

Pneumococcal vaccination coverage in elderly people in Belgium

by

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Abstract

Background: *The 23-valent pneumococcal vaccine was officially introduced on the Belgian market in 1995. In Belgium national vaccination guidelines (from the Belgian Superior Health Council) include the total elderly population.*

Aim & Methods: *The aim of the study was to estimate the pneumococcal vaccination coverage between 1993 and 2004 among elderly aged 60 and over in Belgium and its regions by means of the sentinel surveillance network of general practitioners.*

Results: *Since the official introduction of the vaccine, vaccination rates showed two peak moments (1997 and 2002-2003) and were consistently higher in the southern part of the country. The national vaccination coverage among the elderly population steadily increased up to 29% in 2004.*

Conclusion: *Less than one third of the eligible elderly people were vaccinated with the pneumococcal vaccine. As a result of differences in regional vaccination policies, more elderly people from the southern,*

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French-speaking part of the country were vaccinated than from the northern, Dutch-speaking part. The overall vaccination coverage among elderly in Belgium was lower compared to countries that have similar vaccination guidelines.

Keywords: 23-valent pneumococcal capsular polysaccharide vaccine, Belgium, family physicians, *Streptococcus pneumoniae*, vaccination

Introduction

The annual occurrence of invasive pneumococcal infections in people aged over 65 in North-West Europe, the United States and Canada is estimated at 50 cases per 100,000 people (1). In 7-35% of the cases, these infections have a fatal outcome (2). In Belgium, the number of invasive pneumococcal infections in people over the age of 65 is estimated at 1000 to 1200 cases annually (3).

Since no registered pneumococcal vaccination was available in Belgium between 1988 and 1995, the vaccine was sometimes ordered abroad during this period and administered to a restricted group of people with critical indications. In 1995, the (nonconjugate) 23-valent pneumococcal vaccine appeared on the Belgian market (4). Initially, there were two identical vaccines on the Belgian market: Pneumune® and Pneumovax 23®. Currently, only one vaccine is available: Pneumo 23® produced by Aventis Pasteur MSD (Belgian Centre for Pharmacotherapeutic Information, personal communication, 3 September 2002).

The analysis of the *S. pneumoniae* isolates during the period 1994-2000 indicated that 95% of invasive pneumococcal infections in the elderly in Belgium are caused by serogroups and serotypes processed in the 23-valent vaccine. Of all the invasive *S. pneumoniae* isolates in the elderly (minimum 60 years old) that the reference laboratory received in the period 1994-2000, 92% were bacteraemic isolates. The number of bacteraemic *S. pneumoniae* isolates in the elderly increased from 296 in 1994 to 523 in 1996, decreased subsequently to 459 isolates in 1998 and rose again to 514 isolates in 2000 (5).

According to the scientific literature, revaccination of the elderly is advised every 3 to 5 years (6-9). As early as 1993, the Belgian Superior Health Council drew up recommendations with indications for the vaccine. These recommendations are regularly tested in accordance with the current status of scientific knowledge. From 1993 to 2002, apart from risk groups, such as people with a weakened immune system and people older than 45 suffering from specific serious chronic disorders

(chronic broncho-pulmonary disorders, chronic cardiovascular disorders, diabetes mellitus, alcoholism and cirrhosis of the liver), these recommendations also apply to healthy people over the age of 60. The Belgian Superior Health Council advised that the vaccination be repeated every 5 to 7 years in healthy people over 60 (3,10). In 2002 recommendations were changed and included vaccination of all healthy persons over 60 and only one revaccination at least 5 years after the first administration in people older than 65.

The aim of the study was to estimate pneumococcal vaccination coverage between 1993 and 2004 among elderly aged 60 and over in Belgium and its regions. As within the Belgian healthcare system, the vast majority of pneumococcal vaccines is administered by the general practitioner and especially for people aged ≥ 60 years, the sentinel network of general practitioners, a surveillance network of 150 GPs who register weekly the occurrence of a limited number of health topics, was considered an appropriate tool to estimate this coverage.

This article compares vaccination rates in the northern, Dutch-speaking part of the country (Flanders) with rates in the southern, French-speaking part (Wallonia). The reason for this approach is that vaccination policy is no federal competence, but a competence of the community governments. The scientific association of French-speaking GPs subscribes fully to the recommendations of the Belgian Superior Health Council. On the other hand, its counterpart, the scientific association of Dutch-speaking GPs, questions the effectiveness of the vaccine and does accept a weakened immune system and the presence of chronic pathology in people aged 45 and over as indications for vaccination, but does not recommend administering the vaccine to healthy elderly (11-13). This difference in viewpoint may have an influence on the vaccination rates in the different regions.

Material and methods

Data collection

The sentinel surveillance network of general practitioners exists since 1979 and is very stable in terms of turnover rates. From 1993 to 2004, the network's GPs were representative of the Belgian but also of the Flemish and Walloon GPs separately with regard to age, gender and geographic distribution. The number of GPs in Brussels (the third region of the country) was too limited to draw meaningful conclusions on pneumococcal vaccinations.

The participating GPs complete weekly paper forms including questions on all conditions under surveillance (7-8 per year). For every vaccine administered, the GP noted the agegroup (10-year bands) of the patient and the date of administration. The data were collected from 1993 up to and including 2004.

Population

In the period 1993-2004, 72 to 99 Flemish general practitioners and 41 to 67 Walloon general practitioners took part in the registration for one year. Since no patient lists exist in Belgium, the population surveyed per district (P_i) is estimated by dividing the total number of patient contacts with the sentinel GPs (C_{SGPi}) within a district by the average number of contacts per inhabitant (C_{GPI}/N_i) within the same district. The total population surveyed P is then estimated using the following formula:

$$P = \sum_{i=1}^{43} P_i = \sum_{i=1}^{43} \frac{C_{SGPi}}{C_{GPI}/N_i}$$

This way, the sentinel network of general practitioners reached 1.5% to 1.8% of the total Flemish population and 1.1% to 1.7% of the total

TABLE 1
Network size of sentinel network of general practitioners
in Flanders and Wallonia, 1993-2004

Year	Flanders			Wallonia		
	Number of sentinel practices	% of total population covered by sentinel practices	Population surveyed aged 60 and over	Number of sentinel practices	% of total population covered by sentinel practices	Population surveyed aged 60 and over
1993	76	1.7	20,485	41	1.1	8,119
1994	81	1.7	20,595	50	1.2	8,564
1995	86	1.9	22,662	57	1.4	9,670
1996	76	1.6	20,217	49	1.1	7,984
1997	78	1.6	20,298	46	1.1	7,997
1998	72	1.5	19,533	45	1.1	8,485
1999	74	1.5	19,393	49	1.2	8,657
2000	77	1.5	19,915	63	1.6	11,253
2001	81	1.5	20,216	66	1.6	11,826
2002	79	1.6	20,659	61	1.6	11,438
2003	86	1.7	22,705	66	1.7	12,103
2004	99	1.8	24,986	67	1.7	12,237

Walloon population (Table 1). In this period, the Flemish sentinel population aged 60 and older varied between 19,393 and 24,986 people, and the Walloon sentinel population aged 60 and older varied between 7,984 and 12,237 people.

In the text below the term elderly refers to people aged 60 and over. People aged between 60 and 69 are called 'younger elderly' and people aged 70 and over are called 'older elderly'.

Analysis

The age distribution for administering the vaccine was calculated by dividing the number of doses administered in a specific age group by the total number of doses administered. The timing of the vaccinations was calculated in an analogue way by dividing the number of doses administered in a specific week by the total number of doses administered in that year.

The number of doses administered annually (per 10,000 members of the elderly population surveyed) was age-standardised by means of direct standardisation using the European population as reference population. Subsequently, the vaccination figures for the two regions were compared to each other by means of a variance test for standardised fractions (14).

A minimum vaccination coverage was estimated by dividing the number of doses administered over a period of 5 years by the population surveyed in this period. Again, the vaccination rate of the two regions was compared by means of the variance test for standardised fractions (14).

Results

Age of vaccinated subjects

From 1996 on, 90% of pneumococcal vaccinations supplied were administered to elderly people. This was the case in both Flanders and Wallonia (Figure 1).

Number of vaccines administered

Since 1995, the year when the vaccine became available in Belgium, two peak moments could be observed in the number of pneumococcal vaccines administered to the elderly: the first in 1997 in both regions and the second in 2002 in Flanders and in 2003 in Wallonia. Except for 2001 and 2002, each year significantly ($p < 0.001$) more vaccines were administered in Wallonia (Figure 2).

FIGURE 1
Age distribution of patients vaccinated with pneumococcal vaccine,
Flanders and Wallonia, 1993-2004, sentinel network of general practitioners

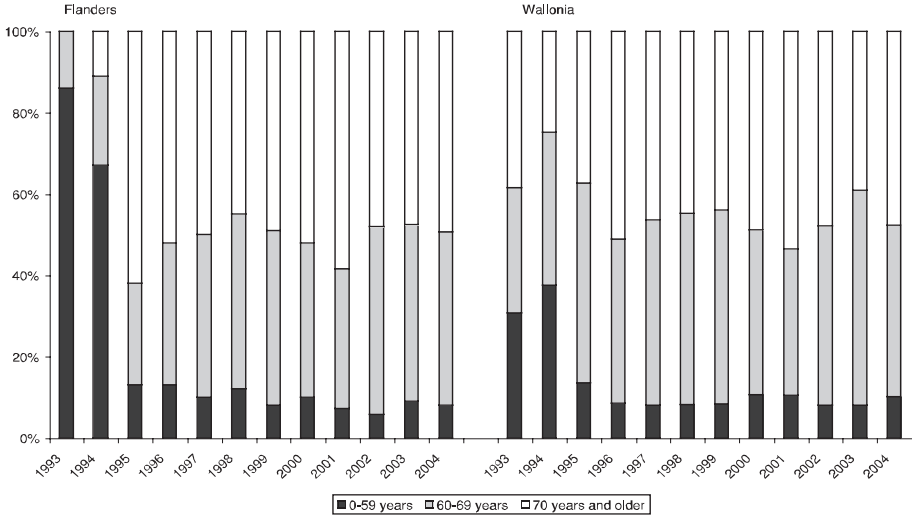
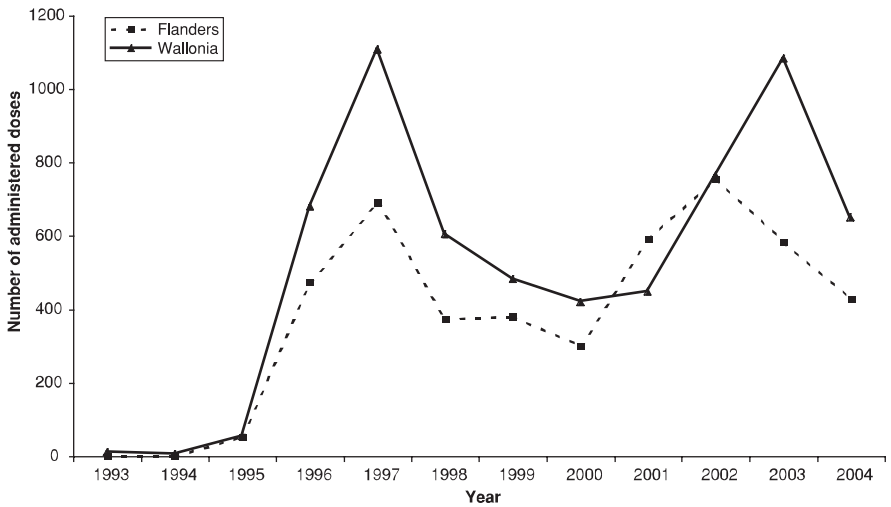


FIGURE 2
The annual number of pneumococcal vaccinations administered per 10,000
elderly, standardised for age, Flanders and Wallonia, 1993-2004,
sentinel network of general practitioners



Timing of vaccinations

From 1996, elderly were mainly vaccinated in the months of September, October and November, in both Flanders and Wallonia. This fraction is noticeably higher in Wallonia than in Flanders, except for 2001 (table 2). In other words, in Flanders, relatively more people were vaccinated outside the September-November timeframe. From 2002 on, there was a noticeable decline of vaccination in this time-period in both regions.

TABLE 2
Pneumococcal vaccinations for elderly from September-November,
Flanders and Wallonia, 1995-2004

Vaccination in September-November	Flanders (%)	Wallonia (%)
1995	43	43
1996	56	81
1997	75	84
1998	74	86
1999	75	85
2000	64	85
2001	86	86
2002	67	71
2003	60	69
2004	56	71

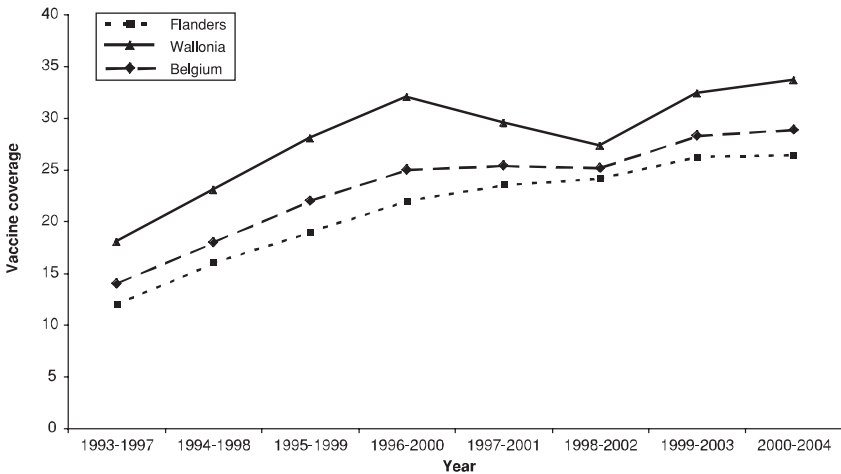
Minimum vaccination coverage after five years

Assuming that people are revaccinated every five years at the most, it can be calculated how many elderly were administered the vaccine in a five year period (= the vaccination coverage). This vaccination coverage is a "minimum" vaccination coverage, given that it only concerns vaccinations administered by a GP. Elderly who were vaccinated by a doctor other than their GP were not included. Consequently, the actual vaccination coverage for the pneumococcal vaccine is probably slightly higher.

The most recent figures indicate that at the end of 2004, 29% of the Belgian elderly, namely 26% of Flemish elderly and 34% of the Walloon elderly were vaccinated against pneumococci by their GP. The vaccination coverage, standardised for age, was always slightly higher in Wallonia than in Flanders and this difference was each time statistically significant ($p < 0.001$). As expected for a relatively new vaccine, the vaccination coverage initially grew each year, up until 2002. Due to a greater

decline in the vaccination rate in Wallonia in 1997-2000 and the strong increase in the vaccination rate in Flanders in 2000-2002, the vaccination coverage in Flanders continued to rise and the vaccination coverage in Wallonia decreased until 2002. From 2002 on, coverage increased in both regions, but at a faster pace in Wallonia (Figure 3).

FIGURE 3
Pneumococcal vaccination coverage by region



Discussion

Principal findings

At the end of 2004, 29% of Belgian elderly were vaccinated against pneumococci by their GP. Due to consistently higher vaccination rates in Wallonia, the resulting coverage was considerably higher in Wallonia (32% in 2004) than in Flanders (26% in 2004).

Strengths and weaknesses of the study

These data are the only recent national and regional data on pneumococcal vaccination and hence the only indicator of pneumococcal vaccination practice in Belgium.

There are some major drawbacks however. The estimation of the coverage relies on the assumption that patients are vaccinated once every 5 years. Since registration is completely anonymous, patients cannot be identified and therefore this assumption cannot be checked. Moreover, guidelines from the Belgian Superior Health Council in Belgium

have changed and from 2002 on, only one revaccination at least 5 years after the first administration in people older than 65 is recommended. As a result, the method used here to estimate the coverage will almost inevitably yield an underestimation in the future and will therefore not be applicable anymore.

Also, only vaccines administered by the general practitioner are taken into account. Though the vast majority of vaccines is administered by the general practitioner in Belgium, the registration underestimates the real number of vaccinations. The size of the underestimation is not known.

The fact that a GP participates in the sentinel network may form a bias in itself, since the participation may reflect an above-average level of motivation and scientific interest, which can influence individual vaccination practice. However, the same would apply for vaccination against influenza but since influenza vaccination rates from the sentinel network of GPs and from the national health interview survey are highly comparable, it is assumed that such a possible bias is minimal for pneumococcal vaccination as well.

Comparison with other studies

After an initial raise in the number of administered doses from 1995 until 1997, vaccination rates decreased in the following years, after which they increased again to reach a second peak in 2002-2003. This undulating trend is in line with the expectations for a new vaccine that only needs to be administered every five years.

The increase of vaccination rate in the period 1995-1997 is confirmed by the sales figures of the vaccine. In 1995, a total of 20,000 doses were sold in Belgium; 166,000 in 1996, and 211,000 in 1997 (15). However, the minimum vaccination coverage of 14% for elderly in Belgium late 1997 from the sentinel GPs, is lower than the 20% within the total target group of the vaccine, based on these Belgian sales figures (15). meaningful interpretation of this difference is complicated by differences in methodology and target group.

The proportion of the vaccines (87-92% in Flanders and 86-92% in Wallonia) administered to people aged 60 years and over corroborates the results of a large-scale study of 18,236 patients of Belgian GPs that indicated that the vaccine was administered to patients aged 60 and over in 82% of cases (15).

Coverage in Belgium seems low compared to countries with similar recommendations (persons aged ≥ 65 years). In a Canadian survey of

2001, 42% of elderly aged 65 or older stated that they had been vaccinated with the pneumococcal vaccine (16), whereas, in a similar large-scale survey in the US in 1999, 54% of elderly aged 65 or older reported having been vaccinated with pneumococcal vaccine (17). A recent study in Australia revealed a vaccine coverage of 51% among inhabitants aged ≥ 65 years in a jurisdiction with a publicly funded pneumococcal vaccine program (18). The Belgian coverage was more comparable with the 22% coverage found in a study on pneumococcal vaccine use in primary care in Scotland, where pneumococcal vaccination is not recommended for all elderly (19).

Not only differences in age groups and instruments used exclude drawing far-reaching conclusions from this comparison of coverages. Other influencing factors such as guidelines and financial aspects also vary between countries. Currently, there are guidelines for pneumococcal vaccination in almost all western countries, but they differ considerably from country to country. Most countries recommend the vaccine in cases of a weakened immune system and serious chronic disorders, but in only half of these countries are healthy elderly part of the target group (20). Compared with other countries (US, France, Norway, Denmark, the Netherlands, Austria, Iceland and Germany), Belgium was relatively late with setting up national guidelines (1993) and with the registration of the 23-valent vaccine (1995). The reimbursement of vaccination expenses also differs considerably from country to country and the fact that there is no reimbursement of the vaccine in Belgium for elderly might also partly explain the relatively lower coverage than in countries or states with publicly funded pneumococcal vaccines programmes.

Meaning of the study: Regional differences within Belgium

The most striking finding of this study is that the Walloon sentinel GPs vaccinated significantly more elderly against pneumococci than their Flemish colleagues. Also, relatively fewer elderly people were vaccinated outside the recommended period September-November in Wallonia than in Flanders.

This regional difference in compliance with the recommendations of the Belgian Superior Health Council could partly be explained by the different viewpoints adopted by the GPs' regional scientific associations concerning the vaccination of healthy people aged 60 and over.

The media coverage of the vaccination campaigns (not only for pneumococcal vaccine but also for the yearly influenza vaccine) also differed between Wallonia and Flanders. In Wallonia, from 1998 until

2004, annually a television and radio spot was broadcast during the months September, October and November. The scientific association of French-speaking GPs is one of the active promoters of these spots. In Flanders, although there was some media coverage of the pneumococcal vaccine, it was much less consistent and regular and it was not actively supported by the scientific association of Dutch-speaking GPs.

Future research: how to increase pneumococcal vaccination coverage in the elderly?

The regional differences indicate that policy decisions strongly influence vaccination coverage. In general, interventions at three levels can improve vaccination coverage in adults: increasing the community demand for vaccinations, enhancing the access to vaccination services and provider-based interventions addressing missed opportunities to vaccinate (21). Moreover, on the basis of strong evidence of effectiveness, the Task Force on Community Preventive Services (US) recommends the combination of one or more interventions to enhance access to vaccination services (expanded access to healthcare settings or reduced client out-of-pocket costs) with at least one provider- or system-based intervention (standing orders, provider reminder systems, or provider assessment or feedback) and/or at least one intervention to increase client or community demand for vaccination (client reminders or client education) in order to improve pneumococcal vaccination coverage in high-risk adults (22,23).

In Flanders, the discrepancy in recommendations of the Belgian Superior Health Council and the regional scientific association of GPs creates confusion and affects vaccination practice of the Flemish GPs. Making recommendations more similar would hence be a major provider-based intervention. The well-organised media campaigns in Wallonia most probably have an additional positive effect through increasing client demand for vaccination and could serve as an example. Finally, increasing access to vaccination services by means of (partial) public funding of the vaccination will almost certainly lead to higher vaccination coverage in both regions. More detailed analysis of the reasons why elderly people are not vaccinated is needed however to set up a comprehensive intervention strategy for the improvement of pneumococcal vaccination coverage in Belgium.

Conclusion

Although the pneumococcal vaccine is used on a relatively large scale in Belgium, the pneumococcal vaccination practice is still far from

the objective of the Belgian Superior Health Council of vaccinating all persons aged 60 and older. The results of this registration by the sentinel network of general practitioners are in line with similar, but punctual, research carried out among Belgian GPs. The vaccination coverage in our country is also lower compared with countries that have similar vaccination guidelines.

By the end of 2004, 29% of the population aged 60 and over had been administered the pneumococcal vaccine by their GPs during the previous five years.

As a result of differences in regional vaccination policy, comparatively more elderly Walloons were vaccinated until the year 2000 than their Flemish counterparts.

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