

# Why do healthy elderly people fail to comply with influenza vaccination?

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## Abstract

**Objective:** to assess motivating factors of healthy elderly people to comply with influenza vaccination.

**Design:** survey of healthy elderly people invited by mail by their general practitioner to come for influenza vaccination. Compliance and the personal characteristics of gender, age and medical insurance were recorded by the general practitioner. A postal questionnaire assessing socio-psychological factors was sent to all non-compliant patients and to a random sample of 30% of the compliant patients.

**Setting:** seven family practices with a total of 26 000 patients in The Netherlands.

**Patients:** 505 healthy elderly people over 65.

**Main outcome measures:** odds ratios (ORs) for non-compliance by personal characteristics and socio-psychological factors, adjusted by multiple logistic regression analysis; decisive reason whether to comply.

**Results:** non-compliance was 16%. Correlations between personal characteristics and non-compliance were low, except for age: those under 75 were less compliant than those over 75. Elderly people endorsing the statement about the vaccine's serious side-effects displayed the highest non-compliance [adjusted OR 216; 95% confidence interval (CI) 16.2 to 2883]; patients judging their own health to be good were also less compliant (adjusted OR 57.9; 95% CI 4.4 to 770). The belief of not being susceptible to influenza was the most frequently mentioned reason for not complying, while the general practitioner's mail cue was the most common reason for complying.

**Conclusions:** in healthy elderly people, fear of the side-effects of influenza vaccination and perceived good health seem to be the main factors leading to non-compliance. Better and more specific information about the paucity of systemic side-effects should accompany the invitations.

**Keywords:** compliance, general practice, influenza, socio-psychological factors, vaccination

## Introduction

The efficacy and cost-effectiveness of vaccinating elderly people living in the community have been demonstrated in the US [1]. Govaert and colleagues concluded that the vaccination of healthy individuals aged 60 and older reduces the chance of influenza by 50% [2], while more than 90% of the mortality arising from influenza occurs in that age group [3]. Glezen and colleagues found there was no specific risk factor in 40% of the elderly patients admitted to hospital for influenza-related disorders [4]. In Europe, 81% of the national policies [5], like those of the US and Canada [6, 7], recommend the vaccination of all elderly people regardless of their health status.

In the US, immunization against influenza may have already attained the goal set by the Public Health Service for the year 2000 (60% of those aged 65 years and over), but not all groups have been reached equally [8]. Up to 1996, in The Netherlands, older age was not in itself regarded as a risk factor for influenza. Consequently,

vaccination rates for high-risk and healthy elderly people in The Netherlands differ markedly: they were 61 and 24% respectively in 1993 [9]. The current advice from the Department of Health in the UK is that only elderly individuals with identified risk factors, such as chronic cardio-pulmonary disease, chronic renal failure, diabetes mellitus, or disease which causes impaired immunity should be offered influenza vaccination. The routine vaccination of healthy elderly people in the UK is not at present advised. However, as it is difficult to identify all the risk factors, the vaccination of every elderly person seems to be appropriate. In the light of the recent studies on cost-effectiveness, the Dutch authorities have recently changed their advice: as from 1996 all people 65 years of age and over have been advised to have an influenza vaccination.

In The Netherlands, general practitioners carry out influenza vaccinations: about half of the practices invite high-risk patients by mail, as recommended in the Dutch College of General Practitioners Guidelines [10]. In

Table 1. Relationship between gender, age and medical insurance, and non-compliance with influenza vaccination for all invited healthy elderly people ( $\geq 65$  years)

Factor	No. of people		Odds ratio (95% confidence interval)		
	All ( <i>n</i> = 505)	Non-compliant ( <i>n</i> = 81)	Crude	Adjusted <sup>a</sup>	<i>P</i>
Gender					
Female <sup>b</sup>	352	60 (17) <sup>c</sup>			
Male	153	21 (14)	0.8 (0.5 to 1.3)	0.7 (0.4 to 1.2)	0.19
Age (years)					
$\geq 75^b$	220	28 (13)			
< 75	285	53 (19)	1.6 (1.0 to 2.6)	1.6 (1.0 to 2.7)	0.06
Insurance <sup>c,d</sup>					
Social <sup>b</sup>	268	36 (13)			
Private	236	45 (19)	1.5 (0.9 to 2.4)	1.6 (1.0 to 2.5)	0.07

<sup>a</sup>Odds ratios (ORs) adjusted for all other factors in the table by means of multiple logistic regression. OR > 1 indicates positive association with non-compliance; OR < 1 indicates negative association.

<sup>b</sup>Reference group.

<sup>c</sup>% of total.

<sup>d</sup>One missing value.

contrast to official policy, some general practitioners also invite their healthy elderly patients to have vaccinations, but to date this has been the exception rather than the rule. Moreover, we do not know the extent to which healthy elderly people comply with such invitations.

The personal characteristics of age, race [8], marital state and income [11] and, more importantly, the epidemiological factors of the nature and number of the risk factors [12, 13] have been shown to correlate with compliance with influenza vaccination in elderly people. Other factors, such as perceptions of one's own health, of the threat of influenza [14], of the vaccine's efficacy and side-effects [15], and a postcard reminder, preferably annually [16], play a dominant role in the compliance decision. As yet, we have no information on the background underlying the non-compliance of healthy elderly people to suggest why we should expect behaviour different from that of patients with risk factors.

The aim of this study was to investigate the personal and socio-psychological factors which are correlated with non-compliance with influenza vaccination by healthy elderly people to determine how take-up of the vaccination programme might be improved.

## Methods

The study was based on seven family practices situated in a suburban area in the middle of The Netherlands where 505 people (2% of the practice population of 26 000 patients) aged 65 years of age or older who had no other risk factors for influenza were offered vaccination. In November 1993, the general practitioners registered gender, age, type of medical insurance and compliance. (In The Netherlands, the type of medical insurance

reflects socio-economic status, as social health insurance is only available to, but also compulsory for, people whose income is below Dfl 60 000.)

We double-checked the noted absence of risk factors in 20% of the medical records. In 3% of these records we found risk factors that the general practitioners had not indicated. For all the healthy elderly people invited, the relationship between personal characteristics and non-compliance was expressed in percentages and odds ratios (with a 95% confidence interval), adjusted for possible confounding and effect modification with logistic regression analysis [17].

In May 1994, we sent a postal questionnaire to all the non-compliant elderly people and to 30% of the compliant group. This random sample was obtained by computerized selection. The questions referred to family characteristics, perception of one's own health and endorsements of statements about the perceived threat of influenza and perceived benefits and costs, all factors being derived from the Health Belief Model [18]. Ratings were on a 5-point scale ranging from 'strongly agree' (1) to 'strongly disagree' (5).

All the variables were dichotomized: age into below and above 75 years, and the 5-point scales between levels 2 and 3. For all responding subjects, the odds ratios for the personal characteristics and socio-psychological factors were adjusted for possible confounding variables and effect modification by logistic regression analysis [17]. Possible interactions between age and gender and other variables, and between the socio-psychological variables, were investigated by adding the appropriate interaction terms to the logistic model (stepwise forward selection, significance testing by the likelihood ratio test) [19]. Finally, we asked patients to record on a list of pre-coded answer categories the main reason that had led them to their compliance decision.

## Compliance of healthy elderly people with influenza vaccination

Table 2. Relationship between personal characteristics and socio-psychological factors and non-compliance with influenza vaccination for responding healthy elderly people ( $\geq 65$  years)

Factor	No. of people <sup>a</sup>		OR <sup>b</sup> (95% CI)		P
	All (n = 181)	Non-compliant (n = 62)	Crude	Adjusted	
<b>Personal characteristics</b>					
<b>Gender</b>					
Female <sup>c</sup>	134	45			
Male	47	17	1.1 (0.6 to 2.2)	0.8 (0.1 to 3.9)	0.75
<b>Age</b>					
$\geq 75^c$	84	22			
< 75	97	40	2.0 (1.1 to 3.7)	2.5 (0.6 to 10.9)	0.23
<b>Insurance</b>					
Social <sup>c</sup>	87	26			
Private	94	36	1.4 (0.8 to 2.7)	1.1 (0.2 to 4.8)	0.93
<b>Living alone</b>					
No <sup>c</sup>	94	30			
Yes	79	30	1.3 (0.7 to 2.4)	1.8 (0.4 to 8.8)	0.47
<b>Perceived health</b>					
Opinion about one's own health					
Not good <sup>c</sup>	82	18			
Good	95	43	2.9 (1.5 to 5.7)	57.9 (4.4 to 770)	0.00
<b>Perceived threat of influenza</b>					
'I am rather susceptible to influenza'					
Agree <sup>c</sup>	49	3			
Disagree	118	51	11.7 (3.4 to 39.7)	4.4 (0.5 to 41.6)	0.20
'Complications of influenza could be dangerous'					
Agree <sup>c</sup>	51	6			
Disagree	107	47	5.9 (2.3 to 14.9)	14.3 (1.5 to 128)	0.02
'I cannot run the risk of catching influenza'					
Agree <sup>c</sup>	61	14			
Disagree	91	38	2.4 (1.2 to 5.0)	0.2 (0.0 to 1.4)	0.11
<b>Perceived benefits and costs</b>					
'Influenza vaccination gives a good protection'					
Agree <sup>c</sup>	102	12			
Disagree	67	39	10.4 (4.8 to 22.6)	6.5 (1.1 to 37.1)	0.03
'Influenza vaccination can make you more sick'					
Disagree <sup>c</sup>	107	10			
Agree	57	39	21.0 (8.9 to 49.6)	216 (16.2 to 2283)	0.00

<sup>a</sup>Totals can be lower because of missing values (in 41 patients).

<sup>b</sup>Crude OR (n = 181); adjusted OR (n = 140) adjusted for all other factors in the table by means of multiple logistic regression. OR > 1 indicates positive association with non-compliance; OR < 1 indicates negative association.

<sup>c</sup>Reference group.

## Results

Of healthy elderly people invited, 424 were vaccinated (84%; Table 1). The correlations between personal characteristics and non-compliance were low. There was a stronger tendency towards non-compliance in those aged less than 75 and in those with private medical insurance.

No questionnaire was sent back marked 'undeliverable'. The random sample of 30% of the compliant patients did not differ from the compliant group in gender, age or type of medical insurance. The rate of response to the questionnaire was 91% among the

compliant group and 77% among the non-compliant (difference 14%; 95% confidence interval 3 to 25%). The rate of response did not differ with gender, age or type of medical insurance.

In the group who responded, being less than 75 years old was associated with non-compliance, although not significantly (Table 2). Elderly patients who endorsed the opinion that 'influenza vaccination can make you more sick' displayed the highest non-compliance. The perception that one's own health was good was also strongly associated with non-compliance. Doubts about possible dangerous complications associated with influenza and about the efficacy of the vaccine also correlated with

non-compliance. No interaction was found in the logistic regression analysis.

Half of the responding non-compliant elderly patients cited the belief of not being susceptible to influenza as their main reason for not complying (data not shown). For 44% of the responding compliant elderly group, the main reason for complying was the letter sent by their general practitioner.

## Discussion

In the seven family practices studied, patients had already been invited by mail for more than two consecutive years, which might have led to the low non-compliance [20]. There was a trend for non-compliance in younger elderly people and among the privately insured (usually those in the higher income bracket of the population). The age factor found here confirms the findings of other research studies [13, 21].

Our study shows clearly that healthy elderly people's misconceptions of the side-effects of vaccination correlate with non-compliance, so that myths about side-effects persist [15, 16]. In reality, only local side-effects are more common in elderly patients given an influenza vaccine compared with those given placebo [22]. Moreover, we found that many elderly people think that their perceived 'good health' renders their vaccination pointless. Usually, perceived health correlates well with the objective medical records [23, 24]. Elderly people's perceptions of enjoying good health corresponded with the feeling of not being susceptible to influenza, the decisive reason most frequently mentioned for non-compliance. Non-compliance was also associated with the endorsement of the opinion that the complications of influenza were not dangerous. General practitioners should give their elderly patients more information about the risks of influenza and the scale of the vaccination's side-effects. The development of intranasal vaccines could potentially improve compliance [25].

In contrast to these findings in the healthy elderly population, perceived health was not found to be a predictor for non-compliance in high-risk patients of all ages [26]. The opinion that influenza complications are not dangerous was only associated with non-compliance in high-risk patients younger than 50 years of age. In that respect, the non-compliance of healthy elderly people seems to run parallel to that of younger high-risk patients. For high-risk patients, the perceived threat of influenza was most frequently mentioned as the decisive reason for compliance, whereas for the healthy elderly group the general practitioner's invitation was most frequently cited. Apart from the dissemination of specific information to those elderly people who have no known risk factors, the invitation itself serves as a stimulus for promoting compliant behaviour in the healthy elderly population.

How valid is our study? Sending the questionnaire about half a year after the invitation might have caused bias, for instance due to the influenza epidemic that year. Although opinions were assessed some time after the vaccinations took place, we confidently suggest a causal relation between beliefs and behaviour, because the patients had been compliant (and non-compliant) for several consecutive years. The response to the questionnaire was somewhat lower in the non-compliant group, but was not related to gender, age or medical insurance. Non-compliant patients might not have responded because they were untraceable or even deceased. However, no questionnaire was sent back marked 'undeliverable'. Finally, because of the small numbers, the odds ratios showed wide 95% confidence intervals. The mutual relationships between the different factors were more important than the exact magnitude of the odds ratio. We therefore consider the results capable of generalization to The Netherlands as a whole but, acknowledging trans-cultural differences, we cannot assert generalization to other countries.

## Conclusions

Fear of side-effects determines non-compliance with influenza vaccination in healthy elderly people, as does positive thinking about one's own health. Information about the absence of systemic side-effects, the efficacy of the vaccine and the danger of the complications associated with influenza should accompany the invitation.

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## Key points

- The efficacy and cost-effectiveness of vaccinating elderly people against influenza have been demonstrated.
  - A mail cue for influenza vaccination by the general practitioner to healthy elderly people leads to a high compliance.
  - The belief of not being susceptible to influenza is the most frequently mentioned decisive reason for not complying.
  - Perceived good health is a major factor for non-compliance for influenza vaccination.
  - Specific information about the absence of systemic side-effects of influenza vaccination, the efficacy of the vaccine and the danger of complications should accompany the invitation.
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