Author's response to reviews

Title: Low birth weight in Sao Luis, northeastern Brazil: trends and associated factors

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

Please find enclosed the re-revised version of our paper entitled **Low birth weight in São Luís, northeastern Brazil: trends and associated factors.** We changed the title to better reflect the manuscript contents.

Please note that the present version followed concerns made by the BMC Executive Editor Peter O'Donovan that mentioned overlap in the data presented in this manuscript and in another manuscript under consideration entitled “Changes in perinatal health in two birth cohorts, 1997/98 and 2010, in São Luís, Brazil - manuscript number 9114343501112551”

We argued that while the manuscript number 9114343501112551 presents data including multiples this manuscript only presents data including singletons. For the first year (1997/98) the number of cases presented in the first manuscript is 2467 and low birth weight (LBW) rate is 8.5% whereas in the second manuscript the number of studied cases is 2426 and LBW rate is much lower, 7.6%. The same applies to the second year (2010). Thus data are not comparable because of exclusions of multiples in the second paper as it is always done in papers aiming at exploring risk factors for LBW to avoid confounding by multiplicity. Thus, we are convinced that data presented in the two manuscripts although coming from the same database is not the same.

Please find below a transcription from the last email sent by the BMC Executive Editor Peter O'Donovan:

“Having read your response, and both manuscripts I would agree that the data used in both manuscripts are indeed different. I would recommend that you do mention this and explain it clearly in the cover letter of your revision so that it is easily assessed by our Associate and Section Editors”.

Please find below our point-by-point response to the reviewer’s comments. All changes performed in the manuscript are marked in yellow. Please find enclosed the other manuscript number 9114343501112551.

We hope you will find this re-revised version suitable for publication in BMC Pregnancy and Childbirth

Please let us know if you have any further questions.

Best regards

Heloisa Bettiol and co-authors

**Reviewer's report**

**Title:**

**Version:** 4  **Date:** 28 August 2013  **Reviewer:** Cynthia Ferre  **Reviewer's report:**

I appreciate the attempts the authors made to address several of the methodologic concerns this article has. However, they have not addressed methodologically the major
flaw in their analysis: the 2 cohorts cannot address the changing rates of low birth weight and of stillbirth that the trend data show. The cohorts were not designed to investigate changes in low birth rates: several key variables are missing; there is no review of medical records; still births were not included; and they do not have any cohort data for the years when the low birth rates were higher. Thus the article remains confusing and misleading to the reader. I still strongly recommend limiting the analysis to that of the 2 cohorts or the SINASC trends, but not both together.

In this article we looked at factors associated with low birth weight that could explain changes in time using cohort data but also looked at registry data because if we had only analyzed cohort data it would have given us the impression that LBW had not changed between the two cohort points. However, in fact LBW increased and further decreased. So we are convinced that by including the two data sources we are able to better understand what is going on with LBW rate rather than by looking at each data source separately. We do not think it is better to use only one data source. It was not our intention and we are sure that by doing this it would make the manuscript less interesting. We have data on stillbirths for both cohorts and since this data is the same that has already been described in another manuscript under consideration in BMC Pregnancy and Childbirth, we cited this data in the discussion in this present version (please see page 11 third paragraph). We also changed the manuscript title to make it clear that we studied trends using registry data and factors associated with LBW using data from two birth cohorts.

According to data from the two birth cohorts, stillbirth rate decreased from 18.9 to 13.4 per thousand[23].

The comments below are offered to improve the coherency and interpretability of the analysis.

The statements in the 1st paragraph of the discussion regarding the low birth weight and preterm birth rates remaining stable during the study period are incorrect. They were not significantly different *at the 2 time points* for the cohorts. The authors present no data on how PTB rates may have varied in between these 2 time points.

Changes were made accordingly (page 11, 1st paragraph). The text now reads: “However, LBW rate was not significantly different comparing data from the two birth cohorts at the two time points”.

The authors have not clearly described what this article contributes to the public health or perinatal epidemiology literature, nor even why it is important for the local community. The findings - low birth weight has a multiple risk factors which change over time - are not new. The finding of a ‘fetal shift’ is also not new. In the discussion, the authors go over a list of associations they found and confirm that others have found these associations in other studies. Moreover, the authors cannot address several crucial risk factors such as race/ethnicity, changes in maternal pre-pregnancy BMI, or maternal morbidity (which they have acknowledge in this recent revision). There is no discussion of the implications of the findings for public health practice in the local community.
The two highest ORs for LBW in 2010 are for no prenatal care and for smoking. It is very important to continue improving access to prenatal care and promoting smoking cessation to reduce LBW rate.

Discussion was changed substantially and results were put into context. We also added a paragraph to the background section (please see background, page 5, 4th paragraph). Implications of the findings for public health were also addressed. A sentence was devoted to the need to continue improving access to prenatal care and smoking cessation (page 11, 6th paragraph).

The article continues to have problems with word and paragraph flow within each section. For example, in the Methods section, exclusions are listed in the 5th paragraph however an additional exclusion (births less than 500 g) then appears in paragraph 7. Acronyms are misspelled in several places (IURG in the abstract; LBE in the discussion). References to Tables are missing.

Exclusions are now listed in the same paragraph (page 6, 3rd paragraph). Misspelled acronyms were corrected. We could not find any missing reference to tables. We checked this and all tables are referenced.

Please provide the total number of births for each time period before sampling.

We did not report this number because they can be easily derived from the numbers and percentage already shown in the text.

Please state that the study design is a retrospective cohort and trend study.

We have stressed in the methods section that this is a birth cohort and trend study.

Page 5: Data was abstracted from two birth cohorts performed in the municipality of São Luís.

Page 8: Birth registry data from SINASC for São Luís, from 1996 to 2010, were used to analyze trends in stillbirth and LBW rates, using 3-year moving averages.

Please provide a reference for the prenatal care index in paragraph 8 in the Methods section.

This reference was already provided (reference 19) but it was in a different paragraph. This paragraph was moved to the most appropriate place (page 7, 2nd paragraph).

The statement about newborns being weighed at birth is not needed since the authors removed the language on babies being weighed at interview. The use of “birth weight” is...
sufficient.

The statement was removed.

Please include the percentages that were imputed, not just the numbers, in the methods section.

Percentages were included (page 8, 1st paragraph).

In 1997/98, 250 cases were imputed (10.3%), 7 as preterm and 243 as term births whereas in 2010 a total of 487 cases were imputed (9.7%), 29 of them as preterm births and 458 as term births.

Results line 1: this p-value (0.742) does not agree with Table 1 (p=0.847)

Thank you for spotting this error. The correct figure is 0.847. The text was corrected.

The statement “Later on possibly medical care improved further still leading to simultaneously decreasing stillbirth and LBW rates” is conjecture. Not clear what ‘improved medical care’ means.

A reference was included to support this hypothesis (reference 24). Medical care was explained: obstetric and neonatal care including careful fetal surveillance and prompt obstetric intervention where indicated (page 11, discussion 3rd paragraph).

These changes suggest improving obstetric and neonatal care including careful fetal surveillance and prompt obstetric intervention where indicated[24]. From 1996 to 2001 low birth weight fetuses instead of dying in utero (stillbirths) were rescued and born alive, thus increasing LBW rate. Later on possibly obstetric and neonatal care improved further still leading to simultaneously decreasing stillbirth and LBW rates.

The statement about the lower LBW rate in 1997 in the SINASC data being due to missing birthweight is also conjecture (no data presented).

This sentence was deleted.

The paragraph on cesarean section in the discussion needs to be reordered and clarified. Was there an assessment of potential effect modification between c-section and other maternal variables? Several sentences in this section do not make sense: “although unnecessary cesarean section deliveries were still performed they may now be less associated with iatrogenic prematurity and IUGR”. Not clear how c-sections for iatrogenic PTB and IUGR are unnecessary.

The paragraph on cesarean section was modified. It was not our objective to assess potential effect modification between c-section and other maternal variables. Several sentences were rewritten to make the meaning clearer (page 14, 1st paragraph).
Despite the significant increase in cesarean section rate, type of delivery was not associated with LBW in the adjusted analysis. This association was only observed in univariable analysis in 1997/98. After adjustment for confounding variables, type of delivery was not considered to be a risk factor for LBW in any of the cohorts studied, in contrast to other studies [2, 12]. Previous studies conducted in Brazil have shown that incorrect late ultrasound dating of gestational age was associated with increased iatrogenic preterm births [2, 31]. This lack of association between cesarean section and LBW in the later cohort may be explained in part by greater access to early ultrasound exams that provide a better dating of gestational age. Thus, although many unnecessary cesarean deliveries were still performed because of convenience (cesarean section rate was very much higher than the maximum recommended rate for medical reasons[32]), cesarean section was not associated with iatrogenic prematurity and LBW in the 2010 cohort. An association between cesarean section and LBW has been reported in a previous study using data from the earlier cohort (1997/98)[33]. However, there was an increase in early term births, what might be associated with increasing cesarean section rates from 1997/98 to 2010. Increasing early term births has been associated with medical intervention and has deleterious effect on subsequent offspring’s health and development[34, 35].

Not clear how “percentage of births at 37 and 38 weeks . . . provides evidence in this respect”.

This sentence was deleted.

Figure 3 indicates that there was a shift to this gestational age range from the greater gestational ages (reduction in weeks 40-42) but the authors do not present data showing c-section or induction rates by gestational age and how these may have changed over time. C-section was associated with increased low birth weight in the first cohort and not in the second.

Figure 3 was amended. Some gestational age groups were collapsed to facilitate understanding. We also included figure 4 to show how c-section rates by gestational age changed over time. We emphasized that c-section was associated with increased low birth weight in the first cohort and not in the second.
Cannot read the legend in Figure 2. The columns on %LBW in Table 5 repeat data from Tables 3 and 4.

Legend was modified. The columns were removed.

Supplementary Tables 3 and 4 are not necessary. It is sufficient to say in the text that a sensitivity analysis was done and the imputation did not affect the findings.

Supplementary tables 3 and 4 were removed. It was stated in the text that sensitivity analysis was performed and the imputation did not affect the findings (results, page 11).

**Level of interest:** An article of limited interest  
**Quality of written English:** Not suitable for publication unless extensively edited  
**Statistical review:** Yes, and I have assessed the statistics in my report.  
**Declaration of competing interests:** I declare that I have no competing interest

English was revised.