PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	A MODEL FOR THE DISTRIBUTION OF DAILY NUMBER OF BIRTHS IN OBSTETRIC CLINICS BASED ON A DESCRIPTIVE RETROSPECTIVE STUDY
AUTHORS	Gam, Christiane; Tanniou, Julien; Keiding, Niels; Lokkegaard, Ellen

VERSION 1 - REVIEW

REVIEWER	Alison Macfarlane Professor of Perinatal Health City University London England No competing interests
REVIEW RETURNED	04/19/13

GENERAL COMMENTS	The authors have an interesting set of data consisting of numbers of births each day in seven hospitals in Copenhagen, tabulated by onset of labour and method of delivery. The hospitals vary in the size of their maternity units and in their intervention rates. 1. The authors' main question is whether the numbers of births of non-elective onset follow a Poisson distribution. It is stated that this information will inform workforce planning, but it is not stated how and no information is given about how the results would be used. 2. The authors report that higher numbers of births occur on mid week days than at weekend but do not present their results on this. 3. They group births after emergency caesarean section with spontaneous births. These should be analysed separately as decisions made to intervene could be influenced by workload as well as clinical factors. 4. There is no analysis induced births or elective caesareans. Having these analyses and being able to see how they differ between hospitals would give a fuller picture. 5. Figure II, which gives sample analyses for three of the hospitals each for a different single year does not seem very informative. This article has already been rejected by a number of journals, but does not show much sign of having been revised according to reviewers' comments. The authors have material which could potentially be used for a useful and informative article, but it would seem time for them to have a major reconsideration of their analysis and use this to write a new and better focussed paper.

REVIEWER	Michael Robson Consultant Obstetrician and Gynaecologist The National Maternity Hospital Dublin Ireland

	No conflicts of interest
REVIEW RETURNED	04/28/13

THE STUDY	I think that is an important study of an important topic and is in general well thought out. I think that the terminology of the participants could be better defined and more clearly explained in the text. The terms planned, elective, non elective obstetric interventions are all used with some degree of overlap. I think that the English is generally good but can be improved. Some words could be changed. There are a few spelling mistakes
RESULTS & CONCLUSIONS	I think this is a nice study but the presentation could be improved. I think that more should be written about the organizational aspects of a labour and delivery unit. I understood that there was still some variation in spontaneous labour midweek. In the text it refers to this as "weekly variation" i presume they mean daily in the middle of the week. The most important variation in when people are recorded as in spontaneous labour is how and who makes the diagnosis and is this consistent over the week and weekend or the time of the day. The study looked at 24 hour periods i think and for the purpose of the study is probably reasonable but in the general planning for staff for the delivery ward maybe a comment should have been made in relation to night and day time staffing. There are a number of other factors related to manpower planning on the delivery ward that might have been discussed if the paper was meant to make conclusions about that subject. The discussion could have been expanded a bit yet at the same time more focussed
GENERAL COMMENTS	I enjoyed reading your paper, but i think you could improve it considerably.

VERSION 1 – AUTHOR RESPONSE

Reviewer:Alison Macfarlane
Professor of Perinatal Health
City University London
England
No competing interests
The authors have an interesting set of data consisting of numbers of births each day in seven hospitals in Copenhagen, tabulated by onset of labour and method of delivery. The hospitals vary in the size of their maternity units and in their intervention rates.
1. The authors' main question is whether the numbers of births of non-elective onset follow a Poisson distribution. It is stated that this information will inform workforce planning, but it is not stated how and no information is given about how the results would be used.
Response to comment: More detailed description on how this would be used has now been added to the result and discussion sections.
2. The authors report that higher numbers of births occur on mid week days than at weekend but do not present their results on this.
Response to comment: Mean numbers in Figure II have been added. Furthermore a supplementary file has been added illustrating this finding.
3. They group births after emergency caesarean section with spontaneous births. These should be analysed separately as decisions made to intervene could be influenced by workload as well as clinical factors.
Response to comment: Additional analyses have been conducted and results are described in the paper.
4. There is no analysis induced births or elective caesareans. Having these analyses and being able to see how they differ between hospitals would give a fuller picture.
Response to comment: Additional analyses including the variation of all birth have been performed

and included as a sensitivity analysis. However, as expected the main criterion for fulfilling the Poisson distribution, i.e. the variance equals the mean is not as nicely fulfilled, we keep the 'nonelective'
births as the main focus.
5. Figure II, which gives sample analyses for three of the hospitals each for a different single year does not seem very informative.
Response to comment: The idea is to show the fit of the normal distribution and the nice fit of the Poisson distribution. As these two distributions resemble each other, the main finding of this paper is supported, implying that the calculation of the variation in the number of non-elective births can be based on the normal distribution with the variance characteristics for the Poisson distribution given by the average number of non-elective births per day over the year.
This article has already been rejected by a number of journals, but does not show much sign of having been revised according to reviewers' comments. The authors have material which could potentially be used for a useful and informative article, but it would seem time for them to have a major reconsideration of their analysis and use this to write a new and better focussed paper.
Response to comment: We regret that the reviewers from BMJ Open could not access former comments from reviewers. Revisions have been undertaken, but the main argument for rejection has been that our article was beside the scope of the journal.

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Reviewer: Michael Robson
Consultant Obstetrician and Gynaecologist
The National Maternity Hospital
Dublin
Ireland
No conflicts of interest
I think that is an important study of an important topic and is in general well thought out.
I think that the terminology of the participants could be better defined and more clearly explained in the text. The terms planned, elective, non elective obstetric interventions are all used with some degree of overlap.
I think that the English is generally good but can be improved. Some words could be changed. There are a few spelling mistakes
I think this is a nice study but the presentation could be improved.
Response to comment: We tried to improve the presentation and make it more clinically oriented.
I think that more should be written about the organizational aspects of a labour and delivery unit.
Response to comment: We have included this information in the background.
I understood that there was still some variation in spontaneous labour midweek. In the text it refers to this as "weekly variation" I presume they mean daily in the middle of the week.
Response to comment: Yes, thank you, we have changed the wording.
The most important variation in when people are recorded as in spontaneous labour is how and who makes the diagnosis and is this consistent over the week and weekend or the time of the day.
Response to comment: Supplementary information on registration has been added under the subsection Data.
The study looked at 24 hour periods I think and for the purpose of the study is probably reasonable but in the general planning for staff for the delivery ward maybe a comment should have been made in relation to night and day time staffing.
Response to comment: Thank you, this perspective has now been added to the description of the organizational aspects of labour and to the discussion.
There are a number of other factors related to manpower planning on the delivery ward that might have been discussed if the paper was meant to make conclusions about that subject. The discussion could have been expanded a bit yet at the same time more focussed
Response to comment: The discussion has now been elaborated and more focussed.
I enjoyed reading your paper, but I think you could improve it considerably.

VERSION 2 – REVIEW

REVIEWER	Alison Macfarlane Professor of Perinatal Health City University London England
REVIEW RETURNED	07/17/13

THE STUDY	Although the authors have used methods relevant to their research question, I am concerned about the research question.
RESULTS & CONCLUSIONS	Again my concern is about the research question
REPORTING & ETHICS	No checklist is quoted but this may not be necessary for this article.
GENERAL COMMENTS	The authors have answered my previous comments, but I still have concerns about the relevance of their results. 1. The authors have answered their research question, and given fuller information but it still appears to me to be limited. As the information they have analysed is available only retrospectively and there is considerable year to year variation in numbers of births, I find it difficult to see how it can be used for forward planning of staffing levels. An explanation is needed. 2. Data for each day of the week within each year were analysed separately. The authors stated that there is a mid week peak and presented data graphically showing trends for each day of the week separately. These show considerable differences from year to year. Summary statistics showing the extent of day of the week differences and how they differ from place to place and year to year. 3. Many studies of daily births elsewhere have found seasonal differences within years. It may be that these differences do not exist in Denmark. If so, this should be demonstrated. 4. For an international audience, a description is needed of an 'obstetric clinic'. Are these staffed only by obstetricians, or do midwives work there too? If so the term 'maternity unit' would be more appropriate and the application of the findings to midwives and obstetricians separately should be described. Also it would be more appropriate to replace the term 'manpower' by 'workforce' or 'staffing'.

VERSION 2 – AUTHOR RESPONSE

Concerning the comments made by professor Macfarlane.
Response to the 1st comment:
Management will always have to plan the average staff needed based on general demographic trends, known seasonal patterns and other more gradually varying trends, while the short-term random variation needs to be described by a probability model. We have performed an empirical investigation of the often quoted possibility of using the Poisson distribution and found it more suitable and easy to use than anybody could have hoped for.
Response to the 2nd comment:
The specific differences between days of the week can only be rationally explained as consequences of decisions at some (or several) management levels. Our ambition is restricted to describing the remaining random variation, and here the Poisson distribution turns out to be helpful.
Response to the 3rd comment:
We also have seasonal differences in Denmark as apparent from the attached Table 2.2 from the official publication on Vital Statistics 2009 from Statistics Denmark (please see the cover letter). However, these variations are reasonably stable and not very large, so should be easy to incorporate into long-term management planning of average staffing levels.
Response to the 4th comment:
We have made some few changes in the introduction where the term 'obstetric clinic' in the Danish setting is described. Furthermore we have opted for the term 'staffing' throughout the manuscript.