

## Short communication

# Pneumococcal vaccination among adult risk patient with axial spondyloarthritis in Switzerland: Data from the survey of the ankylosing spondylitis association of Switzerland (SVMB)

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## ABSTRACT

While in Switzerland, pneumococcal vaccination is recommended for adult patients with axial spondyloarthritis (axSpA) treated with biological drugs, since 2014, little is known about the vaccination status of this specific patient population. This study assessed their vaccination status as part of a larger online survey by the ankylosing spondylitis association of Switzerland (SVMB). Out of 1560 who participated in the survey, 834 (53.5%) were eligible for the analysis. Vaccine coverage was low at 32.5% (271/834). Women and patients who got a flu shot every year were more likely to be covered. Age was negatively associated with being vaccinated. Most (54.2%; 147/271) were vaccinated by their general practitioner. Almost two-thirds of those who had not received the vaccine stated that it had not been offered to them (64.1%; 302/471). In summary, the vaccination coverage is low, but might be increased if the vaccine was offered systematically by general practitioners and specialists.

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## 1. Background

Axial spondyloarthritis (axSpA) is a chronic inflammatory disease, which mainly affects the axial skeleton and causes chronic back pain and skeletal/postural changes [1,2]. Biological therapies have been shown to stimulate or restore the ability of axSpA patients' immune systems and improve work productivity and activity impairment [3]. Patients with axSpA can experience fatigue, sleep problems, and depression, and are also at high risk for invasive pneumococcal disease if they receive immunosuppressive therapy [4]. Pneumococcal-related diseases, including pneumonia, bacteraemia, meningitis and otitis media, are among the most frequent vaccine-preventable infectious conditions and are associated with considerable morbidity and mortality [5,6]. For this reason, the pneumococcal conjugate vaccination is recommended by the Swiss Federal Vaccination Commission (EKIF) for axSpA patients treated with biological drugs, since 2014 [7,8]. Currently, it is unclear how well these recommendations are implemented, as little is known about the vaccination coverage rates (VCRs) of pneumococcal vaccination in adult axSpA patients. International studies

suggest that the pneumococcal VCR remains low in this patient population [9,10,11]. A recent Swiss study examining vaccination records found that only 2.7% of individuals reporting no health pre-disposition were vaccinated, while those with asthma or chronic pulmonary disease, or weak immune system, had higher coverage of 14.8% and 27.1%, respectively [12]. Reasons for not being vaccinated included fear of adverse effects, lack of information and recommendation, and self-perception of good health [11–14].

This study aimed to investigate pneumococcal VCR and its predictors among Swiss axSpA patients treated with biological drugs.

## 2. Method

This study was part of the 2020 online survey of the ankylosing spondylitis association of Switzerland (SVMB). SVMB has about 4300 members. It advises, supports and connects people with axSpA and organizes therapy groups and seminars throughout Switzerland on how to deal with the disease [15]. The association is mainly financed through donations, commercial sponsors and membership fees [16]. The link to the survey was distributed by email to members of the association and also published on the association's website, newsletter and social media sites. The survey was available in French and German, and open to all patients with axSpA residing in Switzerland. Participation was voluntary and not

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reimbursed. The survey received an ethics waiver from Ethikkommission Zürich (EKNZ). Individuals who agreed to participate in the survey were asked 85 close-ended questions about axSpA [17].

### 3. Measures

Pneumococcal VCR was assessed with the question: “Have you received the pneumococcal vaccination since you have been diagnosed with ankylosing spondylitis?” Patients who responded that they had been vaccinated were presented with a follow-up question about who administered the vaccine. Differently, unvaccinated patients were asked to indicate the main reason why they hadn’t been vaccinated. The survey featured detailed inquiries concerning the patient’s disease, past and present therapies, present health status, as well as personal data [18].

### 4. Statistical analysis

Characteristics of the sample were described using counts (percentages) for categorical variables. We used Chi-square tests of independence and Fisher’s exact tests were used for categorical variables in the univariate analyses, and unadjusted and adjusted logistic regression models to investigate whether biological therapy was associated with pneumococcal VCR. The multivariable analysis adjusted for gender (female or male), age category (18–39, 40–49, 50–59, 60 or older), the language of the questionnaire (French or German), yearly flu vaccination (yes or no), presence of Crohn’s disease (yes or no) and psoriatic arthritis (yes or no). All statistical analyses were conducted with Stata/IC version 16.0 (StataCorp LP, College Station, TX).

### 5. Results

Out of the 1560 individuals who answered the invitation and participated in the survey, almost all indicated that they suffer from axSpA (1426/1560; 91.4%). A majority of them (834/1426, 58.5%) stated that they had a biological therapy. The characteristics of these patients are presented in Table 1. The majority were

**Table 1**  
Characteristics of the axSpA patients using biologic drugs (N = 834).

Variable	Frequency	Percent
<i>Responder’s gender</i>		
Male	279	33.4
Female	555	66.6
<i>Responder’s age</i>		
18–40	179	21.5
40–49	234	28.1
50–59	239	28.7
60 and older	182	21.8
<i>Responder’s language</i>		
German	490	58.8
French	344	41.2
<i>Crohn’s disease</i>		
No	759	91.0
Yes	75	9.0
<i>Psoriatic Arthritis</i>		
No	757	90.8
Yes	77	9.2
<i>Yearly flu shot</i>		
No	437	52.4
Yes	397	47.6
<i>Pneumococcal vaccine received</i>		
No	563	67.5
Yes	271	32.5

female (555/834; 66.6%), answered the questionnaire in German (490/834; 58.8%) and didn’t get a flu shot every year (437/834; 52.4%).

### 6. Pneumococcal vaccination coverage

Table 2 shows that 32.5% (271/834) of the patients had received a pneumococcal vaccine. The logistic regressions indicated that patients were more likely to have received the pneumococcal vaccine if they were female (35.7% vs. 26.2%, adjusted odds ratio (aOR) 1.57, 95% confidence interval (CI) 1.10–2.23,  $p < 0.05$ ), got a flu shot every year (49.1% vs. 17.4%, aOR 5.14, 95 %CI 3.70–7.14,  $p < 0.01$ ). Vaccination coverage decreased with age ( $\chi^2$  (3, N = 834) = 11.539,  $p = 0.009$ ). The table shows that higher age was increasingly negatively associated with being vaccinated in the unadjusted and adjusted regression. Patients aged 18–39 had the highest vaccination rate with 41.9% and patients aged 60 or older had the lowest one with 25.8%.

Almost all of the 271 vaccinated patients were either vaccinated by their general practitioner (147/271; 53.1%) or by their treating rheumatologist (94/271; 34.7%, see Fig. 1). A comparison between those who got their flu shoot every year and those who didn’t, revealed that in the latter group a larger share of patients got the shot from their general practitioner (64.4% vs. 50.3%, Fisher’s exact test,  $p = 0.014$ ; see Table S1 in the supplementary files).

### 7. Reasons for not being vaccinated

Fig. 2 shows the main reasons for not getting vaccinated for 471 of the 563 responders (missing responses 92/471; 16.3%). Almost two-thirds of the responders stated that the vaccine had not been offered to them (302/471; 64.1%), followed by other, not specified reasons (61/471; 13.0%), lack of perceived necessity to get vaccinated (29/471; 6.2%). Fear of adverse effects or doubts about the effectiveness of the vaccine was only stated by 5.3% (25/471). A comparison of those who got a flu shot regularly and those who didn’t, showed that the latter group was more likely to state they hadn’t been offered the vaccine (79.4% vs. 54.4%, Fisher’s exact test,  $p < 0.0001$ ; see Table S2 in the supplementary files).

### 8. Discussion

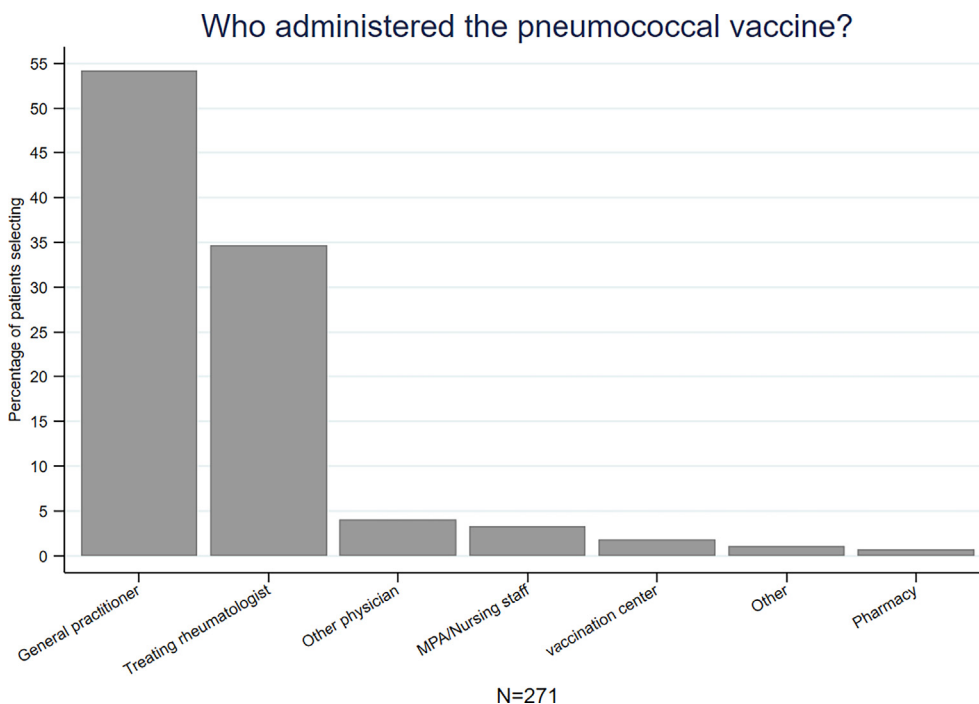
To our knowledge, this is the first study that investigated pneumococcal VCR among axSpA patients being treated with biological drugs in Switzerland. While the vaccine is recommended to this cohort since 2014, the observed pneumococcal VCR in the cohort was low (32.5%). This is consistent with previous studies looking at other patient groups [11,19]. A possible explanation for the low VCR could be that the vaccine is not offered systematically [10,11,12]. This is supported by our observation that a large proportion of patients in our cohort had not been offered the vaccine. Furthermore, as feeling not at risk for pneumococcal disease and fear of adverse effects were not frequently mentioned reasons for not getting vaccinated, future health policies could try to increase general practitioners’ awareness, especially as most patients received the vaccine from their general practitioner.

This study has several limitations. First, the analysis is based on data from the 2020 online SVMB survey, which was only offered in French and German but not Italian, resulting in selection effects. Furthermore, convenience sampling through distributing the link to the survey via social media, emails and the associations’ website and newsletter could have led to biased results due to the under- or over-representation of certain AxSpA patient populations [20]. This can limit the generalisability of the survey results to the population as a whole. The dataset contained 1426 axSpA, while it is

**Table 2**  
Logistic regression on having the pneumococcal vaccine among axSpA patients using biologic drugs (N = 834).

	(%)	Unadjusted models		Adjusted model	
		OR	95% CI	OR	95% CI
<b>Overall</b>	(32.5)				
<i>Gender</i>					
Male	(26.2)	Ref.		Ref.	
Female	(35.7)	1.565	1.138–2.152**	1.565	1.099–2.229*
<i>Age</i>					
18–39	(41.9)	Ref.		Ref.	
40–49	(32.9)	0.680	0.454–1.018	0.641	0.414–0.994*
50–59	(30.1)	0.598	0.399–0.897*	0.523	0.336–0.814**
60 or older	(25.8)	0.483	0.309–0.754**	0.392	0.238–0.644**
<i>Language</i>					
German	(30.4)	Ref.		Ref.	
French	(35.5)	1.258	0.938–1.686	1.063	0.766–1.476
<i>Crohn's disease</i>					
No	(32.0)	Ref.		Ref.	
Yes	(37.3)	1.265	0.773–2.069	1.112	0.651–1.898
<i>Psoriatic Arthritis</i>					
No	(31.8)	Ref.		Ref.	
Yes	(39.0)	1.367	0.843–2.215	1.200	0.710–2.028
<i>Yearly flu shot</i>					
No	(17.4)	Ref.		Ref.	
Yes	(49.1)	4.585	3.343–6.290**	5.140	3.700–7.139**
N		834		834	

\* p < 0.05; \*\* p < 0.01.



**Fig. 1.** Question about administration of vaccine.

estimated that axSpA affects around 1% of the population (around 80,000) [21]. Thus, the survey reached only around 1.8% of the Swiss AxSpA patient population. As little is known about the composition of AxSpA patients in Switzerland, it is not possible to compare the responder characteristics with the overall population. Additionally, due to the distribution of the survey link on the associations' website, newsletter and social media sites, it was not possible to calculate the response rate. This implies a difficult-to-quantify risk of selection effects. However, we would regard an

over-representation of unvaccinated persons, and hence, selection effects causing false low estimates of vaccination rates, as unlikely. Second, we used self-reported measures for pneumococcal vaccination, which may be subject to recall bias. Future research could try to verify the responses with vaccination records. Third, the survey data only allowed us to distinguish between axSpA patients who were treated with biological drugs and those who weren't. The pneumococcal vaccine, however, is also recommended for patients undergoing conventional immunosuppressive therapy.

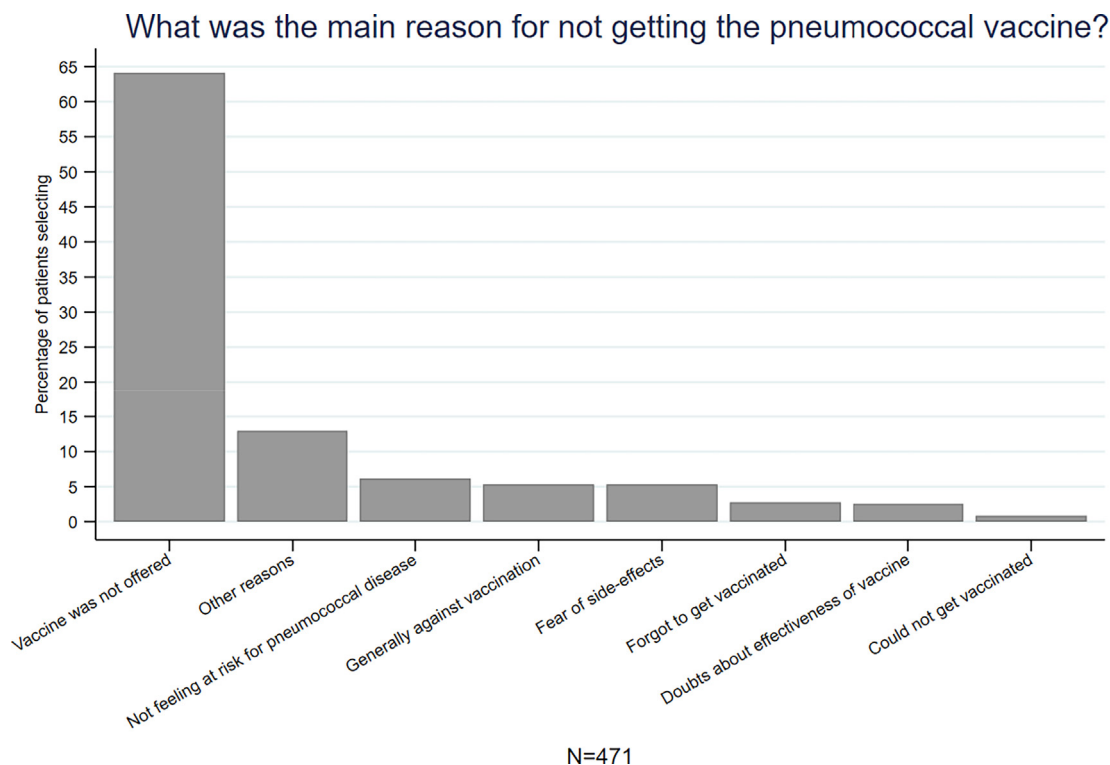


Fig. 2. Question about main reason for not getting vaccinated.

Fourth, the type and time of vaccination were not covered in the survey, making it unclear which vaccine patients received and whether they were vaccinated soon after their diagnosis or later. Fifth, it was not possible to disentangle the not specified other reasons why patients did not get vaccinated. Finally, the use of a cross-sectional survey only allowed assessing associations, but not causality.

## 9. Conclusion

In summary, this study found evidence that adherence to pneumococcal vaccination is low among axSpA patients being treated with biological drugs in Switzerland. While women and those getting a flu shot every year were more likely to get vaccinated, age was negatively associated with pneumococcal vaccination coverage. As most patients were vaccinated by their general practitioner and the most frequently mentioned reason for not getting vaccinated was not having been offered the vaccine, future health policies could involve general practitioners and specialists to increase vaccine coverage.

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This study received funding from Merck Sharp & Dohme (MSD) to analyse the data. The funding agreement did not restrict the authors' independence in designing the study, interpreting the data, writing, and publishing the report.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2022.09.056>.

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