The Affordable Care Act: Did it Improve Pregnancy Health Outcomes for Women?

Honors Thesis

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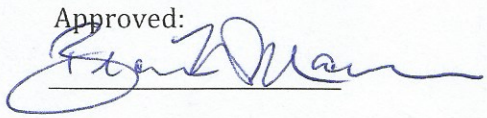

Dr. Brian McManus

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Abstract

This paper is an analysis of the Affordable Care Act in terms of its effectiveness in creating healthier pregnancy outcomes. I use data collected by the CDC from mothers who gave birth in the United States between 2004 and 2013 to analyze the trends in insurance coverage, prenatal health care consumption, and pregnancy health outcomes all while controlling for pertinent demographic factors. The findings of this study show that there is a positive relationship between insurance coverage and consumption of prenatal health care. They also show a positive relationship between consumption of prenatal health care and the probability of having a child with a normal birth weight. Furthermore, this research also finds a sharp increase in the consumption of prenatal health care in 2011 – approximately 9 months after the ACA was signed into law.

1. Introduction

As the cost of health care continues to rise in the United States so has the importance of the Affordable Care Act. The Patient Protection and Affordable Care Act (ACA) was enacted in March of 2010 with the goal of providing health insurance to nearly one hundred percent of Americans in numerous different ways including the young adult mandate, the expansion of Medicaid, and the creation of the public exchange (Gruber 2011). The goal of this paper is to examine the way in which women have received health insurance since 2004 and how the breakdown of insurance types has shifted since the ACA was signed into law with the final goal of understanding if this legislation has affected health outcomes for pregnancies carried to term. A change in the way health insurance is distributed to young women corresponding with an increase or decrease in prenatal healthcare consumption demonstrates that there is a causal effect between health insurance coverage and prenatal healthcare consumption. This paper also shows that an increase or decrease in consumption of prenatal care can affect the likelihood of having a healthy pregnancy outcome to complete the link between health insurance coverage and healthy pregnancy outcomes.

I have chosen to research this topic because very little has been written about the effect of the Affordable Care Act on pregnancy health outcomes, and pregnant women are the most important group to analyze in terms of their health insurance coverage as providing coverage for one pregnant woman ultimately improves health outcomes for two individuals. My research contributes to the existing stock of literature that points to improvements across a wide variety of health categories after the enactment of the ACA. Additionally, an alternative finding would still provide value, as it would demonstrate to policy makers that there is need for further improvement in terms of improving pregnancy outcomes.

Prior to the ACA, young adults were no longer eligible for coverage on their parents' private health insurance plan on their 23rd birthday if they were attending college and on their 19th birthday if they were not. Now, all young adults may remain on their parents' private insurance plan until the start of the first plan year after their 26th birthday (Anderson et al. 2014). For example, if an individual were to turn 26 in May and their parents' insurance plan year does not begin again until August, then that individual would be covered by their parents' plan until August under the new legislation. The ACA provided these young adults with three to seven additional years of health insurance coverage than they previously had access to, and this should have caused an increase in health care consumption among these individuals as the costs to them were greatly reduced.

The next piece of the ACA relevant to the scope of this study is the expansion of Medicaid to 138% of the Federal Poverty Level (FPL) that was adopted by 27 states and took effect on January 1, 2014 (Busch et al. 2014). This is interesting for the study because it increased the number of people with health insurance and access to health care, but because only 27 states adopted the expansion it also provides the chance for a control group that can help isolate the effect of this specific policy. This would manifest itself in the data as a decrease in the uninsured rate, an increase in the Medicaid coverage rate, and possibly an increase in health care consumption for those who report Medicaid as their primary insurance provider.

The final portion of the ACA that will be analyzed is the public health insurance exchange. By 2014 almost all Americans were required to have health insurance (or pay a monetary penalty if they do not), and the exchange provides the opportunity for these otherwise uninsured individuals who earn less than 400% of the FPL to purchase coverage (Busch et al. 2014). Under this provision no one could be denied access to coverage based on a pre-existing

condition, and these exchanges opened between 2013 and 2014 depending on the state. Similar to the previous two policies, the addition of the public health insurance exchange increased the number of individuals with access to health insurance coverage and is expected to improve access to health care.

In this paper I analyze the effect that this increased access to health insurance has had on pregnant women and their children. Specifically, I address the following questions:

1. Has the ACA changed way that women receive health insurance coverage?
2. Has the ACA changed the consumption levels of prenatal health care by women?
3. Has the ACA changed health outcomes for pregnancies carried to term?

In addition, this research provides a more in depth look at the specific policies of the ACA and the effect that each had or did not have on pregnancy health outcomes. The analysis of the individual provisions can help lawmakers understand which of the policies were most effective in changing health outcomes for individuals and help them come to more efficient conclusions in the future.

Finally, a strong causal effect between health insurance and healthy pregnancies stresses the importance of providing coverage in a more universal manner and likewise help guide future policy. To date, no study has been conducted focusing specifically on how access to health insurance affects pregnancy outcomes; therefore, this is the first to provide insight on the effectiveness of the Affordable Care Act in regard to pregnancy health and will allow policy makers to better understand whether the ACA is a step in the right direction or if they should consider a different course of action.

This study finds the relationship between health insurance coverage and prenatal health care consumption to be positive and significant. Such a result demonstrates the important role health insurance plays in increasing the likelihood a mother will take prenatal health care visits. Furthermore, this research reveals a positive and significant relationship between prenatal health care consumption and a healthy pregnancy.

2. Literature Review

Very little research has been conducted specifically focusing on pregnancy outcomes and health insurance. But, there has been a fair amount research conducted on access to health insurance under the ACA that shows the young adult mandate had a significant effect in terms of expanding health insurance coverage. According to the National Health Interview Survey there was an 8.3% increase in young adults with health insurance from September 2010 to June 2011 (Cohen 2011). This suggests that assumptions made about the effectiveness of the young adult mandate in providing insurance coverage are correct as the mandate was enacted in September of 2010, and I look to confirm this by showing a similar pattern in my data.

Sommers and Kronick (2012) found that after the implementation of the young adult mandate there was a significant 4.3% increase in dependents covered by employer sponsored health plans, which shows that the dependent coverage mandate did in fact have an effect on dependent coverage that is significant and can be isolated from other provisions of the ACA. The researchers also found that there was no significant change in the number of people covered by Medicaid, and these findings match the intuition because the Medicaid expansion did not take effect until 2014.

Another study conducted in 2015 estimated that the young adult mandate had a much larger effect on the insurance coverage rate than estimated by Sommers and Kronick of between

5.5 and 6.7%, but this could result from the authors narrowing the age range from 19-25 to 23-25 (Barbaresco et al. 2015). These same authors also concluded that the percentage of people self-reporting a health status of "excellent" increased significantly by around 1.4%. This conclusion supports the notion that increased access to health care through increased coverage can lead to improved health.

In another study it was found that there are many merits to a universal health insurance system through her analysis of the Canadian health insurance model (Deber 2003). Though the United States has a plethora of insurance providers and is nowhere near having a similar single payer system, Canada's system can serve as a benchmark for the United States as it attempts to provide a more universal system of health insurance coverage to its citizens. Deber found that, "Canada has universal coverage, excellent health outcomes, minimal paperwork, and high public satisfaction…One key advantage is the avoidance of risk selection; no one is uninsurable" (Deber 2003). Deber's findings are relevant to the scope of this paper for two reasons. First being that a universal system of health insurance coverage results in excellent health outcomes, so a similar result should be recognized in the United States data after health insurance coverage was expanded in a manner that made it nearly universal. Second, by having everyone in an insurance pool, the costs of high-risk individuals are significantly mitigated by the large population of low risk individuals in the same pool. The ACA's individual mandate requires that every American have health insurance or face a monetary penalty, which creates a system more similar to that of Canada as nearly every individual belongs to an insurance risk pool or pays some amount of money for their abstinence. I expect to find similar trends in United States data that will provide further evidence to propel health insurance reform in the direction of universal coverage. Though it is widely recognized that the United States could not realistically adopt the

same type of health care system as it would be far too expensive and our population is far too diverse, this is simply evidence supporting the notion that improved access to health care will lead to better health outcomes.

Despite the lack of existing research on health insurance and pregnancy outcomes, there is still enough research to support the validity of this study. Many researchers found an increase in insurance coverage after the ACA, and others have found that more individuals having access to health insurance leads to a healthier population of individuals. This study is the first to combine both aspects of such previous research and show the complete relationship between health insurance coverage, prenatal health care consumption, and pregnancy health outcomes.

3. Data

The data source that I use is the Pregnancy Risk Assessment Monitoring System (PRAMS), which is produced annually by the CDC since 1988. This dataset provides access to pregnancy data collected in a household survey of individual mothers between the years 2004-2013. The CDC PRAMS Team randomly samples mothers who have recently given birth by drawing from each state's file of birth certificates, which results in a sample population of between 1,300 and 3,400 women per year per state. Such a survey format provided over 390,000 observations from 2004-2013.

The PRAMS data is highly standardized which allows for comparisons between states and makes it extremely clear what each variable is and how it is measured. A major strength of the dataset is that the survey is conducted in an extremely thorough manner consisting of five separate mailings (three questionnaires and two letters) and a telephone follow-up, plus the dataset excludes states with a response rate of <65%. (Note: This threshold was lowered from 70% in 2007). The questionnaires provide a 3-year calendar to serve as a memory aid when

answering retrospective questions and improve the accuracy of such responses. Finally, all states have implemented an incentive program to encourage survey participation, which helps reduce the voluntary response bias. The combination of these methods ensures that the dataset contains reliably accurate information.

This dataset has a plethora of relevant dependent and control variables, ample demographic questions, and an outcome variable that can be used as a proxy for a healthy versus unhealthy pregnancy. PRAMS contains information on the birth weight of the infant grouped into 250 gram buckets that range from 0-8150 grams, and this allows me to further categorize the birth weight as "Extremely Low," "Very Low," "Low," "Normal," and "High." The extensive series of questions provides a great deal of information about each pregnancy, but a measure of ability or intelligence would be helpful for controlling the effects of education and may also have an effect on the decision to purchase health insurance coverage. There is also a minor lag in this data and it is currently only available through 2013. While this does not allow for a complete analysis of the ACA, this dataset still provides the opportunity to examine the effects of the dependent coverage mandate on the national level and to analyze Medicaid expansion as 27 of 50 U.S. states had adopted the Medicaid expansion in the years covered by the scope of this survey. It should be noted that this study is not a holistic examination of Medicaid expansion. Furthermore, this dataset does not have underrepresented populations or small observation numbers, but for several variables, including income and race, there were missing values that were coded as "Unknown." The "Unknown" category never exceeded 2% of the total population.

The biggest drawback in the PRAMS dataset is the lack of consistency in the insurance question between different survey phases—phases 5,6, and 7 were all used between the years

2004-2013. The Medicaid question and corresponding variable codes remained consistent over the survey phases, but the questions and corresponding variable codes for being covered by traditional employer sponsored insurance plan lacked consistency between survey phases. For example, even after multiple attempts to reconcile the insurance variables, the dataset shows a decline in Insurance and Health Maintenance Organization (IHMO) insurance coverage with large, negative jumps between years when a new survey format was introduced. As the Medicaid and uninsured trends seem to fit with the findings of other research and simple intuition, I am hesitant to accept the IHMO trend as the true trend. Instead, I think it is much more likely that as the insurance question was asked differently over years that individuals began to respond to the question differently.

4. Theoretical Model

The relevant choice in this study is whether the mother has chosen to have health insurance, and the policy that influences this choice is the Affordable Care Act. The ACA created a system in which health insurance coverage is more accessible than previously before and presumably had an effect on the rate at which individuals choose to opt in or out of health insurance coverage. However, there are many factors beyond the ACA that play into an individual's decision to purchase health insurance that I control for such as age, education, income and race. Ultimately, the objective of the mother is to maximize the health of her pregnancy. I model the decision making process as follows:

I have grouped the demographic variables into a vector, "D," and it contains information on Mother's Age, Mother's Race, Mother's Education, Father's Education, and Income. Vector D is included in all models and additional variables relevant to each model will be added and removed as necessary.

1) I_i is used to model the decision to purchase health insurance as a function of the vector "D," as well as birth year of the child. Vector "D" controls for demographic information pertinent to the insurance coverage choice. The coefficient β_2 estimates how effective public policy is in increasing the likelihood that one is covered by an insurance policy. Note that the subscript "t" is used to indicate the time of birth, and that the subscript "c" is used to indicate the time of conception, or $(t - ¾)$.

$I_{ic} = f(D_i, BYear_t)$

$I_{ic}^* = \beta_1 * D_i + \beta_2 * BYear_t + \varepsilon$

$I_{ic} = 1 \quad IF \quad I_i^* > 0$

$I_{ic} = 0 \qquad ELSE$

2) P_i is used to model the individual's consumption of healthcare as a function of the vector "D," birth year ($BYear_t$) as well as a categorical representation of the mother's insurance status (I_{ic}). The outcome variable here is prenatal healthcare consumption (P_i) grouped into three categories: "Inadequate," "Adequate," and "Excellent" based on whether the mother took "0-8," "9-11," or "12+" prenatal care visits, respectively. A causal relationship between health insurance coverage and increased consumption of prenatal healthcare would demonstrate the mechanism through which health insurance creates healthier pregnancy outcomes. The coefficient α_1 estimates whether the effect of health insurance coverage on healthcare consumption is positive or negative.

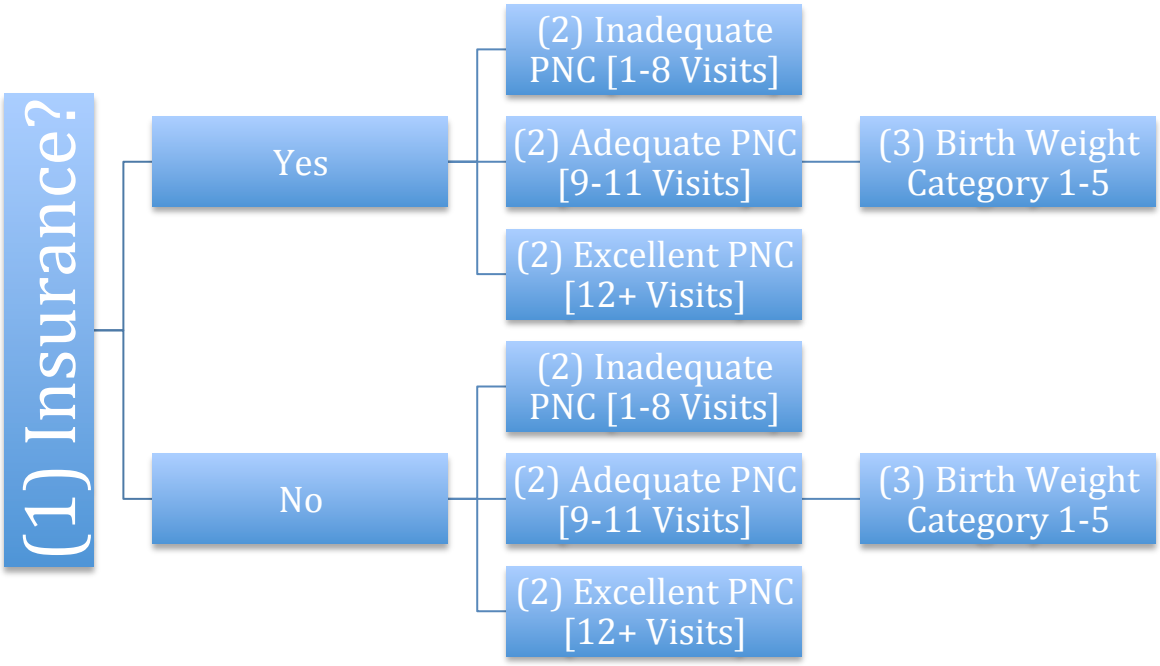
$P_i = g(I_{ic}, D_i, BYear_t)$

$P_i = \alpha_1 * I_{ic} + \alpha_2 * D_i + \alpha_3 * BYear_t + \upsilon$

3) H_{it} is used to model the health outcome of the mother's pregnancy as a function of prenatal health care visits (P_i), the demographic vector (D_i) and birth year. A positive causal relationship between prenatal healthcare consumption and healthy pregnancies would show that prenatal healthcare consumption increases the likelihood of a healthy pregnancy outcome, and the coefficient θ_1 reveals the causal direction of this relationship.

$H_{it} = h(P_i, V_i, D_i, BYear_t)$

$H_{it} = \theta_1 * P_i + \theta_2 * D_i + \theta_3 * BYear_t + \Upsilon$



The above diagram represents the relationship between the three equations described in the theoretical model. Because the PRAMS dataset includes a measure of healthcare consumption during the pregnancy, I am able to determine if having health insurance (1) does in fact increase the number of prenatal care visits taken by the mother (2). Assuming that this can be demonstrated by the regressions, I can then estimate the effect that increased prenatal healthcare consumption (2) has on pregnancy outcomes (3) and ultimately determine the relationship between health insurance coverage (1) pregnancy outcomes (3). Note that the final portion of the diagram displaying "Birth Weight Category 1-5" represents five distinct birth weight outcomes and was condensed to one block for simplicity.

5. Empirical Model

When looking at this information empirically, I am modeling the probability of a healthy pregnancy conditional on that woman's insurance status. I show that whether a woman is insured or uninsured has significant explanatory power in terms of the health outcome for said

pregnancy. Doing so requires three models to link insurance coverage to pregnancy outcomes. The first model is a multinomial logit of insurance status (I_{ic}) on birth year while controlling for demographic variables to show that there was a statistically significant uptick in insurance coverage beginning in 2011. Insurance status is grouped into four categories: "[1] IHMO," "[2] Medicaid," "[3] Uninsured," "[9] Unknown."

$$P(I_{ic}) = \beta_0 + \beta_1 * D[\text{Mother's Age}_{it}, \text{Mother's Ethnicity}_{i,}, \text{Mother's Education}_{ic}, \text{Father's Education}_{ic}, \text{Log Income}_{it}] + \beta_2 * \text{BYear}_t + \boldsymbol{\pi}_{i,t}$$

$$\boldsymbol{\pi}_{i,t} = \boldsymbol{\eta}_t + \boldsymbol{\varphi}_i$$

Please note that the error term, $\boldsymbol{\pi}_{it}$, has been split into two separate error terms to isolate the portion of the error term that arises from time effects ($\boldsymbol{\eta}_t$) from the portion caused by time effects ($\boldsymbol{\varphi}_i$). I also assume that $E(\boldsymbol{\pi}_{it})=0$, $E(\boldsymbol{\pi}_{it} * D_{it})=0$, and $\boldsymbol{\pi}_{it}$ has a standard normal distribution.

The second model is a multinomial logit model that controls for demographic variables and birth year and includes a binary indicator for insurance coverage. The outcome variable of interest is prenatal healthcare consumption (P_i) grouped into three categories: "Inadequate," "Adequate," and "Excellent" based on whether the mother took "0-8," "9-11," or "12+" prenatal care visits, respectively. By setting the base category to 0-8 visits, I expect to find a significant and positive correlation on the insurance indicator variable to show that having insurance makes it significantly more likely that the mother consumes a higher level of prenatal care.

$$P(P_{it}) = \beta_0 + \beta_1 * I_{ic} + \beta_2 * D[\text{Mother's Age}_{it}, \text{Mother's Ethnicity}_{i,}, \text{Mother's Education}_{ic}, \text{Father's Education}_{ic}, \text{Ln(Income}_{it})] + \beta_3 * \text{BYear}_t + \boldsymbol{\upsilon}_{i,t}$$

$$\boldsymbol{\upsilon}_{i,t} = \zeta_t + \boldsymbol{\delta}_i$$

Please note that the error term, $\boldsymbol{\upsilon}_{it}$, has been split into two separate error terms to isolate the portion of the error term that arises from time effects (ζ_t) from the portion caused by time effects ($\boldsymbol{\delta}_i$).

The third model is again a multinomial logit model, but this time I control for demographic variables and birth year with the dependent variable of interest being prenatal care. The final outcome variable of interest is H_{it}, the health outcome of the pregnancy, and it is measured as a categorical variable that corresponds to the infant's birth weight. The birth weight categories are as follows: "Extremely Low," "Very Low," "Low," "Normal," and "High." By setting the base category to "Normal" I anticipate finding a negative and significant correlation on the variable representing consumption of prenatal care visits to indicate that taking higher levels of prenatal care visits results in a lesser probability of the child having a non-normal birth weight.

$$P(H_{it}) = \beta_0 + \beta_1 * P_i + \beta_2 * D[\text{Mother's Age}_{it}, \text{Mother's Ethnicity}_{i,}, \text{Mother's Education}_{ic}, \text{Father's Education}_{ic}, \text{Log Income}_{it}] + \beta_3 * \text{BYear}_t + \boldsymbol{\varepsilon}_{i,t}$$

$$\boldsymbol{\varepsilon}_{i,t} = \boldsymbol{\mu}_t + \boldsymbol{\lambda}_i$$

**Please note the usage of the following subscripts:
i: individual
t: time of birth
c: time of conception (= t – ¾)

Also note that the error term, ε_{it}, has been split into two separate error terms to isolate the portion of the error term that arises from time effects ($\boldsymbol{\mu}_t$) from portion caused by individual effects ($\boldsymbol{\lambda}_i$).

6. Results and Findings

6.1 Modeling Trends in Insurance Coverage

Table 1.0 shows the trends in insurance coverage between the years 2004 and 2013 according to whether the mother was covered by an IHMO insurance plan, a Medicaid plan, or uninsured. The coefficients for IHMO insurance in the birth years 2011-13 are all positive and significant, meaning that in the years 2011 through 2013 it was significantly more likely for an individual to have IHMO coverage than to be uninsured. This points to the effectiveness of the dependent coverage mandate in the Affordable Care Act.

Another trend that should be noted is the relative increase in the Medicaid rate after the ACA took place in 2010. Though all coefficients are negative, they decrease in magnitude from -0.746 in 2010 to -0.180 in 2013. This means that even though individuals are still less likely to have Medicaid than to be uninsured, the expansion of the Medicaid program to 138% of the FPL has increased the likelihood of having Medicaid relative to being uninsured. It should also be noted that by 2013 only 27 states had expanded their Medicaid program, so this data does not encompass the effect of the entire Medicaid expansion.

The demographics variables in this survey all behave fairly normally. Both mother's and father's education have positive and significant coefficients for IHMO insurance that appear for individuals who have attended education beyond high school graduation. This is interpreted to mean that attending higher education increases the likelihood of the mother being covered by IHMO insurance relative to being uninsured. As expected, a mother's likelihood of having IHMO insurance relative to being uninsured increases with the mother's age. The demographic variables do not reveal much in regard to the study, but because they behave normally I am

confident that the trends in insurance coverage are correct trends and not simply the result of bad data.

6.2 Modeling Changes in Prenatal Health Care Consumption

Table 2.0 reveals that a mother who is covered by an IHMO insurance plan is more likely to take between 9-11 or 12+ prenatal health care visits than a mother who is covered by Medicaid or uninsured, and all coefficients are significant at the $p<0.01$ level. This can also be interpreted as mothers without IHMO coverage are less likely to take 9-11 prenatal care visits, and even less likely to take 12+ prenatal care visits, the "adequate" and "excellent" levels of prenatal care, respectively. This table also shows that beginning in the year 2011 there was an overall uptick in prenatal health care consumption through 2013, which points to the effectiveness of the ACA in terms of getting more individuals to the doctor. Table 2.1 shows statistically significant relative risk ratios of 1.185 and 1.295 for 9-11 and 12+ prenatal health care visits, respectively. This reveals that mothers covered by IHMO insurance plans have 1.185 and 1.295 times the risk to take 9-11 and 12+ visits, respectively, than mothers who are uninsured. The table also shows relative risk ratios greater than 1 for Birth Year that increase beginning in 2011 and remain elevated through 2013, which means that in the years 2011-13 mothers were more likely to consume higher levels of prenatal care after the Affordable Care Act was signed into legislation.

Finally, Table 2.1 reveals what is perhaps the most interesting in terms of results. The relative risk ratio for the Medicaid insurance variable reveals that a mother who is covered by a Medicaid health insurance plan has 1.066 and 1.153 times the risk of attending 9-11 or 12+ prenatal health care visits, respectively, than a mother who is uninsured. Both coefficients are significant at the $p<0.01$ levels. What makes these results particularly interesting is that mothers

covered by Medicaid, a government sponsored health insurance plan, do not behave the same way that mothers who are covered by a traditional IHMO plan, which points to a flaw in the Medicaid system. The Medicaid relative risk ratios for "adequate" and "excellent" levels of prenatal health care visits are much smaller in magnitude than the relative risk ratios for IHMO plans, 1.185 and 1.295. This means that mothers covered by Medicaid are *more likely* to consume higher levels of prenatal care than mothers who are uninsured, but they still do not behave the same way as mothers who are more traditionally insured by IHMO plans. The positive coefficients for Ln(Income) in Table 2.0 show a positive causal relationship between income and levels of prenatal health care consumed, which offers a potential explanation for the variance in behaviors between the two groups. Mothers covered by Medicaid plans, by definition, have an income less than 138% of the FPL, so these mothers have inherently low levels of something that is shown to increase the consumption of prenatal health care.

6.3 Modeling Changes in Pregnancy Health Outcomes

Table 3.1 shows relative risk ratios for each birth outcome that decrease as prenatal health care consumption increases. This makes intuitive sense, as consuming more health care should result in healthier outcomes. The relative risk ratios for an "Extremely Low" birth weight are 0.0895 and 0.0578 for 9-11 Visits and 12+ visits, respectively. This means that a mother who attends 9-11 prenatal care visits has 0.0895 times the risk of her child having an "Extremely Low" birth weight compared to mothers who only took between 1 and 8 visits. A mother who takes 12 or more prenatal care visits has 0.0578 times the risk of having an "Extremely Low" birth weight relative to mothers who consume an "Inadequate" level of prenatal health care. This can also be interpreted to mean that a mother who consumes an "Excellent" level of prenatal

health care visits has 94% less risk of having a child with an "Extremely Low" birth weight than a mother who consumes an "Inadequate" level.

The relative risk ratios for a "Very Low" birth weight are 0.210 and 0.144 for 9-11 prenatal health care visits and 12+ visits, respectively. This reveals that mothers who consume "Adequate" levels of prenatal care have 0.21 times the risk of having a child with a low birth weight than mothers who consume an "Inadequate level of prenatal care. Additionally, mothers who consume an "Excellent" level of prenatal care have 0.144 times the risk of having a child with a "Very Low" birth weight compared to mothers who consume an "Inadequate" level.

The relative risk ratios for a "Low" birth weight are 0.555 and 0.429 for 9-11 prenatal health care visits and 12+ visits, respectively. This means that mothers who take "Adequate" levels of prenatal health care visits have 0.555 times the risk of having a child with a low birth weight when compared to mothers who take an "Inadequate" level of visits. Moreover, this reveals that mothers who take an "Excellent" level of prenatal health care visits have 0.429 times the risk of having a child with a "Low" birth weight than mothers who take an "Inadequate" level of visits.

The last bit of information that can be gathered from the results of the third model is a year effect similar to the year effect present in the second model. This means that in 2011-13, the years following the ACA, mothers were less likely to have a child with a low birth weight. All relative risk ratios for the birth years 2011-13 are significant at the $p<0.01$ level, and all of the ratios for each of the low birth weight outcomes are less than their respective 2010 ratio and decrease as the years move from 2011-13.

7. Conclusion

There are several very important conclusions that can be drawn from the findings of this research. The most important being that having insurance coverage makes it significantly more likely for mothers to consume prenatal health care, and such a result demonstrates the importance of providing insurance coverage to more mothers. Another key thing to note about this finding is that while mothers who are covered by Medicaid are more likely to consume prenatal care than mothers who do not have insurance at all, they still do not consume prenatal care at the same rate as mothers who are insured by an IHMO plan. This has important policy implications because it shows that providing insurance coverage to mothers has significant effects on the level of prenatal care that they consume. It also demonstrates that the Medicaid program is by no means a perfect solution and must continue to be improved upon until mothers who are covered by Medicaid begin to behave more similarly to those covered by IHMO plans in terms of prenatal health care consumption.

Another important finding in favor of the ACA's effectiveness when looking at the prenatal health care model is the positive and statistically significant increase in the coefficients for birth years beginning in 2011. This means that the Affordable Care Act did in fact cause an increase in consumption of prenatal health care, which was also found to create a higher probability of a healthy pregnancy outcome.

The results in the third model clearly show the important causal relationship between consumption of prenatal health care and having a child with a normal birth weight—the more prenatal health care that a mother consumed the less likely she was to have a child with a low birth weight. This study links the relationship between insurance coverage, prenatal health care consumption, and healthy pregnancy outcomes to ultimately illustrate the effectiveness of the

Affordable Care Act in creating healthier pregnancies for American women. This study also supports the need for continued health insurance expansion and Medicaid reform in the United States.

8. Tables

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Birth Year	397,936	2008	2.860	2004	2013
Mother's Age					
[2] 18-19 yrs.	397,914	0.067	0.251	0	1
[3] 20-24 yrs.	397,914	0.237	0.425	0	1
[4] 25-29 yrs.	397,914	0.277	0.447	0	1
[5] 30-34 yrs.	397,914	0.233	0.423	0	1
[6] 35-39 yrs.	397,914	0.124	0.329	0	1
[7] 40+ yrs.	397,914	0.031	0.172	0	1
Mother's Race					
[1] White	397,936	0.612	0.487	0	1
[2] Black	397,936	0.168	0.374	0	1
[3] Asian	397,936	0.075	0.263	0	1
[4] Native Am.	397,936	0.037	0.189	0	1
[5] Other	397,936	0.072	0.259	0	1
Mother's Education					
[1] No H.S.	397,936	0.038	0.191	0	1
[2] Some H.S.	397,936	0.132	0.339	0	1
[3] H.S. Grad	397,936	0.282	0.450	0	1
[4] Some College	397,936	0.250	0.433	0	1
[5] College Grad	397,936	0.284	0.451	0	1
Father's Education					
[1] No H.S.	397,936	0.035	0.184	0	1
[2] Some H.S.	397,936	0.092	0.289	0	1
[3] H.S. Grad	397,936	0.268	0.443	0	1
[4] Some College	397,936	0.191	0.393	0	1
[5] College Grad	397,936	0.242	0.428	0	1
Birth Weight					
[2] Very Low	396,959	0.031	0.174	0	1
[3] Low	396,959	0.218	0.413	0	1
[4] Normal	396,959	0.645	0.478	0	1
[5] High	396,959	0.076	0.265	0	1
# of PNC Visits					
[1] <= 8 Visits	397,936	0.225	0.418	0	1

[2] 9-11 Visits	397,936	0.298	0.457	0	1
[3] 12+ Visits	397,936	0.436	0.496	0	1
Income	397,936	31237.67	25573.34	0	110500
Insurance Type					
[1] IHMO	397,936	0.381	0.486	0	1
[2] Medicaid	397,936	0.343	0.475	0	1
[3] Uninsured	397,936	0.198	0.398	0	1
IHMO Insurance	394,644	0.505	0.500	0	1
Medicaid	392,420	0.440	0.496	0	1
Uninsured	394,607	0.200	0.400	0	1
State ID	397,936	20.007	11.209	1	39
Weight	397,936	46.088	61.666	1.000	716.579

This table provides summary statistics on all variables used in this study. For the purpose of displaying the most useful variable categories, "Unknown" is used as the base category for the following variables: Mother's Race, Mother's Education, Insurance Type, and # of PNC Visits. "2004" is used as the Birth Year base category.

Table 1.0 – Trends in Insurance Coverage by Type, 2004-2013

	(1)	(2)	(3)	(9)
VARIABLES	IHMO	Medicaid	Uninsured	Unknown
Mother's Age				
<17 yrs.	1.145***	0.839***		1.039***
	(0.0841)	(0.0624)		(0.0779)
18-19 yrs.	0.333***	0.512***		0.520***
	(0.0533)	(0.0370)		(0.0537)
20-24 yrs.	-0.169***	0.0852***		0.0417
	(0.0244)	(0.0218)		(0.0338)
30-34 yrs.	0.134***	-0.170***		-0.00334
	(0.0209)	(0.0243)		(0.0345)
35-39 yrs.	0.191***	-0.227***		0.00247
	(0.0263)	(0.0317)		(0.0427)
40+ yrs.	0.105**	-0.249***		0.116
	(0.0483)	(0.0588)		(0.0735)
Mother's Race				
Black	0.241***	0.660***		0.430***
	(0.0275)	(0.0237)		(0.0345)
Asian	0.348***	0.287***		0.754***
	(0.0339)	(0.0401)		(0.0478)
Native American	-0.151**	0.887***		1.247***
	(0.0732)	(0.0569)		(0.0696)
Other	-0.333***	-0.241***		-0.0751
	(0.0355)	(0.0323)		(0.0480)
Unknown	0.0247	0.0889		0.143
	(0.0693)	(0.0686)		(0.0903)
Mother's Education				
No H.S.	-0.826***	-0.457***		0.125**
	(0.0670)	(0.0406)		(0.0602)
Some H.S.	-0.629***	0.0191		0.188***
	(0.0416)	(0.0270)		(0.0408)
Some College	0.197***	-0.0222		-0.114***
	(0.0236)	(0.0226)		(0.0339)
College Grad	0.381***	-0.687***		-0.149***
	(0.0263)	(0.0315)		(0.0404)
Unknown	0.127	-0.535***		0.0544
	(0.0814)	(0.0775)		(0.103)
Father's Education				
No H.S.	-0.907***	-0.435***		-0.141**
	(0.0637)	(0.0412)		(0.0635)
Some H.S.	-0.441***	-0.0222		-0.225***
	(0.0390)	(0.0290)		(0.0455)
Some College	0.0942***	-0.190***		0.115***

	(0.0239)	(0.0252)		(0.0364)
College Grad	0.246***	-0.545***		0.210***
	(0.0253)	(0.0323)		(0.0415)
Unknown	-0.208***	0.146***		0.0678*
	(0.0336)	(0.0260)		(0.0391)
Income				
Ln(Income)	1.390***	-0.466***		-0.0275
	(0.0165)	(0.0112)		(0.0173)
Unknown	14.07***	-4.352***		0.0146
	(0.174)	(0.112)		(0.175)
Birth Year				
2005	-0.0884**	-0.0171		-0.0158
	(0.0388)	(0.0318)		(0.0511)
2006	0.0208	0.0911***		0.0863*
	(0.0387)	(0.0324)		(0.0511)
2007	-0.0434	0.0100		0.0107
	(0.0383)	(0.0322)		(0.0518)
2008	-0.0138	0.00377		0.250***
	(0.0377)	(0.0316)		(0.0505)
2009	0.236***	-0.809***		-0.0592
	(0.0358)	(0.0376)		(0.0538)
2010	0.190***	-0.746***		-0.227***
	(0.0354)	(0.0368)		(0.0542)
2011	0.309***	-0.451***		-0.0309
	(0.0350)	(0.0354)		(0.0516)
2012	0.168***	-0.242***		0.341***
	(0.0364)	(0.0359)		(0.0507)
2013	0.135***	-0.180***		0.323***
	(0.0355)	(0.0353)		(0.0504)
Constant	-14.15***	5.212***		-1.132***
	(0.173)	(0.114)		(0.180)
Observations	397,914	397,914	397,914	397,914
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

This table is created using insurance type as the dependent variable and includes demographic vector "D" and birth year as regressors to show the trends in insurance types from 2004-13 and how the ACA influenced them. "(3) Uninsured" is used as the base category for Insurance Type and has been omitted from the table. "25-29 yrs." is used as the Mother's Age base category. "White" is used as the Mother's Race base category. "H.S. Graduate" is used as the base category for both Mother's and Father's education. "2004" is used as the Birth Year base category.

Table 1.1 – Relative Risk Ratio–Trends in Insurance Coverage by Type, 2004-2013

	(1)	(2)	(3)	(9)
VARIABLES	IHMO	Medicaid	Uninsured	Unknown
Income				
Ln(Income)	4.015***	0.628***		0.973
	(0.0662)	(0.00704)		(0.0168)
Birth Year				
2005	0.915**	0.983		0.984
	(0.0355)	(0.0313)		(0.0503)
2006	1.021	1.095***		1.090*
	(0.0395)	(0.0355)		(0.0558)
2007	0.957	1.010		1.011
	(0.0366)	(0.0325)		(0.0524)
2008	0.986	1.004		1.284***
	(0.0372)	(0.0317)		(0.0648)
2009	1.267***	0.445***		0.942
	(0.0454)	(0.0167)		(0.0507)
2010	1.209***	0.474***		0.797***
	(0.0428)	(0.0175)		(0.0431)
2011	1.363***	0.637***		0.970
	(0.0476)	(0.0225)		(0.0500)
2012	1.183***	0.785***		1.407***
	(0.0431)	(0.0282)		(0.0714)
2013	1.145***	0.835***		1.381***
	(0.0406)	(0.0295)		(0.0696)
Constant	7.15e-07***	183.4***		0.323***
	(1.24e-07)	(21.00)		(0.0581)
Observations	397,914	397,914	397,914	397,914
Robust seeform in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

This table is created using insurance type as the dependent variable and includes demographic vector "D," and birth year as regressors. This model is used to show the relative risk ratio for each year to highlight the effect of the Affordable Care Act. "(3) Uninsured" is used as the base category for Insurance Type and has been omitted from the table. "2004" is used as the Birth Year base category. Most demographic information is omitted from this table for the sake of brevity.

Table 2.0 – Prenatal Care Consumption by Mothers, 2004-13

	(1)	(2)	(3)
VARIABLES	1-8 Visits	9-11 Visits	12+ Visits
Insurance Type			
[1] IHMO		0.170***	0.258***
		(0.0138)	(0.0130)
[3] Medicaid		0.0638***	0.142***
		(0.0129)	(0.0122)
[9] Unknown		-0.128***	-0.211***
		(0.0178)	(0.0171)
Income			
Ln(Income)		0.144***	0.187***
		(0.00684)	(0.00647)
Birth Year			
2005		-0.0288	-0.0645***
		(0.0193)	(0.0180)
2006		-0.0280	-0.137***
		(0.0196)	(0.0185)
2007		-0.0195	-0.0659***
		(0.0190)	(0.0177)
2008		0.0483**	-0.0178
		(0.0193)	(0.0181)
2009		0.0638***	-0.00535
		(0.0196)	(0.0184)
2010		0.0530***	-0.0182
		(0.0197)	(0.0185)
2011		0.111***	0.0467**
		(0.0201)	(0.0189)
2012		0.115***	0.0500**
		(0.0209)	(0.0196)
2013		0.0803***	0.0459**
		(0.0200)	(0.0187)
Constant		-1.119***	-1.155***
		(0.0708)	(0.0669)
Observations	397,914	397,914	397,914
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

This table is created using the number of prenatal health care visits that the mother reported taking as the independent variable and includes demographic vector "D," insurance type, and birth year as regressors. This model is used to show how a mother's insurance status influences her consumption of prenatal health care. "(1) 1-8 Visits" is used as the base category for # of PNC Visits and has been omitted from the table. "[3] Uninsured" is used as the Insurance Type base category. "2004" is used as the Birth Year base category. Most demographic information is omitted from this table for the sake of brevity.

Table 2.1 – Relative Risk Ratio–Prenatal Care Consumption by Mothers, 2004-2013

	(1)	(2)	(3)
VARIABLES	1-8 Visits	9-11 Visits	12+ Visits
Insurance Type			
[1] IHMO		1.185***	1.295***
		(0.0164)	(0.0168)
[3] Medicaid		1.066***	1.153***
		(0.0137)	(0.0140)
[9] Unknown		0.880***	0.809***
		(0.0157)	(0.0139)
Income			
Ln(Income)		1.155***	1.205***
		(0.00790)	(0.00780)
Birth Year			
2005		0.972	0.938***
		(0.0187)	(0.0169)
2006		0.972	0.872***
		(0.0191)	(0.0161)
2007		0.981	0.936***
		(0.0186)	(0.0166)
2008		1.049**	0.982
		(0.0203)	(0.0178)
2009		1.066***	0.995
		(0.0209)	(0.0183)
2010		1.054***	0.982
		(0.0208)	(0.0182)
2011		1.117***	1.048**
		(0.0225)	(0.0198)
2012		1.122***	1.051**
		(0.0234)	(0.0206)
2013		1.084***	1.047**
		(0.0216)	(0.0196)
Constant		0.327***	0.315***
Observations	397,914	397,914	397,914
Robust seeform in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

This table is created using the number of prenatal health care visits that the mother reported taking as the independent variable and includes demographic vector "D," insurance type, and birth year as regressors. This model is used to show the relative risk ratio for each insurance type as well as birth year. "(1) 1-8 Visits" is used as the base category for # of PNC Visits and has been omitted from the table. "[3] Uninsured" is used as the Insurance Type base category. "2004" is used as the Birth Year base category. Most demographic information is omitted from this table for the sake of brevity.

Table 3.1 – Relative Risk Ratio–Pregnancy Health Outcomes for Mothers, 2004-2013

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Extremely Low	Very Low	Low	Normal	High
# of PNC Visits					
9-11 Visits	0.0895***	0.210***	0.556***		1.084***
	(0.00387)	(0.00738)	(0.00850)		(0.0306)
12+ Visits	0.0578***	0.144***	0.429***		1.303***
	(0.00252)	(0.00504)	(0.00634)		(0.0343)
Unknown	0.555***	0.637***	0.835***		1.081
	(0.0285)	(0.0351)	(0.0241)		(0.0595)
Income					
Ln(Income)	1.068***	0.969*	0.931***		1.042***
	(0.0209)	(0.0182)	(0.00765)		(0.0137)
Birth Year					
2005	0.890**	0.938	1.060**		0.924**
	(0.0467)	(0.0488)	(0.0254)		(0.0362)
2006	0.807***	0.916*	1.028		0.982
	(0.0443)	(0.0488)	(0.0251)		(0.0388)
2007	0.788***	0.851***	0.924***		0.940
	(0.0412)	(0.0441)	(0.0221)		(0.0356)
2008	0.626***	0.687***	0.916***		0.962
	(0.0353)	(0.0381)	(0.0221)		(0.0366)
2009	0.636***	0.704***	0.911***		1.010
	(0.0363)	(0.0394)	(0.0223)		(0.0384)
2010	0.577***	0.673***	0.880***		0.963
	(0.0338)	(0.0380)	(0.0217)		(0.0369)
2011	0.512***	0.648***	0.806***		0.974
	(0.0316)	(0.0375)	(0.0204)		(0.0377)
2012	0.515***	0.509***	0.784***		1.054
	(0.0330)	(0.0331)	(0.0208)		(0.0412)
2013	0.474***	0.601***	0.815***		0.973
	(0.0296)	(0.0353)	(0.0206)		(0.0371)
Constant	0.146***	0.291***	1.534***		0.0789***
	(0.0292)	(0.0558)	(0.130)		(0.0108)
Observations	198,459	198,459	198,459	198,459	198,459
Robust seeform in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

This table is created using the birth weight of the child as the independent variable and includes demographic vector "D," number of prenatal care visits, and birth year as regressors. This model is used to show the relative risk ratio for each level of PNC visits as well as birth year. "0-8" Visits is used as the # of PNC Visits base category. "(4) Normal" is used as the Birth Weight base category and has been omitted from the table. "2004" is used as the Birth Year base category. Most demographic information is omitted from this table for the sake of brevity.

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