Author's response to reviews

Title: Factors related to late entry to antenatal care in New South Wales, Australia

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Author's response to reviews:

Dear Dr. Regina Kulier,

Please find our responses to the comments from the reviewers in CAPITAL LETTERS after each of the comments. We are willing to further revise the article if necessary.

Thank you,
Lieu Trinh

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RESPONSES TO REVIEWERS' COMMENTS

867431499824043 - Factors related to late entry to antenatal care in New South Wales, Australia
by Lieu T T Trinh and George Rubin

Reviewer 1: Gilda Piaggio

I have reviewed the paper. The regression approach is correctly used. The authors use a strategy that is recommended for observational studies, concisely described in the manuscript under Methods on page 5 (Regressions and model building). The interpretation is also correct and clear.

I would suggest the authors add something in Results on the interpretation of the coefficients for linear regression in Table 3, mainly in the case of categorical explanatory variables, but also for numerical ones. It is done extensively for the logistic regression, in terms of the ORs.

WE ADDED THESE SENTENCES IN THE END OF SECOND PARAGRAPH FROM THE BOTTOM (p7):

"The results from the two models were similar in term of the level of risk. For example, the highest risk group (teenagers) had the highest OR (2.99) and the highest coefficient (3.6)."

Minor points (typos):

- Page 4, 3rd line under Predisposing characteristics: non-indigenous misspelt.
- Page 5 3rd line from bottom and also on page 6: cross reference error, need to update field.
- Page 7 2nd line under Discussion: spelling of forty.

CORRECTED
Table 1, 1st column, Current pregnancy complication: two superscripts do not make sense. Footnote: * missing.

THE TWO SUPERSCRIPTS WERE DELETED AND A FOOT NOTE WAS ADDED:

"$ Pregnancy complication was significant in logistic regression (p<0.05) but not in linear regression (p>0.05)".

THE FOOTNOTE * WAS ALSO ADDED

Reviewer 2: Mary-Ann Davey

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1 Coding of variables for inclusion in the multiple regression model needs to be clarified. In particular, how were categorical variables handled?

This second paragraph under the heading "Regression and model building" in the Method section was added (p5):

"The outcome variable used in the logistic regression was classified into late entry to ANC (after 12 weeks, coded one) and early entry (within 12 weeks, coded zero). The outcome variable used in the linear regression was week of pregnancy. For explanatory variables, numbers of women belonging to each category of variables were examined. Groups were chosen as reference groups (coded as 1 - lowest) if they had the largest number of women."

2 Why did the authors not select either logistic or linear regression (looking at 'late entry' and 'gestation in weeks at entry' respectively)? It is confusing to the reader to include both, so a decision should have been made on theoretical grounds.

We added this paragraph, the first one under the sub heading "Regression and model building" in p5:

The previous studies have used linear regression [14] [16] or logistic regressions [11] or both [22] to identify factors related to pregnancy duration at first visit (in month or week) and/or late entry to ANC.

We used both linear and logistic regressions in this study, because the linear regression provides information on the proportion of variation in the pregnancy duration at entry to ANC explained by the contributing factors and the logistic regression provides information on the characteristics of women who entered late ANC. In addition, some factors may be significant in one model but not in the other. For example, if all women are aware that they should enter ANC within 12 weeks, there may be fewer factors that distinguish between entering ANC within 12 weeks and after 12 weeks, than factors that distinguish between entering ANC at 4 weeks, 8 weeks, 12 weeks, etc. Using both regression techniques increases the chance a potential factor being identified. Further more; the guidelines may change in the future. For example, the US Public Health Service Expert Panel on Prenatal Care has been recommending 8 weeks instead of 12 weeks [6]. Whenever the current standard guideline changes, the results from the linear regression will still be useful.

To simplify, we deleted the result of the linear regression in Table 3 and mentioned some selected result of the linear regression in the text.
3 There is repetition in the text e.g. on page 6, Bivariate Analysis, two consecutive paragraphs are just the negative of one another.

THE SECOND PARAGRAPH WAS DELETED.

4. On Page 7, the last Results paragraph and the second Discussion paragraph give the same information.

THE PARAGRAPH IN THE DISCUSSION SECTION WAS DELETED.

5. There is no need to specify all the Odds Ratios on page 7 when they are given in Table 3. But where they are given, they should be accompanied by the confidence intervals rather than the 'n's e.g. OR 2.18 (CI 1.5, 2.7)

THE TEXT HAS BEEN CHANGED ACCORDINGLY, 3RD PARAGRAPH, P 7

6. R squared results on page 7 should read =0.056 not 5.6% etc.

VALUES OF R SQUARED IN PERCENTAGES ARE EASIER TO INTERPRET. E.G. HOW MANY PERCENT THE REGRESSION MODEL OR A VARIABLE/S EXPLAINED THE VARIATION IN THE OUTCOMES.

7. Chi square results on Page 7 should be replaced by point estimates and p-values. Chi square values are not readily interpretable without looking up tables.

POINT ESTIMATES WERE ALREADY PROVIDED, P VALUES WERE ADDED.

8. Page 8 Please include the year in which the Victorian data were collected, so that this information can be considered when we compare with the current study.

YEAR OF THE VICTORIAN DATA HAS BEEN ADDED IN THE FIRST PARAGRAPH OF THE DISCUSSION

9. Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

CHECKED AND CORRECTED

10. Table 1 needs a footnote for the last column heading '% by row' (Proportion with this characteristic entering ANC after 12 weeks) is what I think it refers to.

A FOOTNOTE WAS ADDED.

11. Table 1 - first footnote is missing an asterisk

CORRECTED
12. Table 1- 'last caesarean delivery' should be replaced by 'last delivery by caesarean', and the first response should read (presumably) 'No, or no previous birth'

CORRECTED

13 Table 3 needs a footnote (or modified title) so that we can interpret the data e.g. is the linear regression reporting co-efficients for each extra week at first presentation? And state which cut off is being used for 'late presentation' in the logistic model.

THE FOLLOWING FOOTNOTES HAVE BEEN ADDED

# Outcome was either entered ANC early (within 12 weeks) or late (after 12 weeks)
@ Outcome was week of gestation at first ANC visit

14. OTHER SUGGESTIONS HIGHLIGHTED IN THE TEXT HAVE BEEN CORRECTED.

Reviewer 3: Jane Sandall

Capital letters will not be used any more because it looks too crowded. We put the name of the person whose opinion come from underneath the comments from the reviewer.

1. The authors have used several definitions of late entry into antenatal care from WHO, UK, USA and Australia; These vary from 12 weeks to 20 weeks. The findings of the paper would be clearer if they used the Australian definition both in the background and the analysis.

LT: The Australian definition (12 weeks) was used in both the background and the analysis. We cited several guidelines from the WHO, UK, USA and NSW health in the background to justify our choice. In the analysis of proportion of women entered ANC late, the guideline from the NSW Health was used because we wanted to compare with a study that used this guideline, the guideline from WHO was used because we wanted to report the proportion of women who did not meet the recommendation for developing countries. These were discussed in the first paragraph of the Discussion. For analyses of factors related to late entry to ANC, we only used the 12 weeks cut off point guideline.

2. Reference for UK guideline

LT: Updated

3. It would be helpful for the authors to consider and summarise the evidence as to whether delayed entry into ANC is an independent risk in its own right or whether it is a marker for other risk factors such as socio-economic status, lifestyle, smoking etc.

LT: We are not clear about which risk the reviewer is referring to. We assume that it is the risk for poor pregnancy outcomes. If so, there have been many extensive literature reviews conducted by the WHO on the direct effects of inadequate ANC utilisation, which includes late entry to ANC, on poor pregnancy outcomes. Reviewing and summarising the evidence on the risk of delayed ANC on pregnancy outcomes is out of the scope of this paper.

The conclusion by the WHO is that inadequate ANC increases the risk of poor pregnancy outcomes. This paper therefore aimed to identify the factors (socio-economic status, smoking, etc) that may predict poor use of ANC.

4. It would be helpful for the factors outlined on p4/5 to be summarised in a Table under the heading of the
Andersen model.

LT: We could make a separate table just to list the factors included in the analyses. However due to the restriction on the number of words and tables, we used the first column of Table 1 to list the factors used in the analyses, grouped into categories of the Andersen model. The last sentence of the first paragraph in the Methods/Explanatory Variable sub heading (p4), refers the readers to Table 1.

5. How these categories are created need to be made clearer

LT: It will be helpful if the reviewer point out which categories were created not clear.

6. The rational for the choice of reference category

LT: Groups were chosen as reference groups (coded as 1 - lowest) if they had the largest number of women.

7. Some definitions are not clear outside Australia

LT: Again, need to be more specific on which definitions.

8. The terms used in text must match up with those used in other parts of the paper. Eg. Indigenous and Aboriginal.

LT: Corrected

9. Table 1 is unclear. The first two columns are very useful. But the purpose of the last two columns is unclear as is the explanation at the bottom of the table.

LT: The last two columns present the results of the bi-variate logistic regression analyses between the outcome (late/early entry to ANC) and each of the potential factors. It is helpful to see, for example that 56% of teenagers entered ANC late while there was only 45% of the women in their twenty, etc, entered ANC late and the proportions of women entered ANC late reduced when age increased. The other purpose of the bi-variate analyses is to choose factors to enter the multivariate regressions. That was why the explanation at the bottom of the table was for.

10. The authors need to explain why two methods of regression were used

LT: WE ADDED THIS PARAGRAPH, THE FIRST ONE UNDER THE SUB HEADING "Regression and model building" in p5:

The previous studies have used linear regression [14] [16] or logistic regressions [11] or both [22] to identify factors related to pregnancy duration at first visit (in month or week) and/or late entry to ANC.

We used both linear and logistic regressions in this study, because the linear regression provides information on the proportion of variation in the pregnancy duration at entry to ANC explained by the contributing factors and the logistic regression provides information on the characteristics of women who entered late ANC. In addition, some factors may be significant in one model but not in the other. For example, if all women are aware that they should enter ANC within 12 weeks, there may be fewer factors that distinguish between entering ANC within 12 weeks and after 12 weeks, than factors that distinguish between entering ANC at 4 weeks, 8 weeks, 12 weeks, etc. Using both regression techniques increases the chance a potential factor being identified. Further more; the guidelines may change in the future. For example, the US Public Health Service Expert Panel on Prenatal Care has been recommending 8 weeks instead of 12 weeks [6]. Whenever the current standard guideline changes, the results from the linear regression will still be useful.
11. The discussion of collinearity on p5 should say which variable was excluded.

LT: p5 is the Method section. We only presented the methods used, not the results. In the result section, we stated that no variables were excluded (2nd paragraph from the bottom of p6).

12. The reporting of Table 2 is confusing, as the exact percentages provided in the table are not used in the text.

LT: The reason for the use of the rounded numbers (e.g. 41%) in the text was for simplification, since there is not much difference between 40.6% and 41%. However the exact percentages (e.g. 40.6%) were used in the Table because 95%CIs were presented. The 95%CI for 40.6% was 40.2-40.9%, it would not make sense if 41% was presented in the Table.

13. It is unclear what Table is being referred to in the text discussing the bi-variate analysis on p6

LT: Table 1. The first paragraph of the Results/Bi-variate sub heading (p6): "The two last columns of Table 1 present bi-variate analyses between duration of pregnancy at entry to ANC and explanatory factors."

14. The linear regression model explained 12.5% of the variance, this is not a substantial amount and the authors need to discus what other variables could/should be in the model.

LT: The last paragraph from the bottom of p8 discusses this.

"The main limitation of the study was that several potential important factors such as health insurance, income and difficulty in transportation were not available for analyses. This could be one of the reasons for the linear regression model to explain only 12.5% of the variation."

15. The analysis and the discussion are unclear

LT: It will be helpful if the reviewer point out where the analysis and the discussion are unclear and if possible, how to improve.

16. attention needs to be paid throughout the article to language and grammar

LT: The article has been proof read by two native English speaking researchers. We recently asked a third person to read the article.