Flu shots — National and provincial/territorial trends

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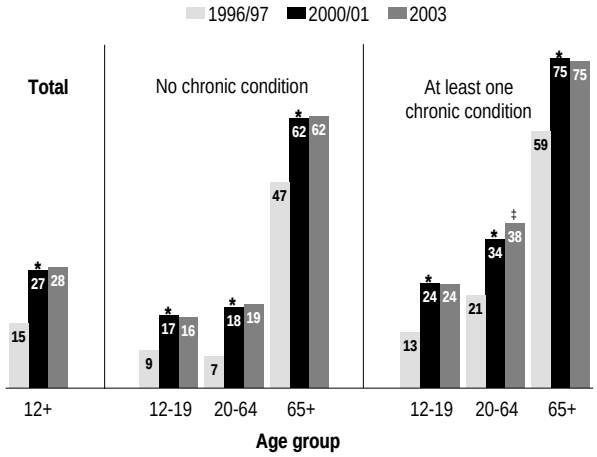
As well as sub-zero temperatures and snowstorms, flu virurses arrive with the Canadian winter. Healthy people usually recover from the fever, cough, headache and other symptoms in less than a week. But some—especially seniors and those with lung or cardiac conditions—may have more severe cases of the flu and may even need to be hospitalized.

Influenza immunization programs were first directed at high-risk groups.[1] In 1993, a national consensus conference recommended that seniors, younger people with serious chronic illnesses, and health care workers receive annual flu shots.[2] A target vaccination rate of 70% was set for seniors and for people of any age with chronic conditions that increase their susceptibility to influenza. Since then, guidelines have become progressively more inclusive. In 2002, the National Advisory Committee on Immunization recommended that, in addition to those in high-risk groups and people in close contact with them, any person who wished to be protected against influenza be offered the vaccine.[3] In 2004, the Canadian Task Force on Preventive Health Care recommended influenza vaccination for healthy adults and children.[4]

Levelling off

In 2003, 28% of Canadians aged 12 or older, an estimated 7.1 million individuals, reported that they had been vaccinated against influenza in the previous year (Chart 1). Although this was up substantially from 15% in 1996/97, it was not a significant change from 27% in 2000/01.

Chart 1
Percentage vaccinated for influenza in past year, by age group and presence of chronic condition(s),† household population aged 12 or older, Canada excluding territories, 1996/97, 2000/01 and 2003



Data sources: *1996/97 National Population Health Survey; 2000/01 Canadian Community Health Survey, cycle 1.1, fourth quarter; 2003 Canadian Community Health Survey, cycle 2.1*

† Asthma, chronic bronchitis/emphysema, diabetes, heart disease, cancer, effects of stroke

‡ Significantly different from estimate for 2000/01 ($p < 0.05$)

** Significantly different from estimate for 1996/97 ($p < 0.05$)*

Rises with age

As might be expected, the percentage of people who get flu shots tends to rise with age. In 2003, the lowest proportion was 13% at ages 20 to 34, somewhat below that for 12- to 19-year-olds (17%) (data not shown). At ages 65 to 79, two-thirds of people reported having had a flu shot, and at age 80 or older, three-quarters.

Overall, women were more likely than men to have been immunized: 30% versus 25% (Chart 2). As well, higher percentages of women than men in the age groups from 20 to 64 had been vaccinated. However, at age 80 or older, the

Data sources

The 2000/01 and 2003 estimates for influenza immunization are based on data from Statistics Canada's Canadian Community Health Survey (CCHS), a general health survey that covers the population aged 12 or older living in private households. It does not include residents of Indian reserves, Canadian Forces bases, and some remote areas.

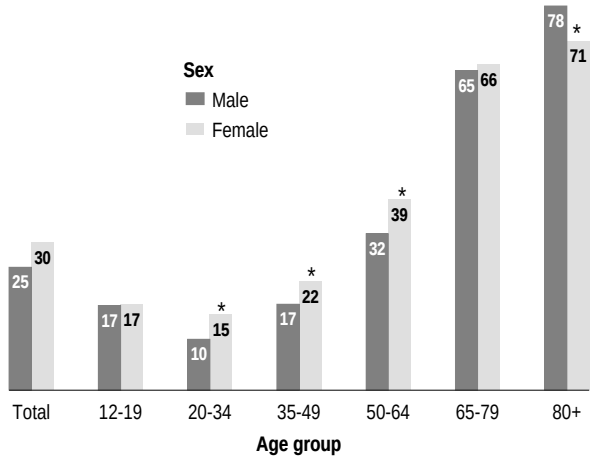
Data collection for cycle 1.1 (2000/01) began in September 2000 and continued over 14 months. The responding sample for cycle 1.1 was 131,535, yielding a response rate of 84.7%. This analysis uses data from the fourth quarter of cycle 1.1 (June to August 2001), in which all respondents were asked about influenza vaccination. The sample consisted of 35,084 respondents aged 12 or older (weighted to represent approximately 25.8 million individuals) who replied to questions about flu shots.

Cycle 2.1 of the CCHS was conducted from January through December 2003. The overall response rate was 80.6%; the total sample size was 131,244 respondents aged 12 or older (weighted to represent 26.6 million individuals) who replied to questions about flu shots. Detailed descriptions of the CCHS design, sample and interview procedures are available in a published report.[5]

The 1996/97 data on flu shots are from the biennial National Population Health Survey (NPHS). Like the CCHS, it covers household and institutional residents in all provinces and territories, except residents of Indian reserves, Canadian Forces bases, and some remote areas. The NPHS has cross-sectional and longitudinal components. This analysis uses cross-sectional data for 70,574 respondents aged 12 or older in 1996/97 (weighted to represent approximately 21.3 million individuals) who replied to questions about flu shots. More detailed descriptions of the NPHS design, sample and interview procedures can be found in published reports.[6,7]

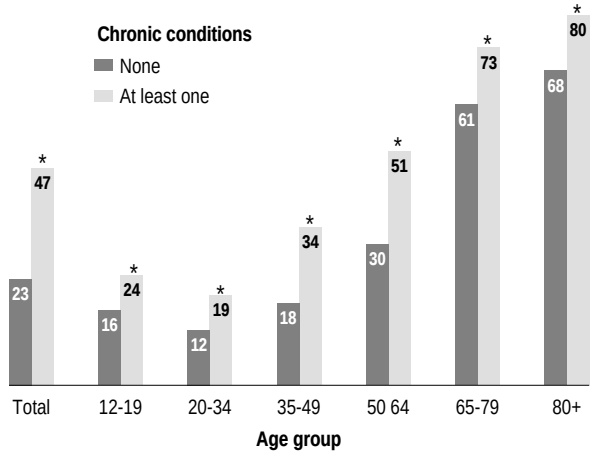
Cross-tabulations were used to estimate national and provincial/territorial percentages of people vaccinated for influenza in the previous year, by age, sex and chronic condition status. Standard errors and coefficients of variation were estimated with the bootstrap technique to account for survey design effects.[8,9] The significance level was set at $p < 0.05$.

Chart 2
Percentage vaccinated for influenza in past year, by age group and sex, household population aged 12 or older, Canada, 2003



Data source: 2003 Canadian Community Health Survey, cycle 2.1
** Significantly different from estimate for male (p < 0.05)*

Chart 3
Percentage vaccinated for influenza in past year, by age group and presence of chronic condition(s),† household population aged 12 or older, Canada, 2003



Data source: 2003 Canadian Community Health Survey, cycle 2.1
† Asthma, chronic bronchitis/emphysema, diabetes, heart disease, cancer, effects of stroke
** Significantly different from estimate for those without chronic conditions (p < 0.05)*

likelihood for men exceeded that for women: 78% versus 71%.

Added incentive?

In 2003, close to half (47%) of people with at least one selected chronic condition (asthma, chronic bronchitis/emphysema, diabetes, heart disease, cancer, effects of stroke) reported having had a flu shot, about double the figure for those without such conditions (23%). This difference prevailed in all age groups. For instance, 24% of teenagers with chronic conditions had been vaccinated, compared with 16% who did not have a chronic condition. Among seniors aged 80 or older, the comparable percentages were 80% and 68% (Chart 3).

While seniors with a chronic condition had the highest likelihood of vaccination, the only high-risk group with a significant increase between 2000/01 and 2003 was 20- to 64-year-olds with chronic conditions. In 2003, 38% of them reported having had a flu shot, up from 34% in 2000/01 (Chart 1).

By contrast, the percentages of teenagers and seniors, with and without chronic conditions, who had had a flu shot were stable between 2000/01 and 2003.

Provincial trends

Most provinces and territories have offered publicly funded influenza immunization to seniors and people with chronic conditions since at least the mid-1990s.[10,11] By 2003, only Prince Edward Island did not cover these groups, although the province provided free vaccinations to health care workers and residents of acute and long-term care facilities. Since 2000, Ontario has made flu shots available to all provincial residents at no charge. As well, Yukon provides coverage for residents aged 18 or older.

To some extent, provincial variations in the proportion of people receiving a flu shot in 2003 reflected public funding of immunization. At 35%, Ontario's proportion was significantly above the national figure (Table 1). However, the proportion

Table 1

Percentage vaccinated for influenza in past year, by age, presence of chronic condition(s)† and province/territory, household population aged 12 or older, Canada, 1996/97, 2000/01 and 2003

	Total population aged 12 or older			Age 12 or older with at least one chronic condition			Age 65 or older		
	1996/97	2000/01	2003	1996/97	2000/01	2003	1996/97	2000/01	2003
		%			%			%	
Canada (excluding territories)	**15**	**27‡**	**28§**	**31**	**45‡**	**47§**	**51**	**67‡**	**67**
Newfoundland	11*	11*	16§*	31	25*	34§*	47	49*	50*
Prince Edward Island	16	21‡*	23*	36	44	38*	56	65	63
Nova Scotia	19*	23‡*	31§*	43*	45	54§*	60*	71‡	74*
New Brunswick	15	19‡*	22§*	31	41‡	39*	48	62‡*	57*
Québec	8*	18‡*	20§*	17*	33‡*	41§*	34*	59‡*	59*
Ontario	18*	36‡*	35*	38*	56‡*	55*	60*	72‡*	74*
Manitoba	14	22‡*	20*	33	43‡	40*	52	62‡	60*
Saskatchewan	13	19‡*	24§*	27	38‡*	43*	53	63‡	63*
Alberta	15	23‡*	23*	33	37*	37*	59*	69‡	64§*
British Columbia	17*	26‡	27	35	46‡	49	52	68‡	69
Yukon	..	26	21*	..	39	30*	..	66	50*
Northwest Territories	..	25	24*	..	36E	41	..	56E	64
Nunavut	..	24	25	..	46	43E	..	53*	74§

Data sources: *1996/97 National Population Health Survey; 2000/01 Canadian Community Health Survey, cycle 1.1, fourth quarter; 2003 Canadian Community Health Survey, cycle 2.1*

† Asthma, chronic bronchitis/emphysema, diabetes, heart disease, cancer, effects of stroke

‡ Significantly different from estimate for 19956/97 ($p < 0.05$)

§ Significantly different from estimate for 2000/01 ($p < 0.05$)

** Significantly different from estimate for Canada (excludes territories for 1996/97) ($p < 0.05$)*

E Coefficient of variation 16.6% to 33.3% (interpret with caution)

.. Not available

in Nova Scotia was almost as high (31%) and had risen substantially since 2000/01 (from 23%). While percentages were below the national figure in most other provinces and territories, several had seen a significant rise since 2000/01: Newfoundland, Nova Scotia, New Brunswick, Québec and Saskatchewan.

In 2003, two-thirds of seniors reported having had a flu shot the previous year—almost unchanged from 2000/01, but up substantially from 51% in 1996/97. The highest percentages were in Ontario and Nova Scotia, where three-quarters of seniors had been vaccinated; at 50%, Newfoundland and Yukon had the lowest percentage. Proportions were also significantly below the Canadian average in New Brunswick, Québec, Manitoba, Saskatchewan, and Alberta. And in Alberta, the 2003 figure was 64%, a significant drop from 69% in 2000/01.

The proportion of people with chronic conditions who had had a flu shot was significantly above the national figure (47%) in Ontario (55%) and Nova Scotia (54%). Percentages were low in Newfoundland, Prince Edward Island, New Brunswick, Québec, Manitoba, Saskatchewan, Alberta and Yukon. Since 2000/01, immunization rates for this target group had increased significantly in Newfoundland, Nova Scotia and Québec.

Of course, seniors with chronic conditions are the group most vulnerable to the effects of influenza. And not surprisingly, this group was the most likely to be immunized. Overall, 75% reported that they had had a flu shot in the previous year (Table 2). The proportion ranged from 56% in Newfoundland to at least 80% in Ontario and Nova Scotia.

Table 2

Percentage vaccinated for influenza in past year, by age, presence of chronic condition(s) and province/territory, household population aged 12 or older, Canada, 2003

	Ages 12-19		Ages 20-64		Age 65+	
	Without chronic condition(s)	With chronic condition(s)	Without chronic condition(s)	With chronic condition(s)	Without chronic condition(s)	With chronic condition(s)
	%		%		%	
Canada	**16**	**24**	**19**	**38**	**62**	**75**
Newfoundland	7‡*E	12‡*E	8‡*	29‡*	45‡*	56‡*
Prince Edward Island	7‡*E	F	16‡	26‡*	58‡	70‡
Nova Scotia	14‡E	27E	20‡	46*	68*	82*
New Brunswick	11‡*E	30E	15‡*	28‡*	50‡*	66‡*
Québec	5‡*	12‡*E	12‡*	31‡*	53‡*	68‡*
Ontario	27*	34*	26*	46*	70*	80*
Manitoba	9‡*	10‡*E	10‡*	28‡*	53‡*	74‡
Saskatchewan	8‡*E	20‡E	14‡*	31‡*	59‡	70‡*
Alberta	14‡	19‡	17‡*	29‡*	61‡	70‡*
British Columbia	11*	18‡E	19‡	37‡	63‡	77‡
Yukon	F	F	19‡	30‡	48‡E	53‡E
Northwest Territories	28E	F	17‡	35‡	59	70
Nunavut	F	F	25*	36E	69E	F

Data source: 2003 Canadian Community Health Survey, cycle 2.1
† Asthma, chronic bronchitis/emphysema, diabetes, heart disease, cancer, effects of stroke
‡ Significantly different from estimate for Ontario (p < 0.05)
** Significantly different from estimate for Canada (p < 0.05)*
E Coefficient of variation 16.6% to 33.3% (interpret with caution)
F Coefficient of variation greater than 33.3% (suppressed because of extreme sampling variability)

Ontario and Nova Scotia

Although most provinces offer free influenza vaccination to high-risk groups, only in Nova Scotia did figures for those groups match Ontario, where coverage is universal (see "The effect of universal influenza immunization on vaccination rates in Ontario" in this issue). In 2003, 80% of Ontario seniors with chronic conditions and 82% in Nova Scotia reported that they had had a flu shot in the previous year (Table 2). The percentages were lower for seniors without chronic conditions, but not significantly different: 70% in Ontario and 68% in Nova Scotia.

In both provinces, 46% of 20- to 64-year-olds with chronic conditions had been vaccinated for influenza. However, among people in this age range who did not have a chronic condition, the percentage in Ontario (26%) was significantly above that in Nova Scotia (20%). As well, the proportion of 12- to 19-year-olds without a chronic condition who had a flu shot tended to be higher in Ontario.

Table 3

Reasons for not being vaccinated for influenza in past year, household population aged 65 or older, Canada excluding territories, 1996/97, 2000/01 and 2003

	1996/97	2000/01	2003
Seniors not vaccinated ('000)	1,567	1,146	1,150
Reason (%)			
Unnecessary	71	64*	66
Did not get around it	12	13	11†
Previous bad reaction	9	9	13†
Doctor said unnecessary	6	6	6
Fear	3	3E	6†
Not available	2E	F	1
Other	2E	7*	1†

Data sources: 1996/97 National Population Health Survey; 2000/01 Canadian Community Health Survey, cycle 1.1, fourth quarter; 2003 Canadian Community Health Survey, cycle 2.1
Note: Because more than one answer was accepted, totals add to more than 100%.
† Significantly different from estimate for 2000/01 (p < 0.05)
** Significantly different from estimate for 1996/97 (p < 0.05)*
E Coefficient of variation 16.6% to 33.3% (interpret with caution)

The questions

Respondents to the 1996/97 National Population Health Survey and the 2000/01 (cycle 1.1) and 2003 (cycle 2.1) Canadian Community Health Survey were asked: "Have you ever had a *flu shot*?" If they replied affirmatively, they were asked when they had had their last shot: less than one year ago; one year to less than two years; and two years or more. Respondents aged 65 or older who indicated that they had not been vaccinated in the past year were asked why not. Proxy responses were not accepted for these questions.

The presence of *chronic conditions* was determined by asking respondents if they had any "long-term conditions that had lasted or were expected to last six months or more and that had been diagnosed by a health professional." A list of conditions was read to respondents. Those who reported asthma, chronic bronchitis/emphysema, diabetes, heart disease, cancer, or effects of a stroke were considered to have a condition for which influenza vaccination was recommended.

Six *age groups* were considered: 12 to 19, 20 to 34, 35 to 49, 50 to 64, 65 to 79, and 80 or older.

Health care workers were defined based on the North American Industry Classification System (NAICS)'97-(C): Ambulatory Health Care Services (code 621), Hospitals (622), and Nursing and Residential Care Facilities (623).[12]

Not necessary

About a third of seniors reported in 2003 that they had not had a flu shot the previous year. Their most common reason for not being immunized was that they thought it was unnecessary (66%) (Table 3). Despite widespread publicity about the importance of annual vaccination, there was no significant increase over 2000/01.

Relatively few seniors cited "a previous bad reaction" (13%) or "did not get around to it" (11%) as their reason for not being vaccinated in 2003. About 6% reported "fear of immunization."

Fewer than half of health care workers

Since flu shots have been available, health care workers have been targeted for immunization. In 2003, 46% of people in health care industries (ambulatory health care services, hospitals, and

Table 4

Percentage of health care workers vaccinated for influenza in past year, by age, province/territory and sex, household population aged 20 or older, Canada, 2003

	Total	Men	Women
Health care workers ('000)	1,283	256	1,027
Vaccination rate (%)	**46**	**45**	**46**
Age group			
20-34	34*	33	42*
35-49	47	48	41
50-64	55*	56*	54*
65+	61*	57*E	72
Province/Territory			
Newfoundland	32*	53†E	24*E
Prince Edward Island	50	79E	46
Nova Scotia	54	54E	54
New Brunswick	35*	F	38
Québec	33*	35*	33*
Ontario	56	56*	56*
Manitoba	31*	23*E	33*
Saskatchewan	40	25†*E	44
Alberta	41	43E	41
British Columbia	50	54	49
Yukon	F	F	F
Northwest Territories	40E	53E	35E
Nunavut	45E	F	44E

Data source: 2003 Canadian Community Health Survey, cycle 2.1
† Significantly different from estimate for women (p < 0.05)
** Significantly different from estimate for Canada (excluding territories) (p < 0.05)*
E Coefficient of variation 16.6% to 33.3% (interpret with caution)
F Coefficient of variation greater than 33.3% (suppressed because of extreme sampling variability)

nursing and residential care facilities) reported having had a flu shot in the past year (Table 4). Among the provinces, the proportions of health care workers who had been vaccinated ranged from a high of 56% in Ontario to a low of 31% in Manitoba. Newfoundland, New Brunswick and Québec also had percentages below the national figure.

Limitations

The data in this analysis pertain to the household population; excluding residents of long-term health care facilities may bias the results, especially for seniors. And even for the household population, those who participated in the surveys may have been healthier and more likely than non-respondents to engage in health-promoting behaviour such as getting flu shots.

The data were self-reported; no independent source was available to verify if respondents who said that they had received a flu shot had actually done so. Nor is it known if people who reported having received a professional diagnosis of a chronic condition actually did have the condition.

The *Canadian Immunization Guide* recommends annual vaccination for people with medical conditions that place them at high risk of flu-related complications.[3] These conditions are: chronic cardiac and pulmonary disorders (including bronchopulmonary dysphasia, cystic fibrosis and asthma), diabetes mellitus, cancer, immunodeficiency, immunosuppression, renal disease, anemia and hemoglobinopathy. Because the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS) did not collect information on all of these conditions, the group identified in this article as having a chronic condition that heightened their susceptibility to influenza complications is a subset of the actual target population.

The 2003 Canadian Community Health Survey (CCHS) data on flu shots pertain to all survey respondents (131,244), whereas the 2000/01 data apply to only the fourth quarter of data collection (35,084), and the 1996/97 National Population Health Sruvey (NPHS) data, to 66,435 respondents. As well, the fourth quarter of the 2000/01 CCHS was conducted during the summer, which may have yielded responses different from those that would have been obtained in the winter.

In the 1996/97 NPHS, residents of Yukon and the Northwest Territories were not asked about influenza immunization.

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