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*Econ 756 | Health Economics*

*Cuttting costs without cutting corners*

Analysis of neonatal mortality for midwife deliveries

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Econ. 756 Paper Proposal

1. Aims

This paper will investigate the relationship between birth attendant (i.e. doctor vs. midwife) and neonatal health outcomes. Analyzing birth records from the U.S. between 1995-2002 using propensity score matching will constitute the first in-depth look into the efficacy of midwife services in the U.S.

1. Relevance
   1. Introduction

One of the main goals of the Affordable Care Act was to lower healthcare costs for Americans by encouraging individuals to get covered by health insurance, expanding Medicaid, and encouraging hospitals to lower healthcare cost while maintaining healthcare quality (citation). Labor and delivery should be foremost in hospitals and policy-makers’ minds. Not only does the U.S. have one of the highest infant mortality rates in the developed world (cia factbook), but the cost of child birth in the U.S. is much higher than other Western countries as well (ny times). One significant difference between childbirth in the U.S. and other developed countries is the percentage of births that are attended by a midwife. In the U.S. only eight percent of deliveries are attended by a midwife as compared to 45 and 68 percent in the Netherlands and Britain, respectively. Although increasing the number of births attended by a midwife may indeed lower costs, but the difference in infant mortality rates may differ because of differences in population characteristics. Therefore, before increasing midwife assisted births is suggested as a cost-cutting measure, we must establish how birth outcomes in the U.S. vary based on birth attendant in order to insure that no adverse health outcomes will be introduced.

* 1. Literature Review

There is a wealth of research on the efficacy of midwives as compared to doctors. Most of these studies focus on midwifery in the developed English-speaking world, but with few studies from the U.S. Berglund, Lindberg, Nystrom and LindMark show that there are no adverse effects on risk assessment when Swedish women’s risk level is assessed only by a midwife as compared to a midwife and doctor in sequence (2007). Black, Mitchell, and Danielian use observational data from a training hospital in the U.K. Their results show midwifes have no more 3rd and 4th degree perineal tears than doctors when performing instrument assisted births. Examining birth data from British Columbia, Janssen and Ryan Et al. demonstrate that low-risk women planning on giving birth with the assistance of a midwife were less likely to receive narcotic analgesia, amniotomy, cesarean section and electronic fetal monitoring than patients planning to deliver with a family practice doctor. Rosenblatt and Dobie Et al. produced similar results to Janssen and Ryan found similar results in the state of Washington. Their results also demonstrated that family practice doctors administered interventions at essentially the same rate as obstetricians. From a randomized trial in the UK Turnbill and Holmes Et al. demonstrate that many of the same findings of Rosenblatt and Janssen as well as showing that neonatal outcomes are much the same between shared care (obstetricians, family practice, midwives) and midwives. Also, perineal tears were lower and mother’s satisfaction was higher among women delivered by a midwife. Finally, Jena, Prasad, Goldman and Romley demonstrate that patients treated for AMI and heart-failure at major teaching hospitals during two national conferences for cardiologists had mortality outcomes no worse than those treated during non-conference periods. All of these studies illustrate something important about the quality of midwifery services.

In above mentioned studies none of the researchers were able to demonstrate that women delivered by midwives fared any worse than women delivered by doctors. Furthermore, all of the studies, including the study involving cardiologists, point to the fact that in many scenarios in medicine it would appear that “less is more”, meaning that practitioners who often use less invasive methods are likely to produce similar outcomes. With this research in mind it is essential to test whether these findings hold true when applied to the entire United States.

* 1. Innovation

My research will be distinguished from previous studies in three major ways. First, I will focus my research on slightly different outcome variables. Second, my sample will be much larger than any previously used in the academic literature. And third, I will use statistical techniques previously unused in the literature to perform my analyses.

First of all, as mentioned above, many previous studies in the public health literature have focused on the differences in rate of analgesia usage, cesarean section rate, and the rate of perineal tears among women delivered by doctors or midwives. While these metrics capture important aspects of the birthing, they do not capture what may be viewed as the most important aspects of childbirth. In particular, according to the Kaiser Family Foundations 2014 data the United States has the 49th lowest number of infant deaths per one thousand live births. The U.S. infant death rate of 6.17/1000 live births puts the U.S. in the same league as Poland, Serbia, Lithuania, Bosnia, and Croatia. In comparison infant death rates are 24%-29% lower in other economically advanced Anglophone countries such as Canada, New Zealand, Australia, and the United Kingdom. While in 2012 the U.S. spent more than twice as much per capita than any of these countries and spent more on healthcare per capita than any other country in the world (citation). Therefore, focusing my research on how midwife deliveries impact infant mortality will not only be a novel addition to the public health literature, but it may also yield valuable insights into reducing healthcare costs.

Second, previous research has focused on the affects of midwifery care at very localized levels. The midwifery studies cited in the literature review focused on the effects of midwifery care at the hospital or in the broadest analyses the provincial/state level. My research will use data from all fifty states and the District of Columbia to evaluate the effectiveness of midwifery care at the national level. The large scope of this data will be necessary because of how rare infant death is. Having such a large sample of infant deaths should allow me to better predict infant deaths. Furthermore, many studies have analyzed only low risk pregnancies. While analysis will also analyze the effects of midwifery care on the outcome of low-risk pregnancies. I will also test the effectiveness of midwifery care on high-risk pregnancies as well. These analyses will highlight any advantages that doctors may have over midwives.

Finally, the literature on midwife services up to this point has failed to use any statistical techniques for improving the comparison between the patients seen by the two types of practitioners. Limiting the test cases to low-risk pregnancies is not enough to guarantee that patients seen by midwives and doctors will be similar. There may still be selection bias unless the observations are conditioned on their treatment status as well as their observable characteristics (citation). Therefore, I will undertake propensity score matching to ensure that my samples of treated and untreated patients are as similar as possible to eliminate any potential selection bias.

The differences between my proposed research and the existing literature are significant. Furthermore, my analysis will be useful to policy makers, insurance providers, and healthcare professionals as they seek for ways to improve the efficiency and cost effectiveness of the American healthcare system. In the next section I will detain my methodology and highlight sample analyses that I performed on a small subsection of the data.

1. Methods
   1. Data

The data for this study were obtained from the National Bureau of Economic Research (NBER), which keeps a repository of U.S. natality data gathered by the Center for Disease Control (CDC). The CDC collects data on every known birth in the United States each year. This data contains information regarding demographics, geography, health status, and birth attendant. In addition, the CDC collects data on infant mortality records and links this information with the birth records if the birth and death occurred in the same year. Using these linked files allows me to control for key characteristics of the mother, child, and birthing experience that have important impacts on neonatal mortality aside from whether the birth was attended by a midwife.

The data covers all births in all fifty states and the District of Columbia from 1995-2004. More data exists for subsequent years, but due to missing key variables in later years the study was limited to the above mentioned timeframe. Also, due to my computational constraints I was unable to analyze all of the data from this period. I limited my analysis to births that took place in Georgia because it had a large proportion of births delivered by a midwife (approximately 20% of all births) and it is one of the largest states in country by population (Wikipedia). I further limited my study to women who did not give birth by cesarean section and who were delivering their first child. Women who had given birth previously to either a live or still born child may have learned valuable information about their childbearing experience which would likely exacerbate the selection bias problem. Also, cesarean births were excluded in order to analyze how midwives actually perform while delivering babies. Since midwives are not able to perform cesarean sections they are naturally excluded regardless of whether or not they were preplanned. *Figure 1* gives a visual representation of proportion of births attended by a midwife in the lower forty-eight states.

*Figure 1*

* 1. Hypothesis

This research will test whether births attended by midwives have noticeably different neonatal outcomes, specifically neonatal mortality and five-minute APGAR score from births attended by doctors. Investigating the relationship between midwife assisted births and neonatal outcomes may be obscured by the myriad of medical complications that may affect a woman or her baby during childbirth. Therefore, to aid in uncovering any potential relationships I divided the data into both low-risk and high-risk births, which will be defined later, to test whether midwives fare relatively better or worse give the risk-level of the birth. I hypothesize that midwives will achieve neonatal mortality rates and five minute APGAR scores among low-risk births that resemble or are more favorable than those found among babies delivered by doctors. I also hypothesize that high-risk births delivered by midwives will exhibit higher infant-mortality and lower APGAR scores. The next section will layout the methodology for testing these hypotheses.

* 1. Methodology

Specifications for low-risk/high-risk

The CDC provides a very detailed record the health of the mother and baby before, during and after the birth of the child. High-risk pregnancies were classified based on a series of indicators that would have either been visible to the practitioner before or during labor but is not based on any variables that would have visible only after birth. These variables include

Propensity score matching

Why it matters

What it does

How I will match

* 1. Next

1. Discussion
   1. Results
   2. Policy Implications
   3. Future Research
2. References:

[http://kff.org/global-indicator/health-expenditure-per-capita/#](http://kff.org/global-indicator/health-expenditure-per-capita/)

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