Author's response to reviews

Title: Influenza vaccination of primary healthcare physicians may be associated with vaccination of their patients: a vaccination coverage study

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Version: 4 Date: 22 January 2015

Author's response to reviews: see over
Dear Dr Rossi:

We are pleased to enclose the revised manuscript now entitled “Influenza vaccination of primary healthcare physicians may be associated with vaccination of their patients: a vaccination coverage study” with the modifications suggested by the editor and the reviewers. We believe that all the modifications suggested have been incorporated, including the multilevel regression analysis. We thank the editor and the reviewers for their helpful suggestions which we believe have substantially improved the article.

All points are answered in detail below, and all changes in the article are marked.

Yours sincerely

Dr Pere Godoy

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Influenza vaccination of primary healthcare physicians is associated with vaccination coverages in their patients: a prevalence study

Pere Godoy, Jesús Castilla, José M Mayoral, Vicente Martín, Jenaro Astray, Núria Torner, Diana Toledo, Núria Soldevila, Fernando González-Candelas, Susana García-Gutierrez, José Diaz-Borrego, Sonia Tamames and Angela Domínguez

Dear Dr Godoy,

Your manuscript has now been peer reviewed and the comments are accessible in PDF format from the links below. Do let us know if you have any problems opening the files.

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Editor's comment:
the comments of the reviewer are quite consistent for the topics but inconsistent for the conclusion. I think the paper can be improved addressing the main problems highlighted by the reviewers:

1) the participation in the survey is low, but there could be some more analyses to understand how much the results could be biased, some methods are suggested by one of the reviewers, A. Fasutini. Another sensitivity analysis could be performed distinguishing the early responders and the late responders, in the hypothesis that the late responders are more similar to the non responders than the early responders.

According to the suggestion of the editor, we have now compared early and late responders. The results are shown in Appendix Table 1A). We also now state in the Discussion section:

“Both vaccine coverages were far from the European targets for HCW and the elderly (21) and may have been overestimated due to a possible bias caused by a greater response to the survey from physicians with a better vaccination record. We compared the characteristics of early and late responders to the survey as a proxy for non-responders: no differences were found according to age and sex, but influenza vaccine
coverage in patients aged ≥ 65 years was higher for physicians who were early responders (Appendix Table A1).”

We also compared vaccination coverages in people aged ≥65 years from the regions participating in the study with those who did not participate. The results are shown in Appendix Table A2). We now state in the Discussion section:

“Influenza vaccine coverage in patients aged ≥ 65 years was quite similar to the figures of the Spanish Health Ministry(21) but the coverage in regions participating in the study was slightly higher than that of the other Spanish regions (Appendix Table A2)(25).”

2) the conclusions are not consistent with the results: even if the difference is statistically significant, the beneficiaries of not vaccinated GPs are only slightly less covered than the beneficiaries of vaccinated GPs.

We have now modified the Conclusion in the Abstract and the main text.

In the Abstract we now state: “Vaccination of physicians together with their opinions on the effectiveness of the vaccine may be a predictor of vaccination coverage in their patients. Further studies are required to confirm this.”

In the text, we now state “In the present study, vaccination of primary care physicians was a minor determinant of the vaccination coverage of their patients aged ≥ 65 years, but remained statistically-significant after controlling for other potential effects associated with physicians’ knowledge, attitudes and beliefs on influenza vaccination.”
Reviewer's report

Title: Influenza vaccination of primary healthcare physicians is associated with vaccination coverages in their patients: a prevalence study

Version: 3 Date: 29 December 2014

Reviewer: Patrizio Pezzotti

Reviewer's report:

see attachment

Level of interest: An article of limited interest

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

Main comments for the authors

The manuscript provided results from a cross sectional survey on influenza vaccination among a sample of primary physicians in Spain.

The objective of the paper is appropriate for the journal but the study is not particularly original.

Furthermore, there are two important issues: 1) the percentage of the respondents (<40%, very low); interpretation of the results limiting the scientific quality.

As stated above, in the Conclusion we now state: “In the present study, vaccination of primary care physicians was a minor determinant of the vaccination coverage of their patients aged ≥ 65 years, but remained statistically-significant after controlling for other potential effects associated with physicians’ knowledge, attitudes and beliefs on influenza vaccination.”

1) The survey had a very low percentage of respondents. As correctly reported in the discussion section it is likely that non respondents were more frequently not vaccinated for influenza. There is a plenty of publications reporting that with this low percentage of respondents, the reality could be completely different.

As stated above, in the Abstract we now state: “Vaccination of physicians together with their opinions on the effectiveness of the vaccine may be a predictor of vaccination coverage in their patients. Further studies are required to confirm this.”

2) The association between physician’s vaccination and percentage of vaccinated elderly is statistically significant but this association explains only a 2% difference (also in the multivariate analysis). My interpretation of this result is completely different from
that given by the authors. Physician’s vaccination is a very minor determinant of patient’s vaccination!

As stated above, we now state: “In the present study, vaccination of primary care physicians was a minor determinant of the vaccination coverage of their patients aged ≥ 65 years ..”

Specific answers to the journal’s guidelines

1. Is the question posed by the authors well defined? Appropriate

2. Are the methods appropriate and well described? The methods are sufficiently described.

3. Are the data sound? Yes

4. Do the figures appear to be genuine, i.e. without evidence of manipulation? There are no figures. Tables are simple and overall clear

5. Does the manuscript adhere to the relevant standards for reporting and data deposition? Substantially yes, although the authors do not report if they follow standards such as STROBE statement

We now state in the Methods: “We conducted an epidemiological study of the prevalence of influenza vaccination coverage in patients aged ≥ 65 and influenza vaccination of primary care physicians according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (guidelines for reporting observational studies) (22).”

6. Are the discussion and conclusions well balanced and adequately supported by the data? This is most critical issue (together with percentage of respondents and multivariate statistical analysis). In fact, the vaccination coverage of elderly >65 years old in the group of vaccinated physicians was around 57% vs. 55%. Although statistically significant this difference does not justify their interpretation.

As stated above, we now state in the Conclusion: “Our results show that vaccination of primary care physicians was a minor determinant of the vaccination coverage of their patients aged ≥ 65 years ..”

7. Are limitations of the work clearly stated? Yes

8. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished? Yes

9. Do the title and abstract accurately convey what has been found? No. As I wrote at point 6, their interpretation of the results is not appropriate

As stated above, in the Abstract we now state: “Vaccination of physicians together with their opinions on the effectiveness of the vaccine may be a predictor of vaccination coverage in their patients. Further studies are required to confirm this.”

10. Is the writing acceptable? English should be revised by a mother tongue person

The article has been reviewed a native English translator.
Reviewer's report

Title: Influenza vaccination of primary healthcare physicians is associated with vaccination coverages in their patients: a prevalence study

Version: 3

Date: 29 December 2014

Reviewer: Maria Grazia G Pascucci

Reviewer's report:

The question posed by the authors appears to be well defined and of great interest. The methods used in the study are appropriate and well described. Data emerging from this work look valid and free of any manipulation. Conclusions which are attained by this essay, turn out to be supported by data and the limitations of the work are thoroughly stated. As far as I can know, a sufficient amount of other studies is included in this work's references. No essays that I know, were used without being referenced to. Furthermore, such topic features interesting takes on the subject that can inspire others to carry on studies on related topics, like vaccination other than the one covering for influenza. The title and the abstract are accurate and consistent with data. Thus, in my opinion this article is acceptable. Level of interest:

An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests: I declare that I have no competing interests
The authors aimed to verify the hypothesis that influenza vaccination of primary care physicians is associated with vaccination coverage of the elderly. They carried out a survey with questionnaires sent to a random sample of physicians working in primary care centres in 7 Spanish regions, so as to obtain data about their age, sex, vaccination status, and opinions about and attitudes towards influenza vaccinations. The vaccination coverage in their patients aged > 64 years in 2011-2012 was taken from regional primary care records. Among the physicians, 55.3% had been vaccinated, among the elderly 56.3% had. Using a multivariate regression analysis, the authors found that vaccination of the physicians, their feeling that the vaccine was effective, and the region where they worked were the most important factors associated with vaccination coverage of the elderly.

**GENERAL COMMENTS**

- The aim of this study is not clearly stated and the reader wonders whether the authors intended to provide indications which might remove obstacles to achieving an adequate population coverage as regards influenza vaccination or whether they aimed to assess the contribution that physician-related factors make to unsatisfactory vaccination coverage.

  We have rewritten the aim of the study. We now state at the end of the Introduction: “The aim of this study was to assess the contribution of physician-related factors, especially their influenza vaccine status, in the vaccination coverage of their patients aged ≥65 years.“

- A clearer definition of the aims would be of help in judging whether the methods used are appropriate to the research question and whether the conclusions are supported by the results. More information about the Spanish situation could help to clarify this point: is there a program for influenza vaccination of the elderly in Spain? or, more importantly, is there a vaccination program for healthcare workers?

  In the Introduction, before the aim of the study, we now explain the Spanish influenza vaccine programme in the European context with a new reference from Eurosurveillance. We now state: “In Spain, influenza vaccination is offered free of charge to groups in which it is indicated, including healthcare workers and persons aged ≥ 65 years, in primary healthcare centers after prescription by the patient’s physician. Vaccination is offered in October and November, in a similar fashion to most European countries (21).”
• Methodological imprecision affects the inferential process the authors developed to answer the research question.

We have added the following new information in Methods:

“We conducted an epidemiological study of the prevalence of influenza vaccination coverage in patients aged ≥ 65 and influenza vaccination of primary care physicians according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (guidelines for reporting observational studies) (22).”

“The final questionnaire consisted of 23 questions (22 closed and one open). Questions were distributed in three sections: information on the history of chronic disease and vaccination, knowledge of influenza and the influenza vaccine, and sociodemographic information. The questions were structured to appear gradually, spread over a total of six screens. The first screen welcomed the participants and provided general information on the survey. The following four screens contained the survey questions, and the last screen contained a text thanking the participants. Using the tools provided by the web platform, 19 of the 23 questions were compulsory, i.e., they had to be answered in order to access the following question.”

“The target population was any physician providing direct patient care in primary healthcare centers. In these centers, influenza vaccination is administered without cost by nurses to all population groups for which it is indicated, including people aged ≥65 years, according to physician prescription.”

“The association between vaccination coverage in patients aged ≥ 65 years and the main independent variable (vaccination of their physicians) was determined using a multilevel regression model with input of variables with a significance of p <0.10.”

MAJOR COMMENTS

Title

The authors describe their work as a prevalence study, but they have used no morbidity indicator. I think that ‘vaccination coverage study’ more appropriately describes this work.

We have changed the title of the article to: “Influenza vaccination of primary healthcare physicians may be associated with vaccination of their patients: a vaccination coverage study”

Methods

- It is not clear which physicians were studied. When the authors speak of primary healthcare physicians, do they refer to general practitioners or to those working in primary outpatient clinics (often dedicated to specific activities, like vaccinations)? This is important, because the former situation requires a trusting relationship between
doctor and patient, much more than the latter, but the authors seem to have studied physicians working in primary care centres. Even in this case, more information about the Spanish context would be helpful: who administers vaccines? are the vaccines paid for by the people who receive them? is the primary physician’s request needed?

We now state in the Methods section: “The target population was any physician providing direct patient care in primary healthcare centers. In these centers, influenza vaccination is administered without cost by nurses to all population groups for which it is indicated, including people aged ≥65 years, according to physician prescription.”

- More specific information should be provided about the items used to assess the physicians’ knowledge about, opinions of and attitudes towards influenza vaccination, as well as about how the authors managed to reduce to a binary yes/no response the answers the doctors gave to the multiple choice (5 categories) questions they were asked.

In the Methods section we now state:

“The questionnaire was developed after reviewing the scientific literature on the subject, especially the questionnaire used in the study by Kraut et al (11). The questions were adapted to the specific circumstances of the Spanish National Health System and two pilot tests were conducted among medical staff in the researchers’ settings to validate understanding of the questionnaire and its length. The final questionnaire consisted of 23 questions (22 closed and one open). Questions were distributed in three sections: information on the history of chronic disease and vaccination, knowledge of influenza and the influenza vaccine, and sociodemographic information. The questions were structured to appear gradually, spread over a total of six screens. The first screen welcomed the participants and provided general information on the survey. The following four screens contained the survey questions, and the last screen contained a text thanking the participants. Using the tools provided by the web platform, 19 of the 23 questions were compulsory, i.e., they had to be answered in order to access the following question.”

“The answers to questions about knowledge and attitudes were dichotomized in two categories: positive (totally agree, agree quite a lot) and negative (neither agree nor disagree, disagree quite a lot, and totally disagree).”

- Most of the results could have been influenced by the selection of physicians included in the study. The authors do admit this challenge, but they have not used all the appropriate indicators to assess the selection. They should compare the vaccination coverage between the 7 included and the 10 excluded regions and between the participating and non-participating primary care centres in each included region. The authors performed a regression analysis of the characteristics of the responding physicians (34.4% of those invited) against vaccination coverage of the elderly but they did not analyse the differences between responding and non-responding physicians for the characteristics that might be linked with a propensity to vaccinate, apart from age and sex, which did not differ substantially in the two groups. The authors could use the data of those who failed to complete the survey to analyse the characteristics of non-respondents. In conclusion, the assessment of the possible selection of participants is really incomplete.
As stated above, we compared early and late responders. The results are shown in Appendix Table 1A. We now state in the Discussion section:

“Both vaccine coverages were far from the European targets for HCW and the elderly (21) and may have been overestimated due to a possible bias caused by a greater response to the survey from physicians with a better vaccination record. We compared the characteristics of early and late responders to the survey as a proxy for non-responders: no differences were found according to age and sex, but influenza vaccine coverage in patients aged ≥ 65 years was higher for physicians who were early responders (Appendix Table A1).”

We also compared vaccination coverages in persons aged ≥ 65 years from the regions that participated in the study and those who did not. In the Discussion we now state:

“The vaccine influenza coverage in patients aged ≥ 65 years was quite similar to the figures of Spanish Health Ministry(21) but the coverage in the regions participating in the study was slightly higher than in the rest of the Spanish regions (Appendix table A2)(25).”

- No difference was found between the groups of physicians who responded and those who did not, even for the vaccination coverage of patients. These results, together with the important influence of the region on vaccination coverage that emerged in multivariate analysis, suggest that the outcome depends on many other factors with more weight than physician-related factors. In conclusion, I have no objection to the authors’ choice of studying the physician-related factors as main exposure; but to study this exposure, they should adopt a different study design, in which the association between physicians’ characteristics and vaccination coverage would be stratified according to vaccination coverage at the regional or primary care centre level. **Multilevel analysis** could be an alternative strategy, power permitting.

We have reanalysed the data using a multilevel model, taking the Spanish regions into account. We now state in the Methods section:

“The association between vaccination coverage in patients aged ≥ 65 years and the main independent variable (vaccination of their physicians) was determined using a multilevel regression model with input of variables with a significance of p <0.10.”

We now state in the Results:

“In the multilevel regression analysis, a physician’s history of receiving influenza vaccination was associated with the vaccination of their patients aged ≥ 65 years (p = 0.049), after controlling for the effect of age (p = 0.046), region (p = 0.089), opinions on the effectiveness of the vaccine (p = 0.013), concern about infecting their patients (p = 0.071) and concern about becoming ill from influenza (p = 0.652) (Table 4). “

We have also added a new table 4.

- Since they studied only one year, the authors did not assess the effect that the pandemic H1N1 influenza had on people after 2009; but among the other factors influencing coverage is the information about vaccination provided by the mass media.
In other words, I suggest that the authors pay more attention, in this observational study, to replicating all the factors that others have used in community trials to make treated and untreated groups as similar as possible, with the sole exception of the main exposure.

We have revised other studies on sociodemographic factors associated with the vaccination of healthcare workers. We have added seven new references and we have enlarged the Discussion.

- Although they evaluate the contraindications to vaccination in physicians, they do not do the same for the elderly, although I suppose that this information could be provided by the primary care centres.

We now state in the Methods section: “Information on the dependent variable (vaccination coverage of patients aged ≥ 65 years treated by physicians who participated in the study) was obtained from primary care records of the regions and was included in the study as information associated with each questionnaire of physicians.”

We obtained the information on vaccination coverage in the form of clusters and were unable to access individual information for each patient aged ≥ 65 years. We now state in the Discussion section: “Information on vaccination coverage was collected from the records of health care providers for all patients ascribed to each physician in the form of clusters and, therefore, the estimate was not controlled according to the individual variables of each vaccinated patient.”

CONCLUSIONS

- The authors discuss only those vaccination-associated factors that interested them: the region under consideration and the possible influence of other unanalysed factors were not considered;

We have now included the regions in a multilevel regression model. We now state:

“Vaccination of patients aged ≥ 65 years was also associated in the multilevel regression model with physicians having a favorable opinion of vaccine effectiveness. This variable has been associated with improved vaccination coverage in other studies (11,30-34) and should be taken into account in educational programs aimed at primary care physicians with the objective of improving vaccination coverages.”

- the authors do not discuss the feasibility of their proposal of increasing the vaccination of unwilling physicians;

We now state in the Discusion section:

“Other studies have found that having a mandatory vaccination policy is the strongest predictor of vaccine coverages in HCW and that implementing such a policy should be a priority for all healthcare agencies(36-38). In the absence of or in conjunction with a mandatory vaccination policy, other interventions may be introduced to increase vaccination compliance in HCW.”
- update programmes for health operators are a generic indication here, unsupported by specific data (no questions about knowledge of pandèmic influenza were included in the questionnaires). Moreover, opinions (unlike habits) are rarely changed by introducing forced behaviours. If the authors think differently, they should discuss this point more exhaustively;

We have added 7 new references and we now state in the Discussion section:

“Interventions to increase influenza vaccination rates in HCWs have shown small effects on vaccination behaviour, and their long-term success is unknown. Kok et al (35) suggested that a systematic approach (i.e. intervention mapping) is needed for the successful development and implementation of programmes to promote influenza vaccination in HCWs, identifying sociocognitive variables that drive the recommended behaviour. Other studies show that having a mandatory vaccination policy was the strongest predictor of vaccine coverages in HCW and that implementing such a policy should be a priority for all healthcare agencies (36-38). In the absence of or in conjunction with a mandatory vaccination policy, other interventions may be implemented to increase vaccination compliance in HCW. These interventions include reducing barriers to vaccination, encouraging staff to be vaccinated, and introducing educational campaigns (36,39), all of which suggest the need for healthcare administrators to be active in encouraging vaccination in HCW. Healthcare agencies should provide free vaccination on site to their staff whenever possible to increase compliance (36,39). This is even more critical in nonhospital settings. Education campaigns based on beliefs aligned with scientific evidence and more favorable attitudes toward vaccines can also improve the intent of HCW to be vaccinated.”

- discussion about vaccination coverage is scanty: the authors do not provide detailed comparison of Spanish data (which are rather low) with data from other countries, or with the coverage threshold recommended in International guidelines;

We now state the Discussion:

“Influenza vaccine coverage in patients aged $\geq 65$ years was quite similar to the figures of the Spanish Health Ministry (21) but the coverage in regions participating in the study was slightly higher than that of the other Spanish regions (Appendix Table A2)(25). The highest reported vaccination coverage rates in patients aged $\geq 65$ years in Europe are in the Netherlands and some parts of the UK (England, Northern Ireland and Scotland), which reached or almost reached the EU 2014/15 target. Five countries (France, Germany, Ireland, Italy and Spain) reported vaccination coverages of around 60% for this specific age group. Denmark, Finland, Luxembourg, Malta, Norway, Portugal and Sweden reported vaccination coverages of around 50%. The remaining countries were below 50% (21).”

- the possible increase of 2% in physicians’ vaccination coverage would, of course, be all to the good, but it hardly represents a worthwhile aim and no estimate of the possibly subsequent effect on patients’ coverage is given. On the other hand, if physicians’ vaccination were the most important factor, an alternative intervention could be a public, free, direct vaccination campaign to assure that people, including patients, are in a position to make an informed and healthy choice. This point too is insufficiently
discussed. In conclusion I think that the results of this study do not support the authors’ conclusions.

As stated above, we have rewritten this aspect in Discussion, and have considered different alternatives, including mandatory vaccination policies, and have added seven new references.

MINOR COMMENTS

- The pilot tests should be moved from the Variables subsection to the introductory part of Methods.

This has been done

- The regression results should be shown in terms of % of vaccination coverage in all the tables.

Vaccination coverage (%) is now shown in tables 1, 2 and 3 but not in table 4 as the information is shown in the other tables.

Level of interest:

An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

The article has been reviewed by a native English translator.

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests: I declare that I have no competing interests