

## PEER REVIEW HISTORY

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### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Seasonal influenza vaccination delivery through community pharmacists in England: evaluation of the London pilot
<b>AUTHORS</b>	Atkins, Katherine; Van Hoek, Albert Jan; Watson, Conall; Baguelin, Marc; Choga, Lethiwe; Patel, Anika; Raj, Thara; Jit, Mark; Griffiths, Ulla

### VERSION 1 - REVIEW

<b>REVIEWER</b>	Claire Anderson University of Nottingham UK
<b>REVIEW RETURNED</b>	31-Aug-2015

<b>GENERAL COMMENTS</b>	<p>This is a very well executed and written paper and it provides an interesting addition to our knowledge about pharmacy flu vaccinations form the biggest service in the country . The conclusions that there needs to be a shared reporting system are extremely important at a time when pharmacists are calling for read write access to patients' medical records.</p> <p>I am surprised at use of word customer – pharmacists would call these people whom they are vaccinating, as part of an NHS service, patients and I would prefer to see this used in the text. Also in line 34 call the pharmacy a shop would refer to see it called a pharmacy.</p> <p>Opening statement of abstract and objective states following a pan-London initiative, pharmacies across England will be allowed to administer vaccines against seasonal influenza (flu) to eligible individuals from Autumn 2015. I am not sure that the authors can claim that the national role out is purely as a result of the pan London initiative of course it contributed but so did a number of other initiatives</p> <p>Introduction under eligibility 4 it is not just those in receipt of a carers allowance but also those who are the main carer for an elderly or disabled person whose welfare may be at risk if they fall ill.</p> <p>The paper states that GP vaccine delivery costs – price of vaccine – no additional payment? Payment is available to GPs as an item of service payment of £7.64 this is not discussed.</p> <p>Under results GP opinion state that GPs were concerned with a reduced quality of healthcare provision for their patients (40–50%), later you say that pharmacists spend longer with their patients and that the actual job is given by pharmacists this provides an ideal opportunity to discuss broader health issues so actually compared with with a mass immunisation process when a few hundred patients are vaccinated one after another on a Saturday morning by a nurse or heath care assistant in a surgery compared with the pharmacy</p>
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	<p>situation this warrants further discussion in this paper and also further research.</p> <p>Opportunistic nature of pharmacy how opportunistic is it is it? Is it always opportunistic or are some pharmacists case finding and calling patients too?</p> <p>In our study of people who paid for flu vaccinations (your reference 15) we found that pharmacy was reaching people who didn't go to GP even if called - Of the 199 patients who were eligible for free treatment, 100 (50%) had been contacted by their GP surgery to go for their vaccination, but had chosen not to go. Reasons given include accessibility, convenience and preference for pharmacy environment.</p> <p>There is no discussion of limitations of study except in strengths and limitations list under the abstract.</p>
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<b>REVIEWER</b>	<p>Laura P. Hurley Associate Professor of Medicine Department of General Internal Medicine University of Colorado Denver and Denver Health U.S.A</p>
<b>REVIEW RETURNED</b>	12-Sep-2015

<b>GENERAL COMMENTS</b>	<p>Thank you for the opportunity to review this manuscript. Please see below for explanation of 'No' responses.</p> <ol style="list-style-type: none"> <li>1. The research objectives in this manuscript are not clearly defined and the authors seem to be trying to incorporate too much material into a single manuscript. If one of the objectives was to survey GPs and pharmacists about pharmacist flu vaccine delivery, then it appears the analyses of the surveys should not be relegated to the supplementary material.</li> <li>2. The objective in the abstract seems to be background material and not an objective or objectives. The GP survey is not mentioned in the design section. Inputting an intervention in the abstract implies this is a manuscript regarding a randomized control trial. It is not clear why the comment that there is 'no incentive to provide a more expensive tetravalent vaccine' made it into the abstract. It seems to overemphasize the point. Is there a preferential recommendation for tetravalent influenza vaccine in England?</li> <li>3. Regarding the up-to-dateness of the references, I would recommend incorporating in the discussion some mention of the U.S. immunization information systems to put this study in the context of the current literature. This is the U.S. attempt to consolidate information from various vaccine deliverers (primary care physicians, retail pharmacies, etc.) in one database. I recommend you evaluate -Martin. J Public Health Management 2013. Pages 1-8. Two other manuscripts discussing the physician perspective on pharmacists delivering vaccines can be found in Annals of Internal Medicine 2014 Feb. 4; 160 (3):161 and Vaccine 2011. Nov. 3; 29(47):8649-55.</li> <li>4. Regarding the presentation of the results, it might be best to divide this manuscript into two manuscripts, perhaps one regarding the trends in vaccine uptake, completeness of data and cost information that can be gleaned without pharmacist input and then one capturing the information from the surveys. Table 1 is very confusing. If it is trying to make the point that a large proportion of individuals without a GP are getting their vaccine at a pharmacy and</li> </ol>
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	<p>thus improving access to influenza vaccine for them, this is not obvious from the table. All abbreviations should be defined in footnotes to tables and figures. The figures sent for review were quite small and difficult to decipher. It is not clear why data is presented by administrative area when there is little, if any, discussion of differences by administrative area. If one of the objectives of the study was to survey pharmacists and GPs about their perspective on pharmacists delivering vaccines, it is not clear why this information is relegated to supplementary material. Also, it is stated that 'individuals classified in Sonar as "Frontline healthcare staff," "Householders of immuno-compromised individuals," or "Living in long stay accommodation facilities," were not provided on ImmForm...and thus were excluded from the analysis, but there is not mention in the results of how many individuals this represented.</p> <p>5. In regards to the discussion and conclusions being justified by the results, it should be clarified from this particular study that you found pharmacists and GPs believe the programme offers convenience of choice to patients, but patients were not surveyed in this study. The discussion should include some mention of how pharmacy delivered vaccine was promoted. If it was not promoted at all, that might explain the lack of increase in vaccine uptake. Also, could it possible that you evaluated the programme too soon to be able to detect an increase in vaccine uptake? The discussion states "It is uncertain how pharmacies ascertain whether individuals are eligible for vaccination." It seems this could have been a question on the pharmacist survey.</p> <p>6. There should be a limitation section in the discussion. The authors mention earlier in the manuscript that their results might not be generalizable. What they did not acknowledge is that the response rates for both surveys was low, and particularly low for the pharmacist survey (5%). Can conclusions be drawn regarding the pharmacist perspective on costs, etc., when the response rate was so low?</p> <p>7. I would defer to the editors as to whether a STROBE checklist would be required.</p>
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<b>REVIEWER</b>	Professor Jane Portlock School of Pharmacy and Biomedical Sciences University of Portsmouth
<b>REVIEW RETURNED</b>	25-Sep-2015

<b>GENERAL COMMENTS</b>	Excellent paper, of value to the readership.  Written in the first person, is this acceptable for this journal?
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### VERSION 1 – AUTHOR RESPONSE

Reviewer 1: Claire Anderson, University of Nottingham UK

This is a very well executed and written paper and it provides an interesting addition to our knowledge about pharmacy flu vaccinations form the biggest service in the country. The conclusions that there needs to be a shared reporting system are extremely important at a time when pharmacists are calling for read write access to patients' medical records.

Thank you.

I am surprised at use of word customer – pharmacists would call these people whom they are vaccinating, as part of an NHS service, patients and I would prefer to see this used in the text. Also in line 34 call the pharmacy a shop would refer to see it called a pharmacy.

As suggested by the reviewer, we have now substituted the term “patient” for all occurrences of the word “customer”, and likewise the instance of the term “shop” has become “pharmacy” in the revised manuscript.

Opening statement of abstract and objective states following a pan-London initiative, pharmacies across England will be allowed to administer vaccines against seasonal influenza (flu) to eligible individuals from Autumn 2015. I am not sure that the authors can claim that the national roll out is purely as a result of the pan London initiative of course it contributed but so did a number of other initiatives.

It was not our intention to imply that the national roll out has been solely based on the pan-London initiative. We have revised our Introduction to mention the existence of other smaller initiatives in England:

Introduction: “...the London-based initiative has been the largest of its kind in England and, as such, can inform decisions about the current national roll out.”

We have clarified the objectives in our Abstract, and the opening statement of the revised Abstract does not refer to the roll out of a national programme.

Introduction under eligibility 4 it is not just those in receipt of a carers allowance but also those who are the main carer for an elderly or disabled person whose welfare may be at risk if they fall ill.

Thank you, we have now updated this criteria.

“4) Those who are in receipt of a carer’s allowance or those who are the main carer for an elderly or disabled person whose welfare may be at risk if they fall ill;...”

The paper states that GP vaccine delivery costs – price of vaccine – no additional payment? Payment is available to GPs as an item of service payment of £7.64 this is not discussed.

Thank you for highlighting this. While we do include the service payment of £7.64 per vaccine dose paid to GPs in our calculations (Table 2), we now include this as a cost in the Methods section ‘Calculating vaccine delivery costs’ subsection ‘GP vaccine delivery’. In addition, after discussion with the Department of Health, we have also included a ‘dispensing fee’, provided only to GPs, and updated the Methods accordingly:

“GPs are reimbursed the list price of the vaccine they choose to purchase (discounted by a percentage that is determined by the total monthly purchase reimbursement request (12)), a fixed service payment for vaccine administration (£7.64 per dose), and a dispensing fee. The dispensing fee depends on the monthly number of doses administered by a clinic and whether the GP clinic is classified as a dispensing practice. With the average number of monthly doses less than 400 per clinic, we averaged the dispensing practice (230.9p) and non-dispensing practice (240.6p) reimbursement fees to get a dispensing fee of £2.25 (12). We calculated the cost of GP flu vaccine delivery per dose as the sum of the cost of the GP vaccine service fee, the average dispensing fee, and the average cost of vaccine purchase reimbursement from the NHS.”

For consistency, we have also specified the fixed service and fee and purchase payment amount paid

to pharmacies in the Methods subsection 'Pharmacy vaccine delivery':

"Pharmacies are reimbursed a fixed price by the NHS for vaccine purchase (£7.08 per dose, incl. VAT) and administration (£7.51 per dose), irrespective of their choice of vaccine they wish to offer."

Under results GP opinion state that GPs were concerned with a reduced quality of healthcare provision for their patients (40–50%), later you say that pharmacists spend longer with their patients and that the actual job is given by pharmacists this provides an ideal opportunity to discuss broader health issues so actually compared with with a mass immunisation process when a few hundred patients are vaccinated one after another on a Saturday morning by a nurse or health care assistant in a surgery compared with the pharmacy situation this warrants further discussion in this paper and also further research.

We have now included this point in the Discussion of the revised manuscript.

"... the survey did not question patients and, notwithstanding the previous patient survey in London, there may be some interesting aspects of pharmacy-delivery that have not been reported. For example, our GP survey found that GPs were concerned about the loss of healthcare opportunity for their patients, but given that nurses are more likely to administer flu vaccines in GP surgeries, and that pharmacists were probably more likely to have more time to administer the jabs, this may be a concern not echoed for patients."

Opportunistic nature of pharmacy how opportunistic is it is it? Is it always opportunistic or are some pharmacists case finding and calling patients too?

Pharmacists did not call patients. Indeed, as part of the pharmacist "script" provided in the training, patients were signposted to the GP as the preferred alternative for vaccine provision. This was the preferred option as GPs are considered best placed to offer broader health advice that eligible patients may require.

A previous survey (Supplementary Information A) found that the vast majority of patients were receiving their vaccine after hearing about the vaccination programme from a poster at the pharmacist (30%) or from the pharmacist directly (42%). The former might be a reasonably conservative estimate of the level of opportunistic vaccination performed by pharmacists. However, as we do not have direct evidence of the level of opportunism -- or to what extent pharmacists may be contacting previously-vaccinated individuals prior to vaccination, we have updated the wording the Discussion as follows:

"Further, it is possible that there will be emerging purchasing issues when scaling up the pharmacy programme nationally: more premises offering flu vaccines, such that the number of doses offered per premises decreases, coupled with the potentially opportunistic nature of pharmacy vaccination will likely result in more wasted flu doses per box compared to a limited number of provider, with a stable number of patients."

In our study of people who paid for flu vaccinations (your reference 15) we found that pharmacy was reaching people who didn't go to GP even if called - Of the 199 patients who were eligible for free treatment, 100 (50%) had been contacted by their GP surgery to go for their vaccination, but had chosen not to go. Reasons given include accessibility, convenience and preference for pharmacy environment.

We have now emphasised this study a little more in the Discussion:

"Indeed, one study reports that some people would rather pay out of pocket at the pharmacy instead

of receiving the vaccine for free in primary care, largely due to convenience and accessibility (15)”

There is no discussion of limitations of study except in strengths and limitations list under the abstract.

Our revised manuscript now includes a new paragraph in the Discussion dedicated to the limitations of our study.

“This study is subject to several limitations that must be considered before generalising the results countrywide. First, the coverage and survey data were London-specific, and these may not be representative of the country. Second, the survey response rate was very low, particularly for pharmacists. Such a low response may be indicative of a biased sample, and more importantly, not provide a large enough sample size for precise estimates of costs, which are calculated from self-reported activity durations. To achieve more accurate estimates of costs from all perspectives, it may be beneficial to conduct a larger, nationwide time-use survey. Third, survey responses and coverage data are from one or two years, respectively. While more data may provide a more precise estimate of outcomes, it is also worth noting that a longer period of pharmacy-based vaccine delivery may increase the awareness of such a programme, and therefore ultimately vaccine coverage may increase over time. Fourth, the survey did not question patients and, notwithstanding the previous patient survey in London, there may be some interesting aspects of pharmacy-delivery that have not been reported. For example, our GP survey found that GPs were concerned about the loss of healthcare opportunity for their patients, but given that nurses are more likely to administer flu vaccines in GP surgeries, and that pharmacists were probably more likely to have more time to administer the jabs, this may be a concern not echoed for patients. Finally, surveys were carried out retrospectively, and thus pharmacists may be prone to misreport activity durations on time use surveys. A more accurate survey would be conducted through the vaccination season in real time.”

Reviewer 2: Laura P. Hurley, Associate Professor of Medicine, Department of General Internal Medicine, University of Colorado Denver and Denver Health, U.S.A

1. The research objectives in this manuscript are not clearly defined and the authors seem to be trying to incorporate too much material into a single manuscript. If one of the objectives was to survey GPs and pharmacists about pharmacist flu vaccine delivery, then it appears the analyses of the surveys should not be relegated to the supplementary material.

The objective of the pharmacist survey was to provide the most pertinent data analysis to advise on the effectiveness and cost of the current pan-London initiative, with a view to inform the national programme.

Due to the contentious nature of the programme, we believe that the views and opinions of the pharmacists and GPs involved are important enough for us to collect via our survey and we believe that these data are complementary to the cost- and uptake-data analysis. Together, these data provide a rounded picture of the pan-London initiative. We therefore discuss the opinions of both the pharmacists and GPs as a piece of evidence in the main text. However, we chose to display the figures in the Supplementary Information for fear of information overload for the reader, instead offering results that can be well-described by statements in the main text.

2. i) The objective in the abstract seems to be background material and not an objective or objectives. ii) The GP survey is not mentioned in the design section. iii) Inputting an intervention in the abstract implies this is a manuscript regarding a randomized control trial. iv) It is not clear why the comment that there is ‘no incentive to provide a more expensive tetravalent vaccine’ made it into the abstract. It seems to overemphasize the point. Is there a preferential recommendation for tetravalent influenza vaccine in England?

i) We have updated the Objective in the Abstract to properly reflect the objectives of the study.

#### “Objective

To evaluate the effectiveness and cost of the pan-London pharmacy initiative, a programme that allows administration of seasonal influenza vaccination to eligible patients at pharmacies.”

ii) We have now updated the Design section of the Abstract as follows:

“We analysed 2013–15 data on vaccination uptake in pharmacies via the Sonar reporting system, and the total vaccination uptake via 2011–15 ImmForm GP reporting system data. We conducted an online survey of London pharmacists who participate in the programme to assess time use data, vaccine choice, investment costs, and opinions about the programme. We conducted an online survey of London GPs to assess vaccine choice of vaccine and opinions about the pharmacy vaccine delivery programme.”

iii) We apologise for this confusion, and have replaced Interventions with Not applicable, but defer to the editor on whether this is suitable.

iv) While there may be a preference for the tetravalent vaccine, which offers protection against an additional B subtype, there is no recommendation by the Department of Health. Therefore, we concur with the reviewer’s suggestion, and have removed this statement from the Abstract.

3. Regarding the up-to-dateness of the references, I would recommend incorporating in the discussion some mention of the U.S. immunization information systems to put this study in the context of the current literature. This is the U.S. attempt to consolidate information from various vaccine deliverers (primary care physicians, retail pharmacies, etc.) in one database. I recommend you evaluate -Martin. *J Public Health Management* 2013. Pages 1-8. Two other manuscripts discussing the physician perspective on pharmacists delivering vaccines can be found in *Annals of Internal Medicine* 2014 Feb. 4; 160 (3):161 and *Vaccine* 2011. Nov. 3; 29(47):8649-55.

We have now cited the author’s AIM and Vaccine papers in the Discussion:

“Studies that have previously assessed physician opinion of regarding non-physician administered vaccine provision in the U.S. are broadly consistent with our findings: with between 60–70% of physicians agreeing that pharmacists and other providers have adequate training and provide a more convenient service to the patients (17). Moreover, 70% of physicians report incomplete vaccine documentation as a result of non-physician vaccine provision (17), and 90% of physicians have reported that this incomplete documentation is a barrier to patient referral (18).”

Unfortunately, we could not locate the article by Martin in *Journal of Public Health Management and Practice* from 2013.

4. Regarding the presentation of the results, it might be best to divide this manuscript into two manuscripts, perhaps one regarding the trends in vaccine uptake, completeness of data and cost information that can be gleaned without pharmacist input and then one capturing the information from the surveys.

Thank you for this suggestion; we understand that there is a sizable quantity of information in this manuscript. However, after much discussion, we have decided to respectfully leave our study as one manuscript. The non-cost results from the survey includes the opinions of GPs and pharmacists,

which we believe is pertinent and illuminating. However, due to the low response rate, particularly of the pharmacists' survey, coupled with the relatively small amount of information, we do not believe this is sufficient for a stand-alone manuscript.

Table 1 is very confusing. If it is trying to make the point that a large proportion of individuals without a GP are getting their vaccine at a pharmacy and thus improving access to influenza vaccine for them, this is not obvious from the table.

We apologise for this confusion. Table 1 provides information on the number of patients who receive their flu vaccine at a pharmacy that is either in the same PCT as their GP, or a different PCT than their GP. The reviewer is correct in the messages from the Table: a large minority of individuals are receiving their vaccine in a PCT that is not the same as the PCT where their GP is based (24% and 19% for 2013/14 and 2014/15, respectively). We have now updated the row names to provide a better description of these distinctions:

Table 1: Total number of reported vaccines administered in pharmacies from Sonar.

2013/14*	
2014/15*	
Pharmacy is in the same PCT as the patient's GP	
50,988 (75%)	
86,282 (80%)	
Pharmacy is in a different PCT as the patient's GP	
16,640 (24%)	
20,989 (19%)	
Patient's GP is outside London	
3,221	
3,521	
Patient's GP is not reported (Null / Unknown / None)	
592 (1%)	
915 (1%)	
Total vaccine doses reported	
68,220 (100%)	
108,186 (100%)	
*% of total vaccine doses administered in pharmacy in parentheses	
PCT: Primary Care Trust	

All abbreviations should be defined in footnotes to tables and figures.

We have now included the definition of PCT in Table 1 (please see comment above).

The figures sent for review were quite small and difficult to decipher.

To reduce the amount of information on a single figure, we have split the plots from the previous Figure 1 across two figures (Figures 1 and 2), and updated the text and figure captions accordingly. This update has increased the size of each plot and therefore increased their readability.

To increase the readability of Figure 2 (now Figure 3), we have not substantially revised plotting of the data. We no longer stratify the plot over administrative areas, thereby reducing the complexity of the graph by removing extraneous information, and improving clarity of the results depicted (see point

below for figure).

It is not clear why data is presented by administrative area when there is little, if any, discussion of differences by administrative area.

We have revised Figure 2 (now Figure 3) to remove the explicit plotting of administrative areas data. The revised figure now shows the distribution of reporting rates across all administrative areas as a histogram (panel a) and the subsequent impact on the distribution of vaccine coverage across all administrative areas (panel b):

“Figure 3: Completeness of reporting across all administrative areas. a) Maximum estimate of fraction of pharmacy vaccine doses are subsequently recorded onto GP recording system, b) partitioning 2014/15 GP data by those vaccines administered in GPs, those administered in total as reported by GP recording system, and those administered everywhere accounting for under-reporting in GP recording system.”

If one of the objectives of the study was to survey pharmacists and GPs about their perspective on pharmacists delivering vaccines, it is not clear why this information is relegated to supplementary material.

Please see above comment.

Also, it is stated that ‘individuals classified in Sonar as “Frontline healthcare staff,” “Householders of immuno-compromised individuals,” or “Living in long stay accommodation facilities,” were not provided on ImmForm...and thus were excluded from the analysis, but there is not mention in the results of how many individuals this represented.

We have now included the percentage that these excluded groups represent and provided the number of pharmacy visits reported in 2013/14 Sonar data:

“Individuals classified in Sonar 2013/14 as “Frontline healthcare staff” (7% of the 68,220 patients reported as attending a pharmacy for the flu vaccine), “Householders of immuno-compromised individuals” (<1% of pharmacy patients) or “Living in long stay accommodation facilities” (<1% of pharmacy patients), were not provided in the ImmForm,…”

The largest of these excluded groups are the Frontline healthcare staff. As the GP Immform data do not provide uptake information about this group, it is correct to exclude these individuals from the direct comparison between overall uptake in GP and overall uptake with GPs and pharmacies.

5. In regards to the discussion and conclusions being justified by the results, it should be clarified from this particular study that you found pharmacists and GPs believe the programme offers convenience of choice to patients, but patients were not surveyed in this study.

We have now included this point in the new limitations paragraphs in the Discussion:

“...Fourth, the survey did not question patients and, notwithstanding the previous patient survey in London, there may be some interesting aspects of pharmacy-delivery that have not been reported. For example, our GP survey found that GPs were concerned about the loss of healthcare opportunity

for their patients, but given that nurses are more likely to administer flu vaccines in GP surgeries, and that pharmacists were probably more likely to have more time to administer the jabs, this may be a concern not echoed for patients....”

The discussion should include some mention of how pharmacy delivered vaccine was promoted. If it was not promoted at all, that might explain the lack of increase in vaccine uptake.

We have now included a discussion of the measures taken to promote the pharmacy-delivered vaccine programme:

“Promotion of the pharmacy initiative to eligible patients was agreed between NHS England and a steering group from London Pharmaceutical Committee. Promotion was predominantly by posters displayed in pharmacy windows, most of which were designed by the LPC, but some pharmacies used general pharmaceutical company vaccine campaign posters. Complementary outreach was achieved by other methods including website promotion ([www.myhealthlondon.nhs.uk](http://www.myhealthlondon.nhs.uk)), twitter, photo shoots (e.g. deputy Mayor of London receiving flu vaccine), and promotion via NHS trust occupational health departments.”

Also, could it possible that you evaluated the programme too soon to be able to detect an increase in vaccine uptake?

We have now added this point in the limitations section of our Discussion:

“Third, survey responses and coverage data are from one or two years, respectively. While more data may provide a more precise estimate of outcomes, it is also worth noting that a longer period of pharmacy-based vaccine delivery may increase the awareness of such a programme, and therefore ultimately vaccine coverage may increase over time.”

The discussion states “It is uncertain how pharmacies ascertain whether individuals are eligible for vaccination.” It seems this could have been a question on the pharmacist survey.

We agree that this would have been illuminating, and it is a shame that we did not get these responses during the survey.

6. There should be a limitation section in the discussion. The authors mention earlier in the manuscript that their results might not be generalizable. What they did not acknowledge is that the response rates for both surveys was low, and particularly low for the pharmacist survey (5%). Can conclusions be drawn regarding the pharmacist perspective on costs, etc., when the response rate was so low?

We have now included a comprehensive discussion on the limitations of the study.

This study is subject to several limitations that must be considered before generalising the results countrywide. First, the coverage and survey data were London-specific, and these may not be representative of the country. Second, the survey response rate was very low, particularly for pharmacists. Such a low response may be indicative of a biased sample, and more importantly, not provide a large enough sample size for precise estimates of costs, which are calculated from self-reported activity durations. To achieve more accurate estimates of costs from all perspectives, it may be beneficial to conduct a larger, nationwide time-use survey. Third, survey responses and coverage data are from one or two years, respectively. While more data may provide a more precise estimate of outcomes, it is also worth noting that a longer period of pharmacy-based vaccine delivery may

increase the awareness of such a programme, and therefore ultimately vaccine coverage may increase over time. Furthermore, the analysis did not account for any underlying secular trends in the uptake of flu vaccination that may obscure any increase due to the pharmacy initiative. Fourth, the survey did not question patients and, notwithstanding the previous patient survey in London, there may be some interesting aspects of pharmacy-delivery that have not been reported. For example, our GP survey found that GPs were concerned about the loss of healthcare opportunity for their patients, but given that nurses are more likely to administer flu vaccines in GP surgeries, and that pharmacists were probably more likely to have more time to administer the jabs, this may be a concern not echoed for patients. Finally, surveys were carried out retrospectively, and thus pharmacists may be prone to misreport activity durations on time use surveys. A more accurate survey would be conducted through the vaccination season in real time.”

7. I would defer to the editors as to whether a STROBE checklist would be required.

We have completed the STROBE checklist as far as possible and have sought advice from the editor on this.

Reviewer 3: Professor Jane Portlock, School of Pharmacy and Biomedical Sciences, University of Portsmouth

Excellent paper, of value to the readership.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Claire Anderson University of Nottingham, UK
<b>REVIEW RETURNED</b>	16-Nov-2015

<b>GENERAL COMMENTS</b>	I am happy that the authors have addressed all the reviewer's concerns in their revised version.
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<b>REVIEWER</b>	Laura P. Hurley Denver Health U.S.A
<b>REVIEW RETURNED</b>	06-Dec-2015

<b>GENERAL COMMENTS</b>	This manuscript remains packed with data with very little discussion of the data presented. For example, data is presented by administrative area when there is little, if any, discussion of differences by administrative area. Is that level of detail important to the overall message of the paper? It would benefit the discussion to include information about the immunization information systems currently in place in the U.S. Immunization Information Systems are the U.S. attempt to consolidate vaccination information from a variety of vaccine providers including pharmacists.
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## VERSION 2 – AUTHOR RESPONSE

This manuscript remains packed with data with very little discussion of the data presented. For example, data is presented by administrative area when there is little, if any, discussion of differences by administrative area. Is that level of detail important to the overall message of the paper?

We have greatly reduced the detail of the figures presented in the main text as per the reviewer's suggestions in the previous round of revisions. All figures in the main text are discussed in detail in the Results and Discussion sections of the manuscript. For example, no main text figures provide specific information on administrative areas. The particular figure to which the reviewer is referring is placed in the online supplementary information (Fig S1). We would prefer to keep this figure accessible to interested readers to provide some context to the variation in uptake rates across the London regions.

It would benefit the discussion to include information about the immunization information systems currently in place in the U.S. Immunization Information Systems are the U.S. attempt to consolidate vaccination information from a variety of vaccine providers including pharmacists.

We have now included reference to the U.S. Immunization Information Systems in the Discussion:

“To calculate incomplete reporting of vaccine delivery in the GP ImmForm system, we compared the number of vaccine doses that were noted to be delivered at somewhere other than the GP practice with the number of doses delivered to customers at pharmacies. If the place of vaccine dose administration was not correctly registered in ImmForm, then our results will have underestimated the number of vaccine doses that are recorded in Immform. Nevertheless, this potential issue further highlights the inefficient and information loss-prone nature of maintaining two recording systems with manual entry. Moreover, it is unclear how pharmacies ascertain whether individuals are eligible for vaccination. For a national programme with increased pharmacy vaccine uptake to remain efficient, it will be important to easily identify patient eligibility. For a national system, it may be helpful to identify advantages and failings of other vaccination reporting software, such as the Information Immunization System (IIS) used in the United States (13)”