Author's response to reviews

Title: Temporal changes in key maternal and fetal factors affecting birth outcomes: a 32-year population-based study in an industrial city

Authors:

Svetlana V Glinianaia (svetlana.glinianaia@ncl.ac.uk)
Judith Rankin (j.m.rankin@ncl.ac.uk)
Tanja Pless-Mulloli (tanja.pless-mulloli@ncl.ac.uk)
Mark S Pearce (m.s.pearce@ncl.ac.uk)
Martin Charlton (martin.charlton@nuim.ie)
Louise Parker (Louise.Parker@iwk.nshealth.ca)

Version: 2 Date: 17 July 2008

Author's response to reviews: see over
Dear Editor,

Thank you for forwarding us the reviewers’ comments. Enclosed is a revised version of the paper that has been amended in response to the reviewers’ comments. Please find our reply to the reviewers’ comments below. The original reviewers’ comments are in Times New Roman font, our reply is in plain Arial, those parts of the text that would appear in the manuscript are given in italic and changes are highlighted in yellow.

Reviewer 1 – Amy Branum

In general, this is an interesting descriptive paper of trends of pregnancy and birth outcomes in an English city. The results will be useful to others conducting trend analysis on a regional or national level. A few discretionary revisions follow.

1. This may be nit-picking, but the title is a bit misleading. Based on the title I expected an analysis of which predictors most strongly indicated adverse birth outcomes, and if those associations had changed over time. For example, I was expecting to see results like whether maternal age a stronger predictor (in the regression analysis sense) of low birthweight in the 1960s compared to the 1990s, versus an analysis of trends in factors that are associated with adverse birth outcomes. In addition, stillbirth and infant mortality are not predictors of birth outcomes, per se.

Reply: We agree that the word ‘predictors’ in the title might be misleading for a reader in terms of expectations of the performed analysis. However, as the described factors, i.e. maternal age, parity, birthweight and gestational age, in particular, affect birth outcomes (stillbirth and infant mortality in this case), in this context they can be seen as predictors.

We have changed the title to address comments of both reviewers (James Chalmers suggested to reflect the population base of our study in the title):

“Temporal changes in key maternal and fetal factors affecting birth outcomes: a 32-year population-based study in an industrial city”

2. It might be interesting if the Authors looked at a few birth outcomes according to the deprivation index. Although the Authors illustrate the important trend in the widening SES gap over time, it could be useful to the reader to see how that trend may have directly impacted low birthweight or preterm birth (e.g., do women in the highest quintile have more low birthweight now than they did in the 1960s?).

Reply: We agree with the reviewer that it would make the results more interesting for the reader if we add analysis on the effect of SES on low birth weight and preterm birth. We suggest that the reviewer/editor consider that if we present this analysis for SES
it would be logical to present a similar analysis for other factors as well. However, this would be beyond the scope of this descriptive paper and is subject of another paper presenting findings from logistic regression analysis and fractional polynomial models. We have therefore not taken up this reviewer’s suggestion.

**Reviewer: 2 – James Chalmers**

The reviewer has one suggestion for discretionary revision and two for compulsory revisions.

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

In the abstract section, the authors state that they aim to “describe temporal changes in key predictors of birth outcomes in Newcastle upon Tyne over three decades, 1961-1992” and this is what they have done. For ease of reading, however, it would be useful to have a more detailed description of the aims of the study. These should point out the main predictors of interest, and indicate that other parameters are also described, such as birthweight, gestation, stillbirth and infant death. (discretionary revision).

**Reply:**

Such fetal parameters as birthweight and gestational age can be considered as birth outcomes, however, they can also be seen as fetal factors affecting such pregnancy end points as stillbirth and infant mortality. Therefore, in this paper we call them ‘fetal factors’ that in addition to maternal factors (maternal age, parity and socioeconomic status) affect fetal and infant survival.

As according to both reviewers’ comments we have changed the title, we have also amended the objective and Conclusions in the abstract accordingly: (Page 2)

“The objective of this study was to describe temporal changes in key maternal and fetal factors affecting birth outcomes in Newcastle upon Tyne over three decades, 1961-1992”.

Conclusions: Key maternal and fetal factors affecting birth outcomes, such as maternal age, parity, socioeconomic status, birthweight and gestational age, changed substantially during the 32-year period, from 1961 to 1992.

In response to the reviewer’s comment we have also amended the objective of the study at the end of the Background (page 4):

“The UK Particulate Matter and Perinatal Events Research (PAMPER) study offers the unique opportunity to describe temporal changes in key maternal and fetal factors affecting birth outcomes in a single conurbation over three decades, from 1961 to 1992. More specifically, we describe trends in maternal age, parity, aggregate level socioeconomic status, birthweight and gestational age and also demonstrate a reduction in stillbirth and infant mortality by decade.”

2. Are limitations of the work clearly stated?

Yes. However, I think that we need to have a more extensive discussion of the problems of estimating the accuracy of gestational age prior to the generalised use of ultrasound. In particular, how likely is it that large babies, who appear heavier than their gestation (based on LMP) might suggest, could be misclassified at birth. For
example, if the mother delivered a large baby at 36 weeks based on a slightly uncertain LMP, is there any possibility that the midwife might assume that the LMP was wrong, and reclassify the gestational age? (compulsory revision)

Reply:
We fully appreciate reviewer’s concerns regarding potential problems of estimating the accuracy of gestational age prior to the use of ultrasound. Gestational age estimates may have more uncertainty in the 1960s and 1970s, because it was mainly based on the last normal menstrual period (LMP) and, if the dates were uncertain, on the paediatric examination of the baby. However, it is unlikely that gestational age in our data which mostly originated from neonatal records, may have been reclassified by a midwife if she felt that the baby was too heavy for a given gestational age. We tried to make sure that the gestational age recorded in our dataset was as accurate as possible by accepting gestational age calculated from the recorded estimated date of delivery (EDD) (i.e. LMP based) for the majority of cases. Only when the EDD recorded in the notes was grossly implausible or missing did we accept the gestational age recorded in the notes (either based on obstetric or paediatric assessment). For example, the percentage of gestational age records based on the recorded EDD for 1961-70 was about 87% from records with known gestational age. It is an almost impossible task to estimate how often for the remaining 13% of births gestational age might have been reclassified on the basis of heavy for gestational age birthweight (BW). Examples of BWs for that period that are quite heavy for their gestational ages are: 102 babies with BW ≥2500g (29 out of them with ≥3000g) born at 32-36 weeks (19% of all babies born at 32-36 weeks) or 16 babies with BW ≥1500g born at 28-31 weeks (15% of all babies born at 28-31 weeks). Hence, if gestational age was reclassified towards a higher gestation, it could only happen in a minority of cases and is unlikely to be systematically biased.

In response to the reviewer’s comment, we have added the following (highlighted in yellow) to the Discussion section when this issue is discussed among the limitations of the study:

The accuracy of gestational age estimates is important for epidemiologic studies of pregnancy outcomes. Different methods for gestational age assessment (based on the last normal menstrual period (LMP) or early ultrasound measurements) throughout the study period may introduce bias in gestational age estimation over time. Thus it has been suggested that higher rates of preterm birth may be reported if determination of gestational age is based on ultrasonographic dating alone [45, 46]. In the 1960s and 1970s, when gestational age estimate was based on LMP and, if the dates were uncertain, on the paediatric examination of the baby, it may have more uncertainty. However, while creating our birth record database, we made the recording of gestational age as objective and accurate as possible by accepting gestational age calculated from the recorded estimated date of delivery (EDD) (i.e. LMP based) for the majority of births rather than by entering gestational age recorded in the neonatal notes or birth records. For example, the percentage of gestational age records based on the recorded EDD for 1961-70 was about 87% of records with known gestational age. In this study the ultrasound age estimate has been used since the early 1980s only for pregnancies with uncertain date of LMP or if there was a significant discrepancy between the two estimates, therefore it should not bias gestational age estimates over time. Moreover, gestational age seems to be accurate in our study as birthweight distribution at early gestational ages has a single mode in contrast to other studies reporting bimodal birthweight distributions at early gestations with implausible high birthweights for gestational age [16, 17].
8. Do the title and abstract accurately convey what has been found?

I am not happy about the use of the term “cohort”. It either implies that a cohort of women has been studied, which is not true since it looks at successive cohorts, or it implies a “cohort study”. This latter interpretation would imply that a group of women with certain characteristics were compared with an appropriate group without such characteristics and then the outcomes were studied. This is not the case here since we are not presented with the outcomes compared to the predictors. What we are getting is a description of the maternity population at different times. This is valuable in itself because so few areas have suitable data going back far enough and the authors should be proud to reflect this in the title.

(compulsory revision)

The abstract is clear.

**Reply:**
We amended the title according to the reviewer’s comment. The title reads now:

“Temporal changes in key maternal and fetal factors affecting birth outcomes: a 32-year population-based study in an industrial city.”

We have also amended the subheading of the Methods on page 5 to ‘PAMPER birth population’ and the title of Table 2 to ‘Basic description of the PAMPER birth population 1961-92’.

We look forward to hearing from you in due course.

Yours sincerely,

Dr Svetlana Glinianaia.