Author's response to reviews

Title: Trends in influenza vaccination uptake among people aged over 74 years, 1997-2000: Survey of 73 General Practices in Britain

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PDF covering letter
Response to reviewers.

We found the reviewers’ comments and suggestions very helpful. Although all the reviewers wished to see substantive changes, we found their remarks on the relevance encouraging. The original draft was kept very short intentionally but we appreciate that a fuller paper could be more useful. While revising the paper we re-ran some models and the reviewers may notice that numbers have changed. This is mainly because we had previously included people for whom we had vaccination records referring to a time before they had the Trial assessment and we decided to remove them. Responses to the individual points are addressed below using the numberings given by the reviewers. Line numbers ignore blank lines.

Reviewer: Tim Doran

Discretionary revisions:

2. Methods. Information on practice location
The practices were spread throughout Britain (now mentioned page 3 methods line 3) but we do not have detailed information about local health policy settings.

3. A comparison of known practice characteristics for those that did and did not provide data would help determine whether the two sets of practices differ in other respects. In particular it should be possible to provide numbers of vaccinations administered and the proportion of the practice population immunised from PACT data, even without specific data on vaccine recipients.
I have added Table 1 showing some of the characteristics. With small numbers of practices in two of the columns, it is difficult to know what are the implications of the characteristics of responding and non-responding practices on the observed results. I am afraid that we do not have the information the reviewer suggests for all the practices and it would require contacting them again.

4. It is disappointing that people in long-term nursing care are excluded, as they are a sizeable and vulnerable group. Is this data not available?
People in long-term nursing care at the time of the Trial assessments were excluded from the MRC Trial, so unfortunately there are no data about them. Although important, this would be another study as the organisation required to deliver vaccine in this setting is different to those in the community.

5. Were Carstairs Scores available for all postcodes? Were any cases dropped for the analysis by area deprivation?
The new Table 2 shows how the samples vary over the years and the numbers for whom area information was missing.

6. Does the 55% cited in the first line of the result mean 13613 had records in years 1997-2000? Is this the 4-year subsample?
Yes, the text in the first paragraph of the Results, page 6, and Table 2 make this clearer, we hope. We have generally expanded and revised the information and the % now quoted is 51% rather than 55%.

7. It might be better to refer to the “worst quintile” as the “most deprived quintile”

Done

8. I would have preferred to see groups under “individual socio-economic position” kept separate
I have shown the separate groups in Table 2 so that it can be seen that some of the sub-groups were very small and keeping them separate does not enable any meaningful comparison within those groups but does show the main distinction to be clearly between the owner-occupiers with heating and the other tenures outside the supported sector. We would prefer to leave the categories as they are in Table 3.

9. Discussion. The results as they stand suggest a steady increase in uptake in the over 74s between 1997 and 1999 (including a “noticeable” increase in 1998”, with a larger increase in 2000. Although changes at the national level (incentives, advertising campaigns, etc) will undoubtedly have had an effect, the local context is also important. There was a degree of discretion for health authorities and then PCG/Ts in how additional resources would be spent, and local initiatives will have had varying degrees of success. This is why it would be useful to know where these practices were located.

Although we agree that there will be variation in what action local practices took, we do not have much information on this. By replicating the analysis for the subset of people with information for all four years, we checked that the overall trends were not confounded by changing practice composition. In the analyses we are doing for 2000 we have been able to take into account whether in that particular year the practice active in the sense of contacting all eligible patients but we only have information for that one year.

10. Increased uptake may not have been at the expense of the less well-off, but they remained at a disadvantage. This may be worth a comment

Done (p7 Discussion line 9)

Minor essential revisions.
11. Use of Poisson.
Ideally we would have used generalised linear modelling with binomial regression but this did not always resolve and also could not take account of clustering so we used population-averaged methods (generalised estimating equations based on Poisson regression with robust standard errors calculated at the practice level) by applying the command “svypois” in the statistical package STATA8. A footnote on page 6 aims to clarify the method.

12 Amendment to sentence “The area deprivation score was not statistically significant…”
The suggestion has been adopted (p7 first para line 5-8) but as an extra model has now been added there is also an expansion of this point.

**Major compulsory revisions**

13 The discussion of vaccination data provided by practices is unclear. As it stands it suggests that 66 practices provided data for 1997-9 of which 55 also provided data for 1995-6 (not analysed) and 7 practices provided data for 2000 only. If this is correct, it renders much of the analysis meaningless, as different practices are being compared for 1997-9 and 2000. Uptake rates for different practices vary enormously, therefore the same set of practices need to be compared for each year for any meaningful conclusions to be drawn about year-to-year changes in uptake. As 2000 is the principal year of interest, this point really needs to be clarified. If the 55 practices first mentioned provided data for 1995-2000, then it would be better to concentrate on just these practices in the analysis. The comparison suggested in point 3 would then be even more important as only half hepractise provided adequate data, and I suspect that would be both more conscientious about immunising patients and better geared to respond to the Government’s incentives to improve intake.

There are several points here and we agree that they are important. To take the time period first, we began in 1997 because practices were joining the Trial from 1995 through 1998 and only in 1997 had sufficient numbers accrued to make analysis worthwhile. Although in an ideal world trends would be estimated on a longitudinal sample, in practice they are often estimated from a series of over-lapping or cross-sectional samples. This increases the uncertainty of trend estimates but does not invalidate them. Also, we repeated the analysis for those with information throughout 1997-2000 and found very similar results (see page 6 Results para 2). A paragraph has been added to the methods section (page 5 Analysis strategy para 2) comments on the different approaches.

We have not addressed the latter part about possible selection bias in the paper. The practices that provided information for all four years were not necessarily the most conscientious ones. If they were, or if the patients were we would expect to see higher uptake throughout and, although superficially they seem to be doing a little better, the confidence intervals overlapped substantially. There was 49% (CI 45-53%) uptake in 1997 for people in all years compared to 46% (CI 42%-51%) for people only in some years; 64% (CI 61-67%) uptake in 2000 for people in all years compared to 60% (CI 54-67%) in 2000 but not all years. Data collection on vaccination occurred in two rounds: in 2000 for years 1997-1999 and in 2001 for year 2000.

**Reviewer: Meirion Evans**

**Minor essential revisions**

All these suggestions have been adopted
See Introduction page 3 line 3
See Methods page 4 line 8,
point re housing status expanded (page 5 Analysis strategy lines 8-10) and links to the description of trial interventions now on page 4 para 3,
“long-term nursing care” means being in nursing homes or in long-stay hospitals
See page 6 Results para 2 line 3, page 7 para 1 lines 8-10
**Major compulsory revisions**

1. **Methods:** should define and clarify the term subsample that is subsequently used in the Results

The Methods section has been considerably expanded and a section on analysis strategy included. The subsample of 42 practices with individual data is defined on page 5 Analysis strategy para 1 lines 8-10 and the further subset with information for all 4 years defined in para 2. Table 2 should also now make this clearer.

2. **Methods:** should clarify the sampling frame: is this people aged 74 year in the calendar year, the winter season or on a given date.

Page 4 last para should now make clear how the age limit is defined. We have added that the information came from the Practice records (page 4 para 2).

3. **Methods:** should briefly describe the models used in the analysis and how they were constructed.

The analysis strategy section (page 5) sets out to do this.

4. **Results:** Are any data available for high risk groups viz, chronic lung disease etc (for whom vaccine was previously recommended) compared to lower risk groups (to whom the new vaccination policy was extended)

- if yes this would be informative and should be included
- if no there should be a comment to this effect in the Methods

As the Trial was not set up specifically to identify those in the high-risk influenza group and we did not collect additional personal information at the time of collecting the vaccination information, we could not take risk-level fully into account. However, there is now a comment in the discussion touching on this (page 8 last half of para 1).

5. **Discussion:** There should be a comment on the implications of different samples and denominators for different years of the study and how this might influence the findings.

Please see response to item 13 reviewer 1, and Table 2 with comment in the first para of results page 6 Results para 1; also page 8 para 2.

**Reviewer: Paul George Wallace**

**Objectives.** It is not clear what aspects of policy change the authors intended to evaluate. Was it the change in recommended lower age limit or the financial incentive introduced more-or-less at the same time?

As our sample was limited to those aged 75 and over when they joined the Trial, the two policy changes we considered relevant were i) the change to inclusive vaccination for all in this age group in 1998 and ii) the financial incentives added in 2000. We have not altered that part of the methods but have adapted the Discussion (page 7 Discussion para 1).

**Background.** The background section is brief and confined to a description of influenza vaccination policy. There is no reference to previous studies relating to activity in general practice to policy changes and/or financial incentives. Nor is there
any mention of how such studies can be designed. This seems to be an important omission, which the authors should address.

We have added two references (4,5) and discussed this further now. We were unaware of any purpose-designed study to follow up changes, therefore undertook this exercise, making use of an existing Trial (and therefore having to fit within its constraints). We did not consider that we should be describing how a purpose-designed study would have been set up.

**Methods**

There is too little information on how vaccination records were utilised to provide the data on influenza vaccination. Was this from routine practice recoding or was it asked at interview? If the former, was it on paper or electronic? Was any attempt made to evaluate the reliability of the recording method, and how this may have changed over the different years of the study?

We have added more information about the collection of vaccination data on page 4 paras 1 and 2. We did not validate the reliability of the method as we only had a small budget (we did cross check that the linkage of data from practices and our study was correct, as far as we could and we looked for any obvious peculiarities like large amounts of missing information). We have a comment in the discussion (page 8 last sentence para 1)

References are made to use the Poisson regression modelling, but we are not told what this was designed to achieve. We are not told how or why these methods were developed, and this is confusing as they are referred to subsequently in the results sections and results tables.

There is now an analysis strategy section that we hope makes this clearer (page 5). Please also see the answer to point 11 of reviewer 1

**Results**

We are told that there were 24,750 people who had vaccination records for at least one year. We were told that this represents 55% of records for all the years. The authors should supply the figures relating to the proportion of the population who had vaccination records by both age band and by year of study. The overall figure of 55% with vaccination records is low and this draws into question the reliability of the figures for vaccination uptake. This will be particularly important if coverage is low for particular age groups in particular years.

Although not expressed in exactly the way you suggest, we hope that Table 2 makes the situation clearer. The figure of 55% refers to those with records for all four years as a percentage of those with records for at least one year (in fact the figure has now changed to 51% as I have expressed it in a different way - see page 6 para 1). As now mentioned in the text (Results page 6 para 1) we had vaccination information for 87% of people in the participating practices who had been eligible for the Trial. This may under-estimate coverage of those still attached to the practices in any given year as we did not always know whether non-responders to the Trial had moved. Also
there is now mention that the gender and age composition of those for whom we had
information was very similar to that for the total sample eligible for the Trial in 106
practices (Results page 6 para 1 last sentence)

As mentioned previously, we need to have better information about how models 1-4
were derived and exactly what they represented. Without this information it is not
possible to interpret Table 1

This table is now Table 3 – the extra tables and description of Methods should
facilitate interpretation of the table

Discussion and conclusion
The authors do not discuss the limitations of the study nor their implications for the
interpretation of the findings. Given the low percentage of vaccination records
available, this would seem to be an important issue and deserves a good deal more
coverage. There is no discussion of the potential contribution of the changes in target
of coverage compared with the introduction of item-for-service payment. Again, this
appears to be an important issue for the authors to discuss. Furthermore there is no
discussion of other factors that may have contributed to the change in vaccination
uptake, such as public awareness campaigns.

We have extended our discussion. Please also see the response to your comment on
objectives above. As explained above, 55% does not represent the percentage of
people with records. As the analyses were making use of an existing Trial, we did not
have the ideal set of information that could tease out the effect of different actions by
the practices so attribution to specific influences can only be speculative.

The final conclusion that “the upturn in 2000 should encourage efforts to increase
vaccine uptake further” is a rather vague statement. Without proper critical
discussion of what the apparent improvement was due to, this conclusion is of limited
assistance.
We appreciate that this is not as specific as one would like but admit that it was a
limitation of our data. However, we were keen to produce the information in the
absence of a purpose-designed study.