Reviewer's report

**Title:** Infant Mortality and maternal age in two Sicilian districts: a retrospective study.

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**Reviewer:** David A Paul

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The study of Mazzucco et al. Infant mortality and maternal age in two Sicilian districts: A retrospective study is a retrospective evaluation of infant and neonatal mortality in two Sicilian districts. This investigation studies an important topic, the affect of maternal age on infant mortality. The authors conclude that infants born to older mothers (>40) in Messina district have greater odds of dying compared to infants born to older mothers in Palermo.

• The objectives are well defined, but broad in nature.
• Methods are appropriate.
• The data analyses are generally sound. However, I question whether IMR in women >40 in each district really differ. See comments below.
• Manuscript does adhere to standard for reporting.
• The authors do a nice job explaining the limitations of the study including missing data. Correcting for birth distribution of missing data is also helpful in supporting the results.
• Previous work is acknowledged.
• Title is appropriate. Abstract, is well written but needs some revision of the conclusion. See comments below.
• Writing is acceptable.

**Major Compulsory Revisions:**

1. The conclusions in the abstract should match more closely the conclusions in the Discussion-that the increase in IMR in Messina is due to an increase in mortality in infants born to older mothers, unrelated to an increase in births in this population.

2. The authors define NMR as death in the 1st week of life. The standard definition for NMR is death is the 1st 28 days of life. Is NMR defined differently in Italy? Unless this is the case, the authors need to either rename the deaths in the 1st week as something other than NMR (early NMR) or recalculate the data using the standard definition. Defining NMR as deaths in the 1st week is also problematic for the classification of post-neonatal MR as it pushes more infants into this category.

3. More demographic information regarding the districts should be provided for
the reader. How many NICUs are in each district? Are Reproductive Endocrinology/Infertility Services available in each district? High risk OB services? Are the rates of multiple births available from each district? It would be helpful to know the total number of births and premature births in each district.

4. Although the proportion of VLBW infants who died is similar in each district, the NMRs are very different. This highlights the point made above, readers need to know more about NICU availability. The authors state that twice as many infants were admitted to NICU in Messina. Why was this case with similar BW distribution? Some data on NICU admission is presented at the end of Table 2. Please clarify what is meant by “Presence” in this table.

5. Authors need to explain why there was an increase in deaths from prematurity in Messina without any difference in the distribution of birthweight or gestation. This would suggest either a difference in registration/classification of deaths or difference in quality of NICU care.

6. Please provide data on multiple births in table 2. The authors speculate that the increase in IMR in older women is secondary to IVF, multiple births and low birth weight. The distribution in birthweight did not differ in the infants who died. The study would be strengthened if evidence were presented that the regions differed in birthweight, multiple births or infertility procedures. This information is really needed to strengthen the speculation of the authors.

7. In Table 3, although the Odds ratios differ in magnitude for women >40, the 95% overlap for the 2 districts. Is there really a difference between regions given this overlap? It is also curious why there is no maternal age affect in the 35-39 category in either region? Please speculate.

**Discretionary Revisions:**

1. Some of the abbreviations are not standard and difficult to follow including RenCaM, BC, ISTAT, ASP, SPO.

2. Please clarify how births were classified for women residing outside of the districts who delivered in the districts and for women residing in the districts who may have delivered elsewhere.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.