI)	39.8%	31.7% - 47.8%	54.6%	47.4% - 61.8%	29.4%	26.9% - 31.9%
Nova Scotia (NS)	55.5%	50.2% - 60.8%	71.7%	67.4% - 76.0%	38.9%	37.1% - 40.7%
New Brunswick (NB)	38.0%	33.1% - 43.0%	56.6%	51.9% - 61.4%	28.0%	26.2% - 29.7%
Quebec (QC)	34.4%	31.5% - 37.4%	59.7%	56.6% - 62.8%	25.2%	24.3% - 26.1%
Ontario (ON)	44.5%	42.0% - 47.0%	68.8%	66.4% - 71.3%	35.7%	34.9% - 36.6%
Manitoba (MB)	37.6%	31.6% - 43.6%	61.7%	57.1% - 66.2%	25.6%	23.7% - 27.4%
Saskatchewan (SK)	34.6%	29.9% - 39.4%	58.4%	54.2% - 62.6%	27.1%	25.7% - 28.5%
Alberta (AB)	35.4%	31.1% - 39.8%	60.0%	55.5% - 64.6%	26.2%	25.0% - 27.4%
British Columbia (BC)	40.1%	36.2% - 43.9%	59.3%	56.0% - 62.6%	29.3%	28.2% - 30.4%
Yukon/Northwest Territories/ Nunavut (YT/NT/NU)	40.9%	30.8% - 51.1%	72.2%	61.8% - 82.6%	32.6%	30.2% - 35.1%
<b>Canada</b>	<b>40.2%</b>	<b>38.6% - 41.7%</b>	<b>63.3%</b>	<b>62.0% - 64.6%</b>	<b>30.5%</b>	<b>30.06% - 30.9%</b>



See data sources and notes on accompanying cover pages.