Fall 4-17-2024

Ensnared Care: How Restrictive Healthcare Laws Impact Mothers

McKenzie Richards

Ensnared Care: How Restrictive Healthcare Laws Impact Mothers

By McKenzie Richards

I. Executive Summary

Do restrictive healthcare policies impact whether expectant mothers receive adequate prenatal care? Could such policies also affect access to alternative birthing options for delivery? Through a literature review and a two-way fixed effects model using panel data, this study investigates two categories of state-level restrictive healthcare policies: scope of practice laws and certificate of need laws. The literature demonstrates the detriments of scope of practice care on access to care and maternal health. However, the statistical models presented on scope of practice find no relationship between scope of practice laws and adequate prenatal care or alternative birthing options. Though the literature finds that on the whole, certificate of need laws negatively impact access to care, the literature has nothing to say about certificate of need and maternal healthcare specifically. To that end, this study finds that states with certificate of need laws increases the rates of inadequate prenatal care by 8%. To address this issue, policymakers should focus targeting states with certificate of need laws that regulate services related to maternal healthcare, such as West Virginia, Kentucky, and Florida.

II. Introduction

When considering that every birth involves at least two patients - the mother and the child - maternal health care conservatively affects 7 million people each year in the United States. At the broadest level, maternal healthcare touches everyone who has lived or has yet to be born.

In the United States, maternal health issues abound. Surprisingly, maternal mortality rates increase year after year (Tu, 2023). American obstetricians also perform too many cesarean sections, which introduces increased risk for mothers. The World Health Organization recommends a rate of 19% for cesarean sections, but the U.S. rate has remained at 32% for the last 15 years (Ledbetter, 2023). U.S. maternal healthcare also faces geographic challenges. According to March of Dimes, 2.2 million mothers currently live in maternal care deserts (2021). Increased access to maternal healthcare and alternative healthcare options could help address many of the challenges. Access to healthcare is a strong predictor for maternal health outcomes (Nelson et al, 2018).

This capstone deals with how restrictive healthcare laws impact access to care for expectant mothers in the United States. Specifically, it looks at rates of inadequate prenatal care and alternative birthing options. Mothers with lower access to care overall are likely to have had inadequate prenatal care. Similarly, giving birth at home or a birthing center increases access to care because it offers additional healthcare options.

III. Policy Analysis

When considering which policies to pursue to improve access to care, policymakers should consider both political feasibility and immediate effects. Without a reasonable path to legislative change, policy efforts might be in vain or require significant resources to move the needle on an issue. Additionally, if a policy will have immediately beneficial effects that could help mothers right away, it should be pursued. Of course, pursuing policy solutions with effects seen in the

long-term is important, but with issues involving healthcare, solutions that can solve problems right away can save lives. Therefore, policies that are both politically feasible and could have immediate effects should be prioritized.

There are two major policy categories that can increase access to care. First, policymakers can look at policies that reduce the cost of care. Reducing the cost of care allows more patients the ability to access care they might not have been able to otherwise. Secondly, policymakers can increase the supply of services available. Increasing the supply of healthcare providers or healthcare clinics can drive up competition, which will bring down costs. Many would-be patients do not get needed care because of high costs (Lopes et al., 2024).

Advocates frequently lobby for increasing Medicaid coverage to lower healthcare costs for soon-to-be mothers. Yet according to recent public data, Medicaid already covers the cost of 41.3% of all births (March of Dimes, 2023). It is unclear whether further increasing Medicaid coverage would appreciably lead to increased access to care. But, if increased Medicaid coverage were to be passed, the effects would likely be immediate because more mothers would have free coverage to care. Even so, seeking increases in Medicaid coverage can be a political nightmare. Both federal and state budgets have a vested interest in keeping costs low, and reforms to healthcare programs can be politically risky. Thus, passing increased Medicaid coverage is politically unfeasible.

In healthcare, hospitals and clinics often shroud the prices for services. The anti-competitive behavior leads to exorbitant costs for patients. Policies promoting price transparency helps decrease costs, which allows more individuals access to healthcare. Both the Biden and Trump administrations promoted the commonsense policies through the new CMS transparency rule and the No Surprises Act. Promoting price transparency is popular on both sides of the aisle.

However, many hospitals remain uncompliant with the transparency rules. Furthermore, consumers are often unaware of the transparency rules, or find the hospital pricing menus too complicated to navigate. Though price transparency policies are politically feasible, seeing improvements to access in the short-term has proven difficult.

Other than decreasing costs to improve access, policymakers can also increase the supply of healthcare services. An increased supply of doctors and clinics means more options on the marketplace for patients, shorter wait-times for care, and increased doctor-patient time spent. Similarly, alternative healthcare models such as direct primary care or birthing centers can create more options for mothers seeking care. However, powerful interest groups work hard to fight against these solutions. For example, healthcare analysts have long argued that increasing residency spots will help address the current doctor shortage. Instead, the current educational structure incentivizes academies to limit residency slots. Similarly, direct primary care is a healthcare model that departs from insurance, and instead allows patients to "subscribe" to one local clinic for all primary care services. Large insurance companies fight against the model, as it has the potential to draw patients away from their pool of payers. Passing reforms to educate more doctors or promote alternative models is politically unfeasible for the time-being. Even if reforms were made, educating doctors takes time, making the policy a longer-term solution.

Though several policies have potential to improve maternal healthcare and even though policymakers can define restrictive healthcare laws in a variety of ways, this study elects to only examine certificate of need laws and scope of practice laws as potential solutions for increasing healthcare access for mothers. As discussed in further detail in the literature review, certificate of need laws artificially restrict the supply of medical facilities and supplies by requiring new providers entering a market to apply for a "certificate of need." Originally designed to bring a

more efficient allocation of healthcare resources, self-interested actors frequently abuse the laws. Many competitors already in the marketplace in a community reside on certificate of need approval boards and reject new providers to retain an oligopoly. Theoretically, such actions restrict access to care for patients in the community. Similarly, scope of practice laws bar individuals with the relevant medical skills, knowledge, and experience from providing care. When it comes to birth, this includes not allowing nurse midwives to provide care despite the lengthy training to do so.

Many states are currently experiencing movement on both certificate of need and scope of practice which makes regulatory reform a politically feasible issue. Once the restrictions are removed, any effect of the laws on access would take effect quickly as more healthcare workers and healthcare infrastructure could serve communities.

In sum, the policy matrix below outlines why regulatory policies such as certificate of need and scope of practice laws should be prioritized when seeking to improve access to care in the current political landscape.

Table 1 – Policy Decision Matrix for Improving Access to Care

Policy	Category	Feasibility	Immediate Effects
Increased Medicaid Coverage	Reduce cost	X	✓
Price Transparency	Reduce cost	✓	X
Educate More Doctors	Increase supply	X	X
Promote Alternative Models	Increase supply	X	X
Remove Regulatory Barriers	Increase supply	✓	✓

IV. Key Definitions

Understanding the typical roles, knowledge, and experience for various health practitioners in the labor and delivery space brings clarity to the significance of scope of practice laws. For reference of key duties for labor and delivery healthcare workers, see the table below.

Table 2 –Maternal Healthcare Practitioners, Key Definitions

Term	Definition
Doula	An individual employed to support a pregnant woman during labor, usually does not have formal obstetric training
Labor and Delivery Nurse	A registered nurse with at least one year of practice, who has specialized in labor and delivery. Can provide medical care for mothers before, during, and after labor
Licensed Midwife	An individual who has completed a graduate level midwifery course and has extensive experience, but is not a nurse
Certified Nurse Midwife	A certified nurse midwife is an advanced registered nurse who has completed an additional masters or doctoral program in obstetric care and has several hundred to thousand hours of experience attending births
OB-GYN	A doctor specialized in providing medical care to pregnant woman, especially care for high-risk pregnancies, before, during, and after delivery.
Birthing Center	Typically run by licensed midwives or certified nurse midwives, birthing centers offer more options for labor methods and delivery for pregnant mothers

In terms of advanced training in the delivery process, doulas rank as the least advanced and OB-GYN's stand as the most advanced. The rank of a licensed midwife compared to a labor and delivery nurse really depends upon hours of experience and relevant skills. Certified nurse midwives have more experience and specialization than both licensed midwives and labor and delivery nurses, and are typically considered less advanced than an OB-GYN. The terms doula

and midwife are sometimes erroneously used interchangeably, leading to a misperception that midwives do not have sufficient knowledge, skills, or experience to care for expectant mothers or deliver babies.

Additionally, the ranking of an OB-GYN does not mean that an OB is the best medical professional to treat pregnant women in all circumstances. Because OB-GYN's have advanced training in high-risk births and pregnancies, the literature shows that they tend to overtreat in low-risk births. As a result, an OB-GYN approach often introduces unnecessary risk for low-risk patients. In many cases, matching low-risk patients with midwives or labor and delivery nurses results in better quality of care overall. Furthermore, some mothers naturally experience increased sensitivity to standard delivery interventions used in a hospital – such as epidurals or oxytocin. In these cases, it would be safer for a mother to deliver in a birthing center attended by doulas or midwives. To improve maternal healthcare quality for all, mothers should align with the healthcare practitioners that best meet individual needs and preferences.

V. Literature Review

A. Overview and Methodology

This literature review covers three major topics. First, it provides a general overview of the literature on access to maternal healthcare. Second, the review covers scope of practice laws and how they may affect maternal access to care. The final section discusses certificate of need law, and whether the laws affect access to healthcare generally. For more details on search methods, please refer to the appendix.

B. Maternal Access to Care

Year after year, maternal mortality rates in the United States continue to grow (Tu, 2023). Among demographic groups, blacks have a three-fold increase in maternal mortality as

compared to other groups. The reasons for this are multifaceted. One comprehensive, population-level statistical article found that obesity, the number of prenatal appointments, Medicaid coverage, average maternal age, access to care, and race are all associated with maternal mortality rates (Nelson et al, 2018). High rates of obesity ranked as the highest predictor of detrimental outcomes for pregnant women. Despite significant conversations around the country on this problem, maternal mortality continues to spike in the United States (Cooper, 2023).

Some factors influencing detrimental maternal health outcomes might not be easily influenced by lawmakers - such as obesity, or average maternal age. However, policymakers might have more effective impact on other predictors such as access to care or Medicaid coverage. Therefore, though many of the issues limiting maternal access to care are worth examining, this paper is interested in examining restrictive healthcare laws that may impact a pregnant woman's ability to access care. A recent study found that maternal healthcare deserts are increasing, (Stewart & Henderson, 2021). Rural areas are particularly vulnerable to the lack of access to maternal healthcare (Kozhimannil et al, 2019).

One expert on maternal healthcare explained that laws such as scope of practice laws and certificate of need may inadvertently restrict access to care (Hall, 2019). For example, scope of practice laws restrict which healthcare providers (i.e. OBGYN, nurse practitioner, midwife, etc.) are allowed to treat patients. This restriction may artificially limit the number of healthcare providers able to serve women, despite the abilities of such providers. Similarly, certificate of need laws may inadvertently restrict access to care, because the laws give state governments the ability to deny new facilities from opening. This literature review will cover what the existing literature has to say about scope of practice and certificate of need laws' potential impact on maternal care.

C. Scope of Practice

Scope of practice laws refer to federal, state, or county regulations that restrict what duties individuals in a particular profession can perform. The laws help protect consumers by ensuring that only qualified individuals with the proper education, expertise, or training can provide services. In healthcare, scope of practice laws generally protect patients from receiving care from unqualified individuals and help maintain a certain standard of care. Scope of practice laws define the roles of doctors, nurse practitioners, and even physician assistants. However, sometimes well-meaning scope of practice laws go too far and unnecessarily restrict qualified professionals from providing needed services. When it comes to healthcare, where there is a dearth of physicians, the restrictions may result in more lives lost overall.

When it comes to scope of practice laws in maternal care, there can be many different types of laws. It can be complex and hyper-specific. For example, some states might allow midwives, but restrict birthing locations to hospitals. Some states might require physician oversight, or might not cover services with Medicaid. To better understand the restrictions placed on midwives, a large, groundbreaking study developed a "Midwifery Integration Scoring System (or, MISS)" where all 73 potential restrictions were outlined, and every state received a score based on how many of the restrictions were in place (Vedam et al, 2018). The higher the MISS score, the more freedom midwives had to treat patients. The study found that higher scores correlated with lower intervention, higher rates of vaginal birth, and better outcomes. When states had fewer scope of practice laws in place, states had better outcomes for infants. Because the MISS scoring system provided the most comprehensive measure of scope of practice laws to date, the study provides strong evidence that scope of practice laws are likely detrimental to maternal healthcare. An earlier study featuring a multivariate regression strengthens the claims

from the Vedam study, as it also found that autonomy for midwives led to better birth outcomes in the states (Yang et al, 2016). Such outcomes can be found in other countries as well (Van Lerberghe et al, 2014; Kennedy et al, 2020; and Butler et al, 2020).

Not only does increased access to options outside of OBGYNs lead to better outcomes for infants and mothers, but increased access to midwives or registered nurses is associated with significantly lower rates of cesarean sections (Rosenstein et al, 2015).

The nature of scope of practice laws vary widely, and identifying which laws should be removed first can be difficult. One review recommended prioritizing the development of the midwifery workforce, removing barriers to working in hospitals, and increasing coverage through public programs such as Medicaid (Smith et al, 2023). Much focus has been placed on the last point especially, with other articles recommending Medicaid expansion to doulas as well as midwives and birthing nurse practitioners (Himes, 2021). Because of barriers to practice, data on the benefits of midwifery actually are scarce, especially in underserved communities of color (Hastings et al, 2018). Furthermore, access to midwifery care is difficult for socioeconomically poor mothers because lack of awareness is low and because of an inability to pay (Darling et al, 2019). By removing scope of practice barriers, researchers can better understand what underserved mothers need for a healthy birthing experience.

D. Certificate of Need

Certificate of need laws require new healthcare facilities to file a "certificate of need" with the state or healthcare advisory boards to operate or sometimes to even purchase new equipment, such as imaging machines. New York implemented the first such laws in 1964, and many states followed suit. At the time, health economists argued that restricting the supply of healthcare facilities would help bring down the costs and improve outcomes for patients

(Conover, 2020). Since doctors and healthcare facilities were limited, certificate-of-need advocates believed that controlling the amount of new equipment and new clinics would lead to a more efficient allocation of health resources.

But by the 1980s, the literature overwhelmingly demonstrated that certificate of need laws were abused by large hospital conglomerates to force smaller health businesses out of the market. This effectively created an oligopolistic healthcare environment, which raised costs and led to worse outcomes for patients. Many states removed all certificate of need laws.

But as of 2023, and despite the evidence against certificate of need law, 39 states still have the outdated laws on the books (Mitchell, 2024). Thus, the effect of certificate of need laws on access to care differs drastically by state and depends on which facilities or equipment are regulated by certificate of need.

When it comes to whether certificate of need lead to oligopolies, some researchers have argued that the laws actually encourage more competition. For example, one article using an HHI-index found that certificate of need may increase competition when applied to emergency departments and may serve as an "anti-trust tool in the hands of the government" (Ni et al, 2017). Yet, another more recent study found statistically significant results that certificate of need laws increase emergency department wait times, pain medication administration, hospital admittance, and hospital discharge (Myers & Sheehan, 2020).

In the debate on certificate of need, the effect of the laws on cardiac care has been of particular interest to researchers. States without certificate of need laws in place led to a surplus of cardiac surgery programs (Lucas et al, 2011). The article argued that certificate of need laws create more effective care and better allocation of resources. Yet an earlier study found that in Pennsylvania, the repeal of certificate of need laws for cardiac surgery connected patients with

higher quality surgeons, regardless of the socioeconomic status of the patient (Cutler et al, 2010). Another article found that the presence of certificate of need laws led to an increase in heart attack deaths by 6-10% three years after the laws were put in place, controlling for other factors (Chiu, 2021). Thus, while certificate of need laws are indeed profitable from the business perspective of incumbent providers, the competition from the surplus of cardiac surgery centers grants all patients access to better quality care and potentially better health outcomes overall.

While conclusions about maternal health outcomes and certificate of need cannot be drawn from the cardiac data, the research neatly shows what kind of studies can be done to better understand the impact of certificate of need in other areas of health. Much more research is needed to understand the impact of certificate of need laws on access to care for other areas of healthcare (Bailey, 2020).

Nevertheless, other evidence strongly indicates that certificate of need laws likely reduce access by increasing price. When assessing access to care, the cost of care is also a relevant consideration. For example, certificate of need laws reduce acceptance of private insurance by a statistically significant 6% (Bailey, 2022). Of course, reduced insurance coverage lowers access, because without coverage many patients choose to go without care rather than risk the unpredictability of paying out of pocket. One theoretical model showed that the presence of certificate of need laws actually increased spending in affordable markets with sicker patients (Bailey, 2023). In other words, certificate of need laws effectively exploit sick communities by raising prices in a controlled market. For those in such communities, certificate of need laws could price out poor and prevent sick individuals from receiving care.

Examining the effect of certificate of need on individuals who are unable to care for themselves also indicates the detriment of certificate of need on access. Those with disabilities or

disorders may face higher barriers in accessing resources to get care. When limits are placed on home and community service providers, a very common certificate of need restriction, access to care is also likely affected (Harrington et al, 2004).

Following comprehensive searches on both Academic Search Complete and EconLit, it appears that no studies have yet been conducted on whether certificate of need impacts access to maternal care or maternal outcomes. Despite this, the literature does indicate that certificate of need negatively impacts emergency care (Cutler et al, 2010), access impacted by increased costs (Bailey, 2022) (Bailey, 2023), and vulnerable populations (Harrington et al, 2004). Though no studies have specifically drawn the connection from certificate of need to maternal health outcomes, maternity care is likely affected by the impact of certificate of need on emergency care, cost, and vulnerable populations.

VI. Data and Results

All sources come from objective organizations that have no conflicts of interest, either from governmental entities or academic articles. For comprehensive breakdown of the data and the sources, see Table 2.

Table 2.

Variable	Definition	Units	Source	Quality
	Main Dependent and Independent Variables			
Certificate of Need (CON)	Binary variable on whether or not certificate of need laws exist in the state	0, 1	Mercatus Center	Excellent
Number of CON laws	Total number of certificate of need laws in the state	Number	Mercatus Center	Gaps in some years
CON birth laws	Total number of certificate of need laws for restrictions related to maternal care: hospital beds, neonatal care, obstetrics care, ultrasound tech	Number	Mercatus Center	Gaps in many years
Scope of Practice	Ranking of states in each year on the severity of scope of practice laws	0 - 4	APRN	Excellent

Percent of Freedom birth	Percentage of individuals who chose to give birth at home or in birthing centers out of total births, by state	Percent	CDC Wonder	Excellent
Rate of Inadequate care	Rate of either no prenatal care at all, or not until the 6th month of pregnancy and less than 10 prenatal visits during pregnancy.	Percent	CDC Wonder	Excellent
	Control Variables			
Number Certified Nurse Midwives	Total number of certified nurse midwives in the state	number	HRSA & CMS	Excellent
Rate Certified Nurse Midwives	Number of certified nurse midwives in the state per 100k state residents	decimal	HRSA & CMS	Excellent
Number OBGYN	Total number of OBGYN medical doctors in the state	number	HRSA & CMS	Excellent
Rate OBGYN	Number of OBGYN medical doctors in the state per 100k state residents	decimal	HRSA & CMS	Excellent
Population	Total State Population	number	CDC Wonder	Excellent
C-section	Percentage of children born via cesarean section	decimal	CDC Wonder	Good
Vaginal birth	Percentage of children delivered via vaginal birth	decimal	CDC Wonder	Good
White	Percentage of the population that is white	percent	CDC Wonder	Excellent
Black	Percentage of the population that is black	percent	CDC Wonder	Excellent
Hispanic	Percentage of the population that is Hispanic	percent	CDC Wonder	Excellent
Below Poverty	Percentage of the population that is below the poverty line	percent	CDC Wonder	Excellent
College	Percentage of the population that went to college	percent	CDC Wonder	Excellent
Medicaid	Percentage of the population on Medicaid	percent	CDC Wonder	Excellent
Private	Percentage of the population on private insurance	percent	CDC Wonder	Excellent

By using panel data from the years 2004 to 2023 for all 50 states and Washington DC, this study examines the associations between:

1. Model 1: Scope of practice laws and delivery at birthing centers or intentionally at home
2. Model 2: Certificate of need laws and delivery at birthing centers or intentionally at home
3. Model 3: Scope of practice laws and rates of inadequate prenatal care
4. Model 4: Certificate of need laws and rates of inadequate prenatal care

For every model outlined above, the study will use a two-way fixed-effects empirical model to analyze the panel data:

$$Yit = \beta Xit + \alpha i + \lambda t + \tau Wit + \varepsilon it$$

For model 1:

Where *Y* is the percentage of births at home and at birthing centers out of total births, Xit is the covariates which include Medicaid, white, black, Hispanic, and college, τ is the causal effect of scope of practice laws, αi is the state fixed effect, and λt is the year fixed effect.

For model 2:

Where *Y* is the rates of births at home and at birthing centers, Xit is the covariates which include Medicaid, white, black, Hispanic, and college, τ is the causal effect of certificate of need laws, αi is the state fixed effect, and λt is the year fixed effect.

For model 3:

Where *Y* is the rates of inadequate prenatal care, Xit is the covariates which include Medicaid, white, black, Hispanic, and college, τ is the causal effect of scope of practice laws, αi is the state fixed effect, and λt is the year fixed effect.

For model 4:

Where *Y* is the rates of inadequate prenatal care, Xit is the covariates which include Medicaid, white, black, Hispanic, and college, τ is the causal effect of certificate of need laws, αi is the state fixed effect, and λt is the year fixed effect.

Table 3: Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Year	1,479	2009	8.36943	1995	2023
CON	1,479	0.5402299	0.4985475	0	1
Number CON	357	12.65546	11.97617	0	51
Number Certified Nurse Midwives	204	183.1422	170.6689	15	754
Rate Certified Nurse Midwives	204	3.505637	2.181647	0.46	9.83
Number OBs	204	793.7059	929.444	55	4941
Rate OBs	204	12.2024	3.903976	6.86	33.58
Population	1,071	6172433	6942555	503453	3.94E+07
C-sections	1,071	24515.2	30023.28	1380	181664
Vaginal births	1,071	52805.57	60939.04	3667	390111
Total births	1,071	77478.44	90800.83	5058	566414
Number of inadequate care	408	5319.38	6949.977	95	45857
Rate of inadequate care	884	0.0322404	0.0385519	0	0.1516986
Freedom births	1,071	990.0383	1129.998	22	8024
White	1,224	81.09645	14.09599	17.77189	99.6235
Black	1,223	11.37465	11.62386	0.0416444	70.78061
Hispanic	1,224	9.488156	9.679821	0.0962556	52.71777
Asian	1,224	4.077485	8.267138	0.0729188	70.99226
Below Poverty	1,326	12.35126	3.582497	4.52597	25.75411
College	1,224	19.4799	5.302224	9.146904	49.42941
Medicaid	1,224	13.66939	4.740721	4.043406	31.77816
Medicare	1,224	14.54355	2.667407	4.369386	23.88055
Private	1,224	69.51757	6.679113	48.75912	85.10834
MISS score	51	37.29412	12.17423	17	61
Scope of Practice	1,120	0.353125	0.3373384	0	0.75
Certificate of need CON	51	1.54902	1.404475	0	4
Freedom births ln	1,071	6.295518	1.178722	3.091043	8.990192
Number of CON ln	357	1.680502	1.643604	0.6931472	3.931826
Number Certified Nurse Midwives ln	204	4.734528	1.031713	2.70805	6.625392
Rate CNM ln	204	1.064432	0.6428464	-0.7765288	2.285439
Rate OB ln	204	2.464486	0.2581431	1.925707	3.513931
Population ln	1,071	15.13245	1.03345	13.12925	17.49023
C section ln	1,071	9.543031	1.098188	7.229839	12.10991
Vaginal Birth Ln	1,071	10.37533	1.025714	8.207129	12.87419
Total birth ln	1,071	10.74251	1.04418	8.528727	13.24708
Number inadequate care ln	408	7.957365	1.202311	4.553877	10.73328
Rate inadequate care ln	408	-2.732271	0.4052007	-4.604985	-1.88586

The dataset consists of 1,479 observations. Variables with lower observations are due to gaps in the data. About half of the observations are from states with certificate of need laws. Additionally, states tend to be less severe with scope of practice laws, with the scale between 0 and 1, and the average score at 0.35.

Table 4: Model 1 – Scope of practice (SOP) and freedom birth

Freedom Birth	Regression 1	Regression 2	Regression 3	Regression 4
SOP	-0.023	-0.020	-0.025	-0.025
	(0.035)	(0.035)	(0.036)	(0.036)
% Medicaid		-0.013	-0.012	-0.012
		(0.006)*	(0.006)*	(0.006)*
% White			0.012	0.012
			(0.008)	(0.008)
% Black			0.026	0.023
			(0.032)	(0.031)
% Hispanic			0.001	0.000
			(0.007)	(0.007)
% College				-0.005
				(0.007)
_cons	-4.835	-4.689	-5.962	-5.840
	(0.041)**	(0.069)**	(0.827)**	(0.825)**
SER	0.162	0.161	0.160	0.160
R^2	0.568	0.575	0.579	0.580
Adjusted R^2	.	.	.	.
N	763.000	763.000	763.000	763.000

* $p<0.05$; ** $p<0.01$

For all regressions in table 4, two-way fixed effects regressions using panel data by state and year were conducted. According to these regressions, the existence of scope of practice laws in a state has no effect on whether a woman chooses to deliver in a birthing center or at home.

However, drawing from a subset of the data using an alternative variable for scope of practice tells a different story.

Table 6: Model 1.2 – Scope of practice and freedom birth

Freedom birth	Regression 1	Regression 2	Regression 3	Regression 4
Midwifery Integration Score	0.025	0.024	0.027	0.022
	(0.008)**	(0.008)**	(0.008)**	(0.009)*
Population	-0.102	-0.069	-0.079	0.000
	(0.087)	(0.080)	(0.079)	(0.093)
% Medicaid		-0.042	-0.041	-0.010
		(0.014)**	(0.013)**	(0.018)
% College			-0.027	-0.013
			(0.011)*	(0.014)
% Black				-0.030
				(0.007)**
% White				-0.004
				(0.004)
% Hispanic				-0.010
				(0.006)
Constant	-3.697	-3.465	-2.813	-3.887
	(1.319)**	(1.184)**	(1.267)*	(1.662)*
SER	0.614	0.590	0.576	0.547
R^2	0.223	0.299	0.345	0.449
Adjusted R^2	.	.	.	.
N	51.000	51.000	51.000	51.000

* $p<0.05$; ** $p<0.01$

In this simple linear regression model using data from 2014, at the 95% confidence level, regression 4 shows that for every scope of practice law benefitting midwives, there is a 2% increase in the rate of babies delivered at birthing centers or at home.

Instead of using the scope of practice variable that comes from the APRN, this model uses the Midwifery Integration Score from the 2018 Vedam study. But because the data only includes one year, wider conclusions cannot be drawn from this data. But it demonstrates that obtaining a midwifery integration score for other years could be promising to better understand whether any relationship exists between scope of practice laws and where mothers are able to give birth.

Table 7: Model 2 – Certificate of need and freedom birth

Freedom Birth	Regression 1	Regression 2	Regression 3	Regression 4
CON	0.072	0.084	0.078	0.079
	(0.065)	(0.063)	(0.058)	(0.059)
% Medicaid		-0.014	-0.013	-0.013
		(0.006)*	(0.006)*	(0.006)*
% White			0.011	0.011
			(0.008)	(0.008)
% Black			0.023	0.021
			(0.031)	(0.031)
% Hispanic			0.001	0.000
			(0.007)	(0.007)
% College				-0.003
				(0.007)
_cons	-4.888	-4.736	-5.903	-5.813
	(0.041)**	(0.068)**	(0.784)**	(0.789)**
SER	0.160	0.158	0.158	0.158
R^2	0.567	0.576	0.579	0.579
Adjusted R^2	.	.	.	.
N	816.000	816.000	816.000	816.000

* $p<0.05$; ** $p<0.01$

For all regressions in table 7, two-way fixed effects regressions using panel data by state and year were conducted. According to these regressions, certificate of need laws have no effect on whether women choose to give birth at home or at birthing centers instead of the hospital.

Table 8: Model 3 – Scope of practice and rate of inadequate prenatal care

Rate of Inadequate Prenatal Care	Regression 1	Regression 2	Regression 3	Regression 4
Scope of Practice	-0.069	-0.070	-0.073	-0.060
	(0.107)	(0.108)	(0.110)	(0.101)
% Medicaid		0.002	0.002	0.004
		(0.006)	(0.006)	(0.006)
% White			0.000	0.001
			(0.007)	(0.007)
% Black			-0.003	0.006
			(0.050)	(0.048)
% Hispanic			0.003	0.005
			(0.008)	(0.009)
% College				0.011
				(0.009)
Constant	-2.733	-2.774	-2.801	-3.240
	(0.058)**	(0.138)**	(0.858)**	(0.909)**
SER	0.066	0.066	0.067	0.066
R^2	0.058	0.060	0.061	0.083
Adjusted R^2	.	.	.	.
N	200.000	200.000	200.000	200.000

* $p<0.05$; ** $p<0.01$

For all regressions in table 8, two-way fixed effects regressions using panel data by state and year were conducted. To account for gestational time, all regressors were lagged. According to these regressions, scope of practice laws have no effect on rates of inadequate prenatal care.

Table 9: Certificate of need on rates of inadequate prenatal care

Rates of Inadequate Prenatal Care	Regression 1	Regression 2	Regression 3	Regression 4
CON	0.079	0.079	0.074	0.079
	(0.015)**	(0.015)**	(0.016)**	(0.018)**
% Medicaid		0.002	0.002	0.004
		(0.006)	(0.006)	(0.006)
% White			0.004	0.004
			(0.010)	(0.010)
% Black			0.002	0.009
			(0.049)	(0.047)
% Hispanic			0.003	0.004
			(0.008)	(0.009)
% Asian			0.007	0.006
			(0.013)	(0.013)
% College				0.011
				(0.009)
Constant	-2.809	-2.847	-3.257	-3.601
	(0.018)**	(0.114)**	(1.082)**	(1.147)**
SER	0.066	0.066	0.067	0.066
R^2	0.056	0.058	0.061	0.084
Adjusted R^2	.	.	.	.
N	200.000	200.000	200.000	200.000

* $p<0.05$; ** $p<0.01$

For all regressions in table 8, two-way fixed effects regressions using panel data by state and year were conducted. To account for gestational time, all regressors were lagged. According to these regressions, for every state with certificate of need laws present, there is an 8% increase in rates of inadequate prenatal care, which is statistically significant at the 1% confidence level.

VII. Limitations

The two-way fixed effect model assumes that the effects of certificate of need laws and scope of practice laws are the same across the states and across time periods. However, the effect of certificate of need laws differs dramatically by state. Some states may only have one to five certificate of need laws, applied to limited services. Other states have over 30. Though the model

assumes that certificate of need laws does not differ by states, that is not the case in practice. This reality indicates that the 8% increase in rates of inadequate prenatal care may actually be more or less severe depending on how many maternal healthcare services are regulated by each state. It would be ideal to use a weighted certificate of need variable to understand the full impact of certificate of need laws on access to prenatal care, by state. Therefore, the study measures the average effect of certificate of need across states. Furthermore, it would be even better to have a complete variable of the number certificate of need laws directly related to obstetric care by state for each year. Such a variable would be possible to create but would take extensive and time-consuming research to produce.

Similarly, scope of practice laws vary in severity by state. The model does account for those differences to a limited degree. However, the 2014 study that created a midwifery integration scoring system measuring 73 different types of restrictions provided the most comprehensive variable to effectively compare differences across states. But the 2014 study required a large team, and the information only exists for the one year. Additional reviews on the laws in each states should be done to provide a more comprehensive midwifery integration scoring system for more years.

Additionally, gaps in the data exist for rates of obstetricians and nurse midwives. The HRSA only recently started publishing that data. It would be great to gather more information for other years to ascertain any relationship between scope of practice laws and rates of practicing obstetricians and nurse midwives.

VIII. Policy Recommendations

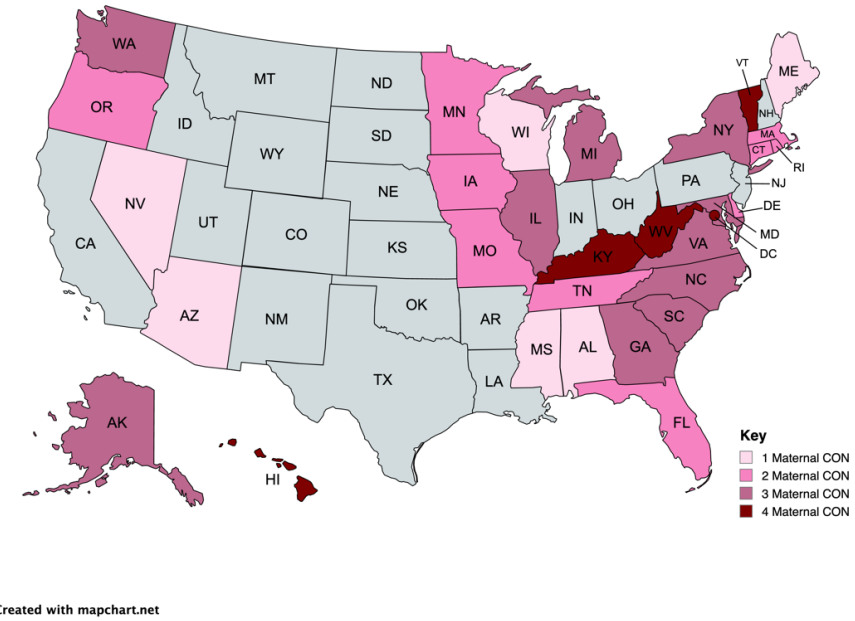
Recall that the number of health care services regulated by certificate of need laws differs by state. Some states regulate everything from radiation therapy to open-heart surgery centers to

dialysis. Others might only regulate ambulatory services or nursing home beds. A Mercatus Center study found that states could have as many as 28 healthcare services regulated (Mitchell et al., 2021). Rather than advocate for full repeal of certificate of need laws in each state, many advocates have had success with partial repeals. When presented with data on how certificate of need laws limit access to care or are associated with adverse outcomes in a particular area of health, legislators are more amenable to partial repeal related to those healthcare services.

There are four specific types of healthcare services regulated by certificate of need that directly relate to maternal healthcare: number of hospital beds, neonatal intensive care units, obstetrics services, and ultrasound machines.

Based on the full matrix data from the 2021 Mitchell study, below is a heatmap of the number of maternal healthcare services regulated by certificate of need laws, by state.

Figure 1: Number of Maternal Healthcare Services Regulated by CON, By State



The figure provides insight on which states policymakers should target first for certificate of need reform for maternal healthcare. Based on this, and the political circumstances of the states, policy advocates should prioritize targeting West Virginia, Kentucky, and Florida.

West Virginia ranks near the bottom in terms of access to healthcare and has all four maternal healthcare service regulations in place. Therefore, the positive impact in West Virginia would likely be great. Furthermore, though certificate of need law has been reformed in several blue states, Republican lawmakers are generally more amenable to the repeal of certificate of need laws, currently. West Virginia has a Republican majority in both houses, and a Republican Governor. Targeting West Virginia, then, would be helpful for policy advocates. Similarly, Kentucky suffers low rankings for access to care, and has a Republican legislature that would also likely be amenable to removing certificate of need laws relating to maternal health. Finally, Florida has been removing certificate of need laws quickly after receiving data on how CON affects specific healthcare services. Florida legislators are moving to sunset all CON laws in the state, but new data could make the state move faster.

When it comes to scope of practice policy recommendations, advocates and academics should consider conducting more research on the issue. Specifically, better data from the HRSA is forthcoming. For example, data on the number of certified nurse practitioners by state has only been released for recent years. Policymakers can request that government organizations continue to publish this data for future research. Additionally, this study only used a scope of practice variable that relied on physician oversight. However, scope of practice laws can take many forms and policymakers can create datasets that look beyond just physician oversight. More comprehensive data can lend better insight into the impact of scope of practice laws on access to maternal healthcare.

IX. Conclusion

The statistical models in this study did not find that scope of practice laws lead to decreased rates of births at birthing centers or increased rates of inadequate care, when controlling for other factors. However, the literature on scope of practice is clear: when licensed midwives and certified nurse midwives, with necessary knowledge, skills, and experience to treat patients are unnecessarily barred from service, access to care is negatively impacted. Scope of practice laws are an example of originally well-intentioned laws that now serve protectionist interests at the detriment of patients. Based on the literature, policymakers should consider rolling back rules that increased physician oversight of nurse midwives so that mothers can receive needed care.

When it comes to restrictive healthcare laws, the literature is clear: certificate of need laws leads to decreased access to care, and even worsened healthcare outcomes in other areas of health. Though there is nothing in the academic literature on associations between certificate of need and maternal health outcomes or access, the findings from this study demonstrate that the presence of certificate of need laws lead to an 8% increase in the rate of inadequate access to prenatal care. To improve access to care, legislators must repeal certificate of need laws restricting maternal health services.

Appendix

Literature Review Search Methods

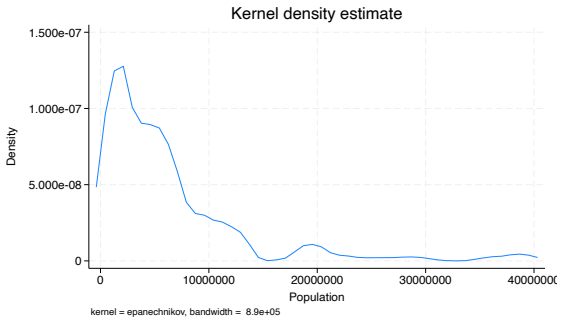
Articles were found by using the Academic Search Complete and EconLit databases provided through the Pepperdine Library. For the section on access to maternal healthcare, the search term was “maternal mortality.” A second search with the terms “maternal or mother or maternity” and “access to care or access to healthcare or access to services or accessibility” was also conducted. Several highly cited articles were taken from both searches.

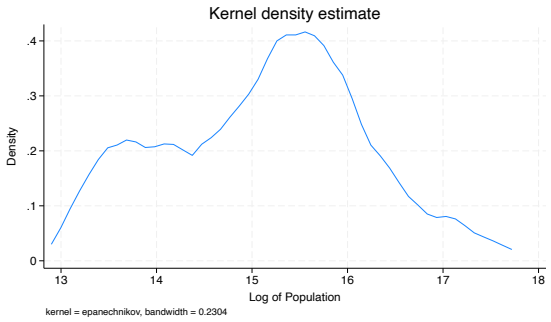
For the scope of practice section, the terms “maternal or mother or maternity,” “scope of practice,” and “access to care or access to healthcare or access to services or accessibility” were searched in both Academic Search Complete and EconLit. Finally, for the section on certificate of need, the terms, “certificate of need,” “maternal or mother or maternity,” and “access to care or access to healthcare or access to services or accessibility or availability” yielded no results in either database. A second search in Academic Search Complete with the terms, “certificate of need,” and “access to care or access to healthcare or access to services or accessibility” yielded 31 results. Several more articles were gathered using the same terms in EconLit. All other articles or books referred to in this literature review that did not show up on Academic Search Complete or EconLit come from the author's background knowledge on the topics from previous research.

Kernel Density Variables

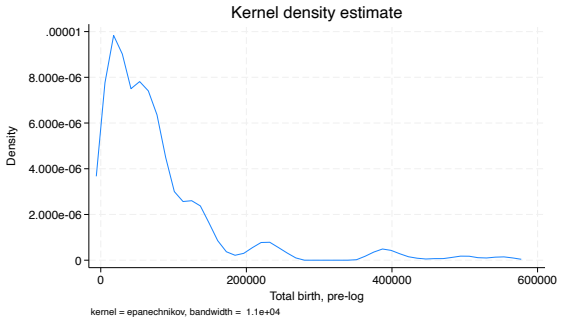
Several of the variables needed to be logged after checking the kernel density. Please see the graphs below to see the variables pre and post log.

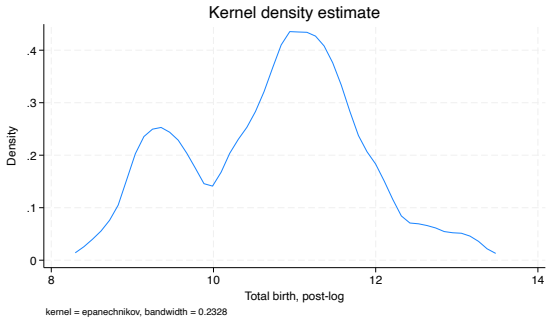
Population



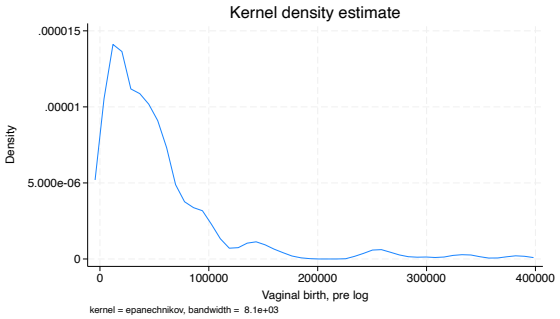


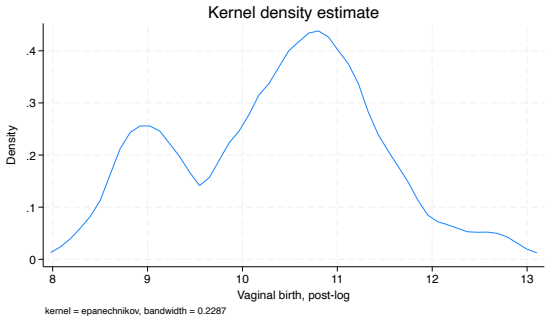
Total Births



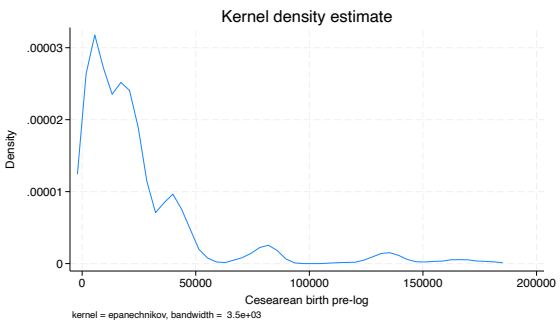


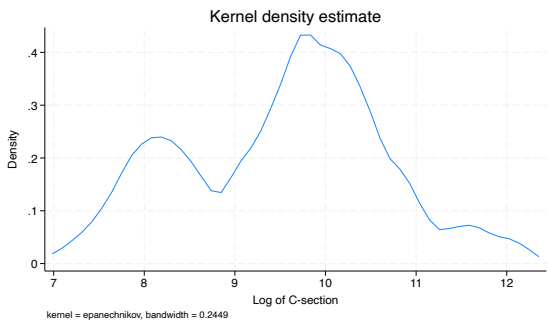
Vaginal Births



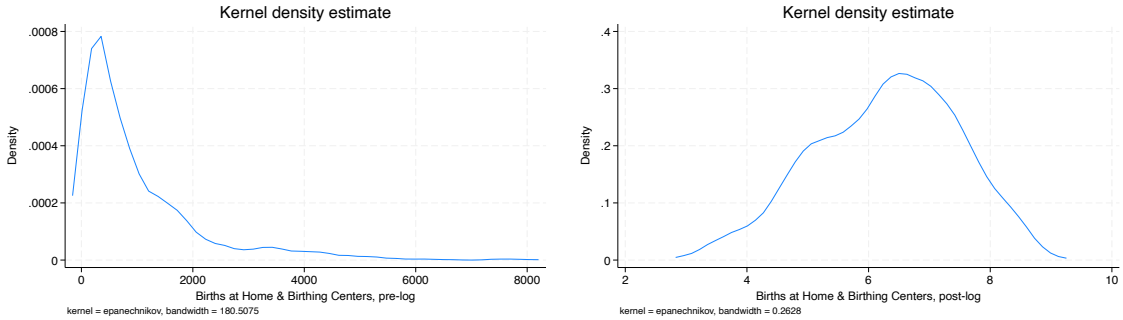


C-section births





Birthing Center/Intentional At-Home Births



Chat GPT

Artificial intelligence aided in working out issues with Stata code. For example, it provided the correct code to use for lagging a variable (L.(var1 var2 var3) and clarified questions on how to analyze logged variables. Additionally, it helped with providing formatting information for some tables in excel.

Bibliography

Bailey, J., & Hamami, T. (2023). Competition and Health-Care Spending: Theory and Application to Certificate of Need Laws. *Contemporary Economic Policy*, 41(1), 128–145.

Bailey, J., Lu, T., & Vogt, P. (2022). Certificate-of-need laws and substance use treatment. Substance Abuse Treatment, *Prevention & Policy*, 17(1), 1–7. doi:10.1186/s13011-022-00469-z

Barnea, E. R., Nicholson, W., Theron, G., Ramasauskaite, D., Stark, M., Albini, S. M., Nassar, A. H., Visser, G. H. A., Escobar, M. F., Kim, Y. H., Pacagnella, R., & Wright, A. (2021). From fragmented levels of care to integrated health care: Framework toward improved maternal and newborn health. *International Journal of Gynecology & Obstetrics*, 152(2), 155–164. doi:0.1002/ijgo.13551

Butler, M. M., Fullerton, J., & Aman, C. (2020). Competencies for respectful maternity care: Identifying those most important to midwives worldwide. *Birth: Issues in Perinatal Care*, 47(4), 346–356. doi: 0.1111/birt.12481

Chiu, K. (2021). The Impact of Certificate of Need Laws on Heart Attack Mortality: Evidence from County Borders. *Journal of Health Economics*, 79. doi:10.1016/j.jhealeco.2021.102518

Conover, C. J., & Bailey, J. (2020). Certificate of need laws: a systematic review and cost-effectiveness analysis. *BMC Health Services Research*, 20, 1–29. doi:10.1186/s12913-020-05563-1

Cooper, J. (2023). Latest Data Show Maternal Mortality Continues to Spike. *Neonatology Today*, 18(5), 267–268.

Cutler, D. M., Huckman, R. S., & Kolstad, J. T. (2010). Input Constraints and the Efficiency of Entry: Lessons from Cardiac Surgery. *American Economic Journal: Economic Policy*, 2(1), 51–76. doi:10.1257/pol.2.1.51

Darling, E. K., Grenier, L., Nussey, L., Murray-Davis, B., Hutton, E. K., & Vanstone, M. (2019). Access to midwifery care for people of low socio-economic status: a qualitative descriptive study. *BMC Pregnancy & Childbirth*, 19(1), N.PAG. doi:10.1186/s12884-019-2577-z

Gruber, Kenneth J et al. "Impact of doulas on healthy birth outcomes." *The Journal of Perinatal Education* vol. 22,1 (2013): 49-58. doi:10.1891/1058-1243.22.1.49

Hall, Lauren K. The Medicalization of Birth and Death. 1 ed. Baltimore, MD: *Johns Hopkins University Press*, 2019. Print.

Harrington, C., Anzaldo, S., Burdin, A., Kitchener, M., & Miller, N. (2004). Trends in State Certificate of Need and Moratoria Programs for Long-Term Care Providers. *Journal of Health & Social Policy*, 19(2), 31–58. doi:10.1300/J045v19n02_02

Hastings, T. M., Foster, S. W., Brucker, M. C., Nodine, P., Burpo, R., Camune, B., Griggs, J., & Callahan, T. J. (2018). Nature and scope of certified nurse-midwifery practice: A workforce study. *Journal of Clinical Nursing* (John Wiley & Sons, Inc.), 27(21–22), 4000–4017. doi:10.1111/jocn.14489

Himes, B. (2021). Medicaid, Doulas and Reducing Maternal and Infant Mortality Rates in the United States. *Neonatology Today*, 16(12), 56–57.

Kennedy, H. P., Balaam, M., Dahlen, H., Declercq, E., Jonge, A., Downe, S., Ellwood, D., Homer, C. S. E., Sandall, J., Vedam, S., & Wolfe, I. (2020). The role of midwifery and other international insights for maternity care in the United States: An analysis of four countries. *Birth: Issues in Perinatal Care*, 47(4), 332–345. doi 10.1111/birt.12504

Kozhimannil, K. B., Interrante, J.D., Henning-Smith, C., Admon, Lindsay. (2019). Rural-Urban Differences in Severe Maternal Morbidity and Mortality in the US, 2007 - 2015. *Health Affairs*, Vol. 38, No. 12 https://www.healthaffairs.org/doi/10.1377/hlthaff.2019.00805

Lopes, L., Montero, A., Persiado, M., & Hammel, L. (2024, March 1). *Americans' challenges with health care costs*. KFF. https://www.kff.org/health-costs/issue-brief/americans-challenges-with-health-care-costs/

Lucas, F. L., Siewers, A., Goodman, D. C., Wang, D., & Wennberg, D. E. (2011). New Cardiac Surgery Programs Established From 1993 To 2004 Led To Little Increased Access, Substantial Duplication Of Services. *Health Affairs*, 30(8), 1569–1574. Doi: 10.1377/hlthaff.2010.0210

March of Dimes. (2020, December). *Medicaid coverage of births: United States, 2022*. March of Dimes | PeriStats. https://www.marchofdimes.org/peristats/data?reg=99&top=11&stop=154&lev=1&slev=1&obj=18

Matthew, M., Philpot, A., & McBirney, J. (2021). *Certificate-of-Need laws: How they affect healthcare access, quality, and cost*. Mercatus Center. https://www.mercatus.org/economic-insights/features/certificate-need-laws-how-they-affect-healthcare-access-quality-and-cost

Myers, M. S., & Sheehan, K. M. (2020). The Impact of Certificate of Need Laws on Emergency Department Wait Times. Journal of Private Enterprise, 35(1), 59–75.

"Nelson, D. B., Moniz, M. H., & Davis, M. M. (2018). Population-level factors associated with maternal mortality in the United States, 1997-2012. *BMC Public Health*, 18(1), N.PAG. doi: 10.1186/s12889-018-5935-2

Ni, H., Paul, J. A., & Bagchi, A. (2017). Effect of Certificate of Need Law on the intensity of competition: The market for emergency care. *Socio-Economic Planning Sciences*, 60, 34–48. Doi: 10.1016/j.seps.2017.02.002

Rosenstein, M. G., Nijagal, M., Nakagawa, S., Gregorich, S. E., & Kuppermann, M. (2015). The Association of Expanded Access to a Collaborative Midwifery and Laborist Model With Cesarean Delivery Rates. *Obstetrics and Gynecology*, 126(4), 716-723. doi10.1097/AOG.0000000000001032

Sheffield, S. M., & Liddell, J. L. (2023). "If I Had a Choice, I'd Do It Natural": Gulf South Indigenous Women's Preferences and Experiences in Childbirth. *Creative Nursing*, 13(1), 23–36. https://doi-org.lib.pepperdine.edu/10.1891/IJC-2022-0050

Smith, D. C., Anderson, J. L., Carrington, S., Nacht, A., Nodine, P. M., & Barton, A. J. (2023). Contemporary Nurse-Midwifery Care in Colorado: A Survey of Certified Nurse-Midwife Practices in Hospital and Community Settings. Policy, *Politics & Nursing Practice*, 24(2), 102–109. Doi: 10.1177/15271544221147301

"Stewart, S. & Henderson, Z. (2022). Nowhere to go: Maternity care deserts across the U.S. 2022 Report. *March of Dimes*

Tu, L. (2023, July 25). Why Maternal Mortality Rates Are Getting Worse across the U.S. *Scientific American*. https://www.scientificamerican.com/article/why-maternal-mortality-rates-are-getting-worse-across-the-u-s/

Van Lerberghe W , Matthews Z , Achadi E , Ancona C , Campbell J , Channon A , et al . Country experience with strengthening of health systems and deployment of midwives in countries with high maternal mortality . *Lancet* . 2014 ; 384 (9949): 1215 – 25 . doi: 10.1016/S0140-6736(14)60919-3 24965819

"Vedam, S., Stoll, K., MacDorman, M., Declercq, E., Cramer, R., Cheyney, M., Fisher, T., Butt, E., Yang, Y. T., & Powell Kennedy, H. (2018). Mapping integration of midwives across the United States: Impact on access, equity, and outcomes. *PLoS ONE*, 13(2), 1–20. https://doi-org.lib.pepperdine.edu/10.1371/journal.pone.0192523

Vedam, S., Stoll, K., Taiwo, T.K., et al. The Giving Voice to Mothers study: inequity and mistreatment during pregnancy and childbirth in the United States. *Reprod Health* 16, 77 (2019). doi: 10.1186/s12978-019-0729- 2

Yang, Y. T., Attanasio, L. B., & Kozhimannil, K. B. (2016). State Scope of Practice Laws, Nurse-Midwifery Workforce, and Childbirth Procedures and Outcomes. *Women's Health Issues*, 26(3), 262–267. Doi: 10.1016/j.whi.2016.02.003