

# Influenza vaccination coverage in the geriatric population of the State of Geneva, Switzerland

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**Background:** In Switzerland, every year the Federal Office of Public Health publishes recommendations for the use of influenza vaccine in people over 65 years, patients of all ages suffering from chronic conditions or immunosuppression, families of the latter and health professionals. However, prior to the present study, there has been no evaluation of the degree to which these recommendations are implemented. The purpose of the survey described in this article was to evaluate flu vaccination coverage of the geriatric population living in the community, to obtain qualitative information on the motivation for receiving vaccination and to understand the network of communication on flu prevention. **Methods:** The study was performed on a random sample of 1,200 residents of the State of Geneva aged 65 years or older. It involved a mail questionnaire and semi-structured telephone interviews on a subsample of respondents. **Results:** The estimated vaccination coverage for 1994 was equal to 35.5% in persons 65 years-old or older. Receiving information from a physician was the major determinant in the decision to be vaccinated. **Misconceptions** about flu were common. **Conclusions:** The results of this study indicate that national recommendations concerning vaccination of elderly people are insufficiently observed in the State of Geneva. It is necessary to reinforce preventive messages that explain why flu vaccination should be performed. These messages should aim at correcting and completing elements of information already present in the at-risk population.

**Key words:** geriatrics, influenza, vaccination coverage

Influenza is a major public health problem. Influenza epidemics are associated with significant increases in morbidity, mortality and health costs, in particular among people over 65 years, patients with chronic disease and subjects with weakened immune defences.<sup>1-9</sup>

Immunization is effective in attenuating disease symptoms, as well as in reducing mortality and complications, such as secondary bacterial infections of the respiratory tract.<sup>10-17</sup> Although annual vaccination of the elderly is recommended and has been found to be cost-effective, the influenza vaccination coverage rates are low or unknown in many industrialized countries.<sup>18</sup>

In the USA, the US Department of Health and Human Services established as a national objective for the year 2000 the attainment of a vaccination coverage against influenza of at least 60% in people over 65 years and in chronically ill patients.<sup>19-21</sup> As a result of a national programme, the influenza vaccination levels among adults over 65 years of age increased substantially, rising

from an estimated 32.9% in 1989<sup>18</sup> to 49.9% in 1993.<sup>22</sup> The results of the Medicare Influenza Vaccination Demonstration Project,<sup>23</sup> which was launched in 1988, is another example of what can be obtained through a structured programme. By 1992, vaccination rates in the 2 million people to which the programme was addressed increased from 26 to 51%. The multiple interventions of this programme include health education through nurses, physician prompts, chart reminders, patient letters and mass-media messages.

To date there is no unified European strategy with respect to influenza prevention. Most European countries have developed national recommendations on influenza vaccination but few have national objectives and even fewer have designed programmes to achieve these objectives.

In England, only an estimated 10-40% of high-risk patients are vaccinated annually. In contrast, coverage with flu vaccination is high in France and Spain where yearly national campaigns are organized to promote flu prevention and influenza vaccination is reimbursed by the social security for all elderly and high-risk people. In France, vaccination coverage with flu vaccination increased between 1979 and 1991 from 30 to 74% in people over 70 years and from 7 to 19% in the adult population.<sup>24</sup>

Thus far, the number of doses of flu vaccine sold each year has been the only available information on vaccination practices in Switzerland. After a slow increase from 1984

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to 1992, the number of doses sold in Switzerland reached a low 55 doses per 1,000 population in 1992.<sup>18</sup> Sixty doses per 1,000 inhabitants were sold in 1993 and 65 doses per 1,000 in 1995. For comparison, vaccine distribution in Spain, Italy and France increased from 40–50 doses per 1,000 population in 1984 to 175, 157 and 130 doses respectively in 1992.<sup>18</sup>

Data on the doses of vaccine sold give no indication about the level of protection of the population at risk. A study carried out during winter 1989–1990 in nursing homes of the Swiss canton of Ticino measured the vaccination coverage to be 57% for both men and women in this population.<sup>25</sup> On the basis of the number of doses of vaccine distributed to residents in nursing homes, a similar rate of vaccination is estimated for the canton of Geneva. So far, however, vaccination coverage has never been estimated in the elderly living in the community in Switzerland.

Measures to promote flu prevention have been taken at the federal and cantonal levels. Every year, the Swiss Federal Office of Public Health publishes recommendations for the use of influenza vaccine in people over 65 years, patients of all ages suffering from chronic conditions or immunosuppression, families of the latter and health professionals.<sup>26</sup> For the past 20 years, the Health Department of Geneva State has reimbursed the doses of influenza vaccine for elderly people and staff in geriatric hospitals and in nursing homes. Furthermore, during the autumns of 1993–1996 letters of information on flu vaccination were addressed to physicians, community nurses and other concerned health professionals working in the canton. Other actions followed in 1995 and 1996, including the creation and diffusion of educational material, media messages addressed to the general public and information for health professionals via the Internet. In other words, the present study took place in 1995 in the context of a flu prevention campaign which has developed with increasing intensity in the State of Geneva, starting in 1993. Other Swiss cantons joined in the effort in 1996.

The purpose of our study was to estimate the vaccination coverage of people over 65 years living in the community of the canton of Geneva. Qualitative data was also collected on the motivations for receiving or not receiving vaccination and on the local network of communication on flu prevention.

#### MATERIAL AND METHODS

A random sample of 1,200 residents of the State of Geneva aged 65 years or older was obtained from the Cantonal Population Office. A government decree allowed the transfer of computerized data from the official population register. The sample was stratified by sex and age (groups 65–75 years, 76–85 years, 86 years or older) with equal allocation. Data on age, sex, citizenship, marital status, profession and county was also obtained from the Cantonal Population Office.

In 1995, the population registry of the canton of Geneva showed the total population to be 399,081 people, of

which 54,022 were over 65 years and, of these, 33,517 were women. Before the study, the sample size for each sex and age group was calculated with the *statcalc* module of the *Epiinfo* program for population surveys. A 50% vaccination rate and a 50% response rate were assumed for each group; the worst acceptable error was fixed at  $\pm 10\%$  and the confidence level at 95% (95% CI from 40 to 60%). The real response rate varied for each group and for each question but was always higher than 70% and the vaccination coverage differed from 50%; as a result the measured error in vaccination rate was in fact between 6.2 and 8.4% (confidence intervals are specified for each result in *tables 1, 2 and 3* and in the text).

The choice of the study design (mail survey) was the only realistic option in the Swiss context. Most out-patient care is delivered by free practitioners, who rarely computerize patient files or vaccination records. Furthermore, experience in the canton of Geneva shows that only a small number of motivated practitioners will voluntarily contribute data for a study.

In June 1995, an introduction letter from the State Health Department, individually addressed and signed by two physicians and a short questionnaire were mailed to all subjects. The letter described the relevance and the objectives of the study. It emphasized the importance of a high response rate while informing subjects of their right to refuse to participate in the study. The questionnaire collected data on whether respondents had been vaccinated against flu during autumn 1994, whether they had received vaccination in previous years and whether they intended to receive vaccination in the coming autumn. Other questions assessed knowledge that vaccination was indicated, sources of information on flu prevention and the occurrence of flu-like episodes during the period October 1994 to April 1995. A specific question allowed participants to refuse telephone contact for the qualitative interview.

Non-respondents received a second mailing after two weeks. Follow-up phone calls were attempted after one month if necessary.

A second step involved telephone interviews of those who did not refuse to contribute further to the survey. Semi-structured questions explored the network of information and the motivations to refuse or to accept influenza vaccination. Estimations of the proportions and 95% confidence intervals under stratified random sampling were computed according to Levy and Lemeshow.<sup>27</sup> A ratio estimation procedure was used to compute estimations for subgroups.<sup>27</sup>

Vaccination rates were estimated by age, sex, national origin, marital status, previous history of influenza immunization and intention to receive vaccination. Other variables studied but not described in the present article include professional category, flu-like episodes and neighbourhood of residence.

The protocol was approved by the ethics committee of the Institute of Social and Preventive Medicine of Geneva University Medical Centre.

**RESULTS**

*Mail survey*

Of the 1,200 people in the sample, 1,010 (84%) returned the questionnaire. Five hundred and fifty-one completed it after a second mailing and 223 after a telephone reminder. Of the 190 non-respondents, 106 had moved and could not be located, 20 refused to participate, 17 were travelling outside the canton and 11 had died or were hospitalized.

The reported vaccination coverage of the Geneva population over 65 years for 1994 was 35.5% (table 1). There is a significant increase in this reported vaccination coverage from 1992 to 1994 ( $\chi^2$  test for trend,  $p < 0.01$ ). In 1994, vaccination coverage was higher among males than females (39.9 versus 32.7%,  $p = 0.04$ ). It increased with age for both sexes (table 2). The difference between men and women decreased with age and was no longer significant for age groups 86 years and over. In this latter category, the proportion of immunized subjects was similar to that found in male and female residents of Geneva nursing homes (unpublished data).

Vaccination coverage did not vary with ethnic origin. It was equal to 37.4% among Geneva natives (95% CI: 29.5–43.5), 35.3% (95% CI: 26.0–44.6,  $p = 0.73$ ) among people from other Swiss cantons and 32.8% (95% CI: 10.5–55.1,  $p = 0.70$ ) among foreigners. Vaccination coverage was similar among married subjects (36.8%; 95% CI: 29.7–43.9) and widowed (40.2%; 95% CI: 29.3–51.0,  $p = 0.61$ ), separated or divorced (28.4%; 95% CI: 0.0–67.7,  $p = 0.68$ ), and single persons (27.7%; 95% CI: 0.0–62.4,  $p = 0.62$ ).

The information on indication to flu immunization appeared adequate. Overall, 86.8% of the respondents (95% CI: 83.0–90.6) knew they were members of the target population for the vaccine. Although less often immunized than men, women were more likely to be aware of the recommendation (91.9 versus 86.8%,  $p = 0.04$ ). This difference by sex was observed across all age groups (table 3).

The proportion of subjects intending to receive vaccination in 1995 was equal to 52.4% (95% CI: 48.4–56.4). For all sex and age groups, this proportion was higher than the 1994 immunization rate but much lower than the proportion of subjects aware that vaccination was recommended to them (data not shown). Attitudes towards vaccination were positively related to past immunization, since 97.4% of the individuals vaccinated in 1994 (95% CI: 95.4–99.4) were planning to receive vaccination in 1995.

*Telephone survey*

Four hundred and seventy respondents to the mail questionnaire accepted the telephone survey. Reliable interviews were obtained from 324 (69%) of them.

As compared with respondents to the mail questionnaire who refused the telephone interview, the participants to the phone survey were younger (mean age 77.4 versus 80.5 years,  $p < 0.0001$ ), more likely to be male (56.5 versus 47.6%,  $p = 0.006$ ), more likely to know that vaccination was indicated (93.4 versus 88.0%,  $p = 0.01$ ), and more likely to have been immunized against flu in 1994 (48.7 versus 41.1%,  $p = 0.03$ ).

Because of the low participation rate (27%), the results of the telephone survey were considered as merely qualitative.

Of the 153 subjects who had reported vaccination in 1994 in the mail survey, nine (6%) declared during the phone interview that immunization was not by injection. The drugs received included 'homeopathic vaccination'.

Physicians appeared as the major source of information and motivation on vaccination (table 4). The media was also an important source of information but apparently contributed little to the motivation for vaccination.

Respondents who were not immunized against flu in 1994 ( $n = 161$ ) spontaneously expressed various reasons for having refused vaccination. Many subjects had not sought

**Table 1** Vaccination coverage by year

Year	Vaccination coverage	
	%	(95% CI) <sup>a</sup>
1992	27.5	(24.8–30.2)
1993	29.7	(27.0–32.4)
1994	35.5	(32.2–38.8)

a: These vaccination coverages are calculated for the population of the canton, weighed for each sex and age group in each given year

**Table 2** Vaccination coverage in 1994 by sex and age group

Age group (years)	n (N)	Men vaccinated		Women vaccinated	
		%	(95% CI) <sup>a</sup>	%	(95% CI) <sup>a</sup>
65–75	58 (172)	33.7	(26.7–41.3)	39 (171)	22.8 (16.7–29.8)
76–85	84 (165)	50.9	(43.0–58.8)	61 (147)	41.5 (33.4–49.9)
86–95	87 (148)	58.8	(50.4–66.8)	86 (149)	57.7 (49.7–65.5)

a: The percentages are calculated by dividing the people that gave a positive answer by the total number of people having answered the specific question, for each subgroup by age and sex.

**Table 3** People aware that vaccination is recommended to them by sex and age group

Age group (years)	n (N)	Men		Women	
		%	(95% CI) <sup>a</sup>	%	(95% CI) <sup>a</sup>
65–75	140 (165)	84.9	(78.5–90.0)	152 (168)	90.5 (85.0–94.5)
76–85	149 (162)	92.0	(86.7–95.7)	147 (156)	94.2 (89.3–97.3)
86–95	121 (143)	84.6	(77.6–90.1)	147 (156)	93.0 (87.4–96.4)

a: The percentages are calculated by dividing the people that gave a positive answer by the total number of people having answered the specific question, for each subgroup by age and sex.

vaccination either because they 'rarely had flu' (66.5%), because they 'were in good health' (62.7%), or because they 'did not fear flu' (46.6%). Less often subjects reported that 'immunization was not recommended by their physicians' (21.7%), that they 'feared vaccination side effects' (11.8%), that they had 'a history of negative vaccination effects' (10.6%), or that they 'doubted that the vaccine was effective' (9.3%).

## DISCUSSION

The high response rate to the mail questionnaire confirmed that the design of the study is well adapted to the context of the canton of Geneva. The response rate appears to reflect the respect for official institutions of the elderly population.

National recommendations concerning the vaccination of elderly people are insufficiently implemented in the State of Geneva. The estimation of vaccination coverage for 1994 in persons 65 years-old or older was only 35.5%. Moreover, it is likely that the true vaccination coverage in this population was even lower. Some subjects classified as immunized apparently received homeopathic preparations or other drugs instead of the true vaccine. It is also likely that vaccination was even less common in non-respondents than in respondents. The national situation is probably similar or less favourable, given the influence on the Geneva population of nearby France and an active policy of information of the local health authority since 1993.

The great majority of elderly people are aware that flu vaccination is recommended to them. However, their information is superficial, they have little knowledge of the potential harmful effects of flu and have a series of fears and misconceptions about vaccination. Health professionals other than physicians do not appear to contribute to a relevant extent to the diffusion of information in the target population.

Some improvement in coverage is expected with the introduction of flu vaccination in the list of preventive measures reimbursed by health insurance, as of 1996. It is, however, interesting to note that the vaccination coverage in the older age groups (86 years and over) living in

the community is similar to that of residents of nursing homes who predominantly belong to the same age group. As vaccine was free of cost in nursing homes but not for people living in the community, this would indicate that cost has not been a determinant barrier to vaccination. Note that vaccine supply has not been a limiting factor for vaccination of high-risk groups in the canton of Geneva. Three competing companies commercialize flu vaccine and this is distributed to people living in the community through private channels (pharmacies and physicians in free practice). To our knowledge occasional shortages in supply have never affected all three brands at the same time and have only lasted 2-3 days.

The results of this study indicate that it is necessary to reinforce preventive messages that explain why flu vaccination should be performed. These messages should aim at correcting and completing elements of information already present in the at-risk population. Furthermore, health professionals in close contact with elderly people, in particular nurses, should be prime targets of training activities aimed at increasing their involvement in information campaigns. The relative importance of factors other than information that may limit access to vaccination should be studied and addressed.

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Table 4 Sources of information and of motivation for vaccination (N=314<sup>a</sup>)

Source	Unvaccinated % N=161	Vaccinated % N=153
Physician	26.7	90.2
Pharmacist	3.1	2.0
Nurse	0.6	2.0
Family	11.2	11.1
Friends	32.3	17.6
Media in general	23.6	23.5
Television	9.9	13.1
Radio	14.9	14.4
Newspapers	37.9	32.7

a: Vaccination status was unknown for ten subjects.

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