

# The Impact of Certificate of Need Laws on Emergency Department Wait Times

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## Abstract

Certificate of need (CON) laws restrict the supply of medical services, from nursing home beds to the number of dialysis machines per hospital. These restrictions have the potential to lower the standard of care people receive. This paper empirically investigates how CON laws affect emergency department wait times and finds that CON laws have a statistically significant impact on increasing the median wait time for medical examination, pain medication administration, hospital admittance, and hospital discharge. These findings support the idea that movement toward a freer market for health care services through a reduction in CON laws could improve patient outcomes.

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## I. Introduction

Certificate of Need (CON) laws have been relevant in health care and American politics since their national implementation in 1979. These laws' stated goal is to decrease health care spending by requiring prospective health care firms to petition for proof that substantive need for a facility exists where the facility intends to enter. Under CON laws, prospective firms face a rigorous approval process to enter the market, resulting in a reduced supply of facilities and, consequently, a decrease in the health care supplied. The CON law regulation reduces the amount of health care available.

Lawmakers believed that reducing health care supply would reduce extraneous spending for hospitals, decreasing health care

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costs. However, several studies have already tackled the notion that CON laws do not reduce costs, do not limit spending for specific procedures, and do not increase quality of care (Lanning, Morrissey, and Ohsfeldt 1991; Khanna et al. 2013; Stratmann and Wille 2018). CON laws are not meeting their stated goal of cost reduction, and they are having unintended consequences in other areas of health care—in particular, in emergency departments. Until now, the impact of CON laws on emergency department (ED) wait times has not been studied.

In the United States, emergency department overcrowding has become a serious problem and is impacting health outcomes. Patient volume has increased significantly since 1993, which has resulted in overcrowding and can manifest in hallway hospital bed use, extended wait times, and high walk-out rates (Moore, Stocks, and Owens 2017). Overcrowding tends to result from a shortage. Normally, the market would correct itself by increasing supply. However, CON laws provide a tangible barrier to entry by requiring incoming health care firms to spend, at a minimum, thousands of dollars and months of effort just to testify for entry: to begin the process of receiving permission to build a facility (DC Health, n.d.).

In addition, other CON law restrictions may increase ED utilization by encouraging patients to move lower-urgency care to a higher-urgency setting such as the ED. CON laws appear to increase wait times in emergency departments by both restricting the number of EDs and restricting lower-urgency supply, which causes increased usage of the ED. This outcome can explain why CON laws are correlated with reduced quality and efficiency of care, leading to worse health outcomes. While CON laws have been repealed nationally, thirty-five states and the District of Columbia still have CON laws in place, negatively impacting health care in these states.

Analyzing emergency department wait times as impacted by CON laws is a multistep process. Prior literature demonstrates how CON laws do not reduce costs, how sharply ED volume has risen, and how lack of supply leads to overcrowding. CON laws are a barrier to increasing supply and thus increase overcrowding and hurt people's health. By exploring specific examples of how CON laws may increase ED utilization and overcrowding, the impacts on patients will become clearer. Overcrowding, especially in terms of hallway beds and wait times in emergency situations, is correlated with worse and more expensive health outcomes. The regulation of health care facilities is harming the very consumers it is purported to

help. Through this multifaceted analysis of the current market, it will become clear how urgently the United States must repeal CON laws and address emergency department crowding for patients' financial and physical well-being.

## II. Background

This section discusses certificate of need laws and emergency departments, including background and the current landscape of the two.

### *A. Certificate of Need Laws*

CON laws have regulated health care facilities since 1964 when New York State first instituted its CON program (Burt 2012). In 1974, Congress enacted the National Health Planning and Resources Development (NHPRDA) Act, which required all states to implement CON regulations or lose Medicaid and Medicare funding. This act effectively expanded CON laws to the entire United States (Mitchell 2016). CON law proponents said the laws would limit spending, arguing that increased costs from expanded health care facilities did not provide health care access for all and instead created “costly surpluses” of health resources (Health Planning and Resources Development Act of 1974). The argument was that CON laws would limit the overutilization of hospital beds and thus limit cost increases from unnecessary hospital stays. Legislators also argued that CON laws would help exploit economies of scale through individual hospital specialization, providing expensive services at a lower cost due to increased volume and utilization.

However, recent research has not shown CON laws to be cost saving. At best, CON laws appear to not impact costs when looking at specific treatments (Khanna et al. 2013) and they either maintain or increase costs when comparing CON to non-CON states (Mitchell 2016; Bailey 2018). For example, hospitals in monopolistic environments, such as those sometimes created by CON laws, have 15 percent higher costs than hospitals with four or more competitors (Mitchell 2016). In the case of nursing homes, Medicare spending was 1.6 to 1.8 times higher in states with CON regulations (Rahman et al. 2015). CON laws, therefore, have not been found to reduce costs, contrary to the laws' stated goal.

CON laws haven't just failed to reduce health care costs. By limiting supply, they have made attaining care more difficult for patients. CON laws reduce the supply of both hospitals and

ambulatory surgery centers: the Mercatus Center finds that states with CON requirements have 30 percent fewer hospitals and 30 percent fewer rural hospitals (Stratmann and Koopman 2016). In the case of freestanding EDs, states requiring a certificate of need had fewer EDs than those without restraints (Gutierrez et al. 2016). Restricting gross supply of health care can increase health disparities, especially in rural areas. However, the effects of an unnecessary supply restriction can also harm other areas of public health. To understand how reducing supply can harm the health care environment, it is important to understand the framework under which CON law restrictions may result in higher ED utilization.

### *B. Emergency Department Utilization*

Emergency departments have witnessed an upward trend in patient volume in recent decades. From 2006 to 2014, the number of ED visits increased by 14.8 percent (Moore, Stocks, and Owens 2017). Lower copays, convenience, and required treatments all factor into this statistic and likely impact ED utilization and overcrowding. Supply-side failures from CON laws also contribute to ED overcrowding. Although overcrowding can resemble increased patient volume, it also results in hallway bed usage, increased wait times, and patient dissatisfaction. Specifically, hallway bed usage, or “outlying,” has been shown to negatively impact patient outcomes: outlying patients have longer hospital stays, at eight days versus seven days, and 27 percent of outlying patients are readmitted to the hospital within 28 days, compared to 17 percent of nonoutlying patients (Stowell et al. 2014).

Although many health care facilities and legislators strive to minimize health care expenditures, the impacts of supply restrictions on health care can surface in more alarming ways. Patients are finding it harder to obtain convenient care appointments as wait times for office visits skyrocket (Merritt Hawkins 2017). For example, a patient in need of cardiac services can expect to wait three weeks for a visit, a phenomenon not isolated to cardiac care. Restrictions in supply such as these can cause patients to put off seeing a doctor or to not go altogether. By avoiding preventative care, patients ultimately must go to hospitals, generally to emergency departments, with acute, more urgent, and more costly conditions (Enard and Ganelin 2013).

Perhaps the most relevant component of ED overcrowding is increased wait times. EDs in the United States have not expanded to account for additional volume, and ED wait times are on the rise.

The Centers for Disease Control reports that only 39 percent of ED patients are seen in fewer than fifteen minutes, the maximum recommended wait time for acute conditions, conditions that require immediate medical care (Rui, Kang, and Ashman 2016). Wait times in the ED range widely between states and facilities, with the average wait time around 28 minutes and total treatment time around or over two hours (Centers for Medicare and Medicaid Services 2019). Fewer than half of hospitals consistently admitted patients within six hours, and less than a quarter of hospitals admitted patients within four (Horwitz et al. 2010). Horwitz et al. 2010 also suggests that increasing the availability of inpatient beds could alleviate ED length of stay, citing several studies to support that claim.

CON laws, as a supply restriction, can cause provider and equipment restrictions that may increase ED volume, wait times, and costs. Such outcomes are particularly troubling since higher wait times have been correlated with increased mortality. Patients admitted to the ED at times of higher volume experience higher wait times and worse health outcomes, reflected in higher short-term mortality and higher hospital admissions regardless of condition acuity (Guttmann et al. 2011). Admittance during ED crowding is associated with 5 percent greater odds of inpatient death and 1 percent higher costs per admission (Sun et al. 2012). Extended length of stay resulting from increased wait time alone increases total ED costs to Medicaid, Medicare, private insurance, and private individuals by around \$9.8 million annually (Foley, Kifaieh, and Malton 2011). CON laws have direct costs—patients in states with CON laws pay more for health care—but they also likely have hidden costs as well. CON laws reduce the quantity and quality of care patients receive. So, although CON laws directly affect costs, by looking further into supply-side failures due to CON laws, one can easily see the potential hidden increased costs.

### **III. Conceptual Framework**

States with CON laws have 30 percent fewer hospitals (Stratmann and Koopman 2016) and fewer freestanding EDs (Gutierrez et al. 2016). CON laws then contribute to a smaller supply of emergency departments that can directly lead to (1) overcrowding and increased wait times in the available EDs and (2) the accompanying health care problems. While a supply-side discussion suggests an increase in wait times and a likely reduction in care, prior research has found that patients in states with CON laws have shorter stays in EDs based on

a measure of CON stringency, although the effect of states with Democratic leadership is not as strong (Paul, Ni, and Bagchi 2014).

CON laws can also increase ED wait times in indirect ways. First, CON laws limit more common forms of care, like dialysis, by restricting new market entrants (new dialysis machines and providers of machines). These restrictions result in longer waiting lists and longer wait times in all areas of health care. Second, these wait times result in patients delaying care or opting out of it entirely. Third, patients who do not treat their less urgent conditions find that they worsen to the point that they require emergency care. By allowing conditions that could be treated in less expensive, less severe environments to escalate to a point where emergency intervention is necessary, CON laws contribute to increased ED utilization. To illustrate this model, two theoretical examples will be examined through end-stage renal disease programs and nursing homes.

A specific example of CON law limitations comes from examining kidney failure treatment. The United States has the second highest dialysis utilization rate and the highest kidney-related mortality rate in the world (Johnson 2014). End-stage renal disease (ESRD) programs, commonly known as dialysis, are utilized frequently by patients suffering from kidney failure and kidney disease. Dialysis is a high-cost procedure; annually, it costs between \$70,000 and \$100,000 per patient. Further, 20 percent of American ESRD patients die annually. Compared to similar nations, the United States experiences higher ESRD-related figures. CON laws may limit dialysis and kidney disease treatment for Americans, leaving increasing demand unaddressed and explaining the United States' high utilization of ESRD programs. Because CON laws restrict entry, existing firms face less competition, and thus quality of care declines due to lack of competitive incentives (Ford and Kaserman 1993).

To compare the ESRD viewpoint to the above analysis, consider how a patient with ESRD may experience CON restrictions. First, a patient with advanced renal disease requires dialysis for sufficient kidney function. Second, as CON laws restrict dialysis facilities and machines, patients run into longer wait times for appointments and difficulty obtaining care. When faced with this barrier, some patients delay dialysis treatment or, if the condition is not critical, forego treatment entirely. Third, without necessary treatment, patients' conditions worsen and require emergency intervention when kidney function deteriorates.

Another area where CON laws may increase ED utilization comes from nursing home and home health care restrictions. Accounting for the largest area of CON law restriction, with thirty-four states limiting nursing home and long-term care beds, nursing home restrictions could represent a significant driver of ED visits and overcrowding. Existing literature testifies that nursing homes and home health care seem to respond to CON laws' goal to lower costs. Aggregate spending on nursing homes grows at a slower rate in CON law states, while Medicaid spending on nursing home and home health care remains the same. Also, both Medicare and Medicaid spending on home health care increase at a faster rate in states without CON (Rahman et al. 2015). Although these data seem to show that CON laws may help reduce nursing homes' costs, a lack of nursing home or home health care access could be detrimental to the health care of elders.

One impact on ED utilization not previously considered comes from the individual health care needs of those who utilize nursing homes and home health care. Elders represent a population with more complicated needs that may be better addressed in a comprehensive care facility. But Medicare only covers stays up to one hundred days (Mullin and Esposito 2016), and with prices of \$225 per day for long-term care beds, many families, individuals, and insurance companies opt out of the higher-cost solution, not pursuing long-term or skilled nursing care at all. Further, even for families who pursue nursing home and home health care, shortages in both caregivers and care facilities plague patients in need of care. As of 2008, the number of nursing home closures exceeds the number of nursing home openings (Assisted Living Today 2018). The situation is dire in all states; 93 percent of US facilities experience some sort of deficiency, such as inadequate staffing or resources, or a resident safety issue such as improper staffing or poor quality of care (Harrington et al. 2017).

Finally, the quality of nursing home and home health care has deteriorated over time. The inadequate quality of care in nursing homes is endemic, measured by poor resident outcomes, inadequate staffing, and regulation violations (Harrington et al. 2011). Artificially decreasing the supply of nursing homes through CON laws exacerbates an already urgent condition. Reducing competition incentivizes lower care quality, and without Medicare payments to support patients after one hundred days, nursing homes have little

incentive to keep these patients. When patients opt to not utilize nursing home care, they seek other avenues for care.

A specific example of how nursing home CON laws could contribute to ED visits is evident in hip fractures. One-third of people ages 65 and older fall every year, and 10 percent of these falls result in a hip fracture. The health outcome for hip injuries is poor; 25 percent of fracture patients die within the first year after the fracture, and those who survive have lower life expectancy and suffer permanent disabilities, requiring long-term nursing care (Bateman et al. 2012). Those with functional disabilities such as walking, balance, and daily living impairments are at higher risk of falls.

To apply the relevant model, first, patients with difficulty in daily living activities seek skilled nursing facilities. Second, when faced with a shortage, patients opt out of obtaining needed nursing care. Third, patients stay at home; without care, they risk falling and breaking a hip. Those with hip fractures and related complications must come to the ED for care, and these visits tend to culminate in more expensive hospital stays.

These examples—dialysis and long-term nursing care—represent only a small portion of possible effects CON laws could have on ED utilization. Other areas with a potential impact on ED visits include psychiatric services, regulated in twenty-eight states, and substance abuse, regulated in twenty-four states (Koopman, Philpot, and Burns 2016). Although each condition's impact on ED utilization is slightly different, the idea remains: if health care access is restricted earlier in the disease process, the disease is more likely to culminate in an ED visit.

#### **IV. Data and Empirical Framework**

The dependent variables utilized in this paper come from the Centers for Medicare and Medicaid Services' Timely and Effective Care data for 2013 through 2016 and the authors' analysis of four named metrics for emergency department performance. All four dependent variables measure the median wait to receive emergency room care. *Examination* is the preferred measure and is the median time until examination by a medical professional. The average wait time for *Examination* in 2013 was twenty-seven minutes; it was twenty-two minutes in 2016. As noted earlier, in acute care conditions, the maximum recommended wait time is fifteen minutes—thus, lower numbers for this statistic are preferable.

The other variables examined are *Medication*, *Discharge*, and *Admittance*. *Medication* measures the median time until administration of pain medication in fractures; *Discharge* measures the median time until discharge from the hospital; and *Admittance* measures the median time until admittance to an inpatient hospital bed. All variables are approximations of ED wait times. *Examination*, *Discharge*, and *Admittance* were all right skewed, so the natural log of these variables is used in the analysis. Table 1 shows summary statistics for the variables and provides a brief description.

**Table 1. Description of variables and summary statistics**

Variable	Description	Mean	Std. dev.
<i>CONin</i>	Indexed number of CON regulations	10.098	8.924
<i>CON</i>	Binary CON regulations	0.715	0.453
<i>Examination</i>	Time to examination	23.520	0.504
<i>Discharge</i>	Time to discharge	137.686	21.299
<i>Admittance</i>	Time to admittance	271.598	57.291
<i>Medication</i>	Time to pain medication	51.686	7.644
<i>Black</i>	% black population	11.225	10.796
<i>Hispanic</i>	% Hispanic population	11.395	10.109
<i>NoInsur</i>	% uninsured population	12.159	4.042
<i>Plus65</i>	% population above 65	14.201	1.818
<i>pcIncome</i>	Per capita income in chained 2009 dollars	43,292.990	5,267.812
<i>Poverty</i>	% population below FPL	10.507	2.769
<i>HSgrad</i>	% population with a high school degree	28.506	4.097
<i>Bach</i>	% population with a bachelor's degree	30.204	6.179

Source: Data from CMS and Census Bureau. Time measured in minutes.

Data about statewide CON laws for 2013–2016 come from the American Health Planning Association (AHPA 2016). However, utilizing the scope of CON laws as a binary does not accurately reflect the extent of CON laws in each state, as Bailey (2016) highlights. A state like Nebraska, for example, only has restrictions on nursing homes, while states like Hawaii have stringent restrictions on everything from ultrasound machines to open heart surgery facilities. To best represent these data, a CON index, *CONin*, like



**Table 2. Number of certificate of need restrictions in each state**

State	CON Index			State	CON Index		
	2013	2016	Change		2013	2016	Change
Alabama	20	18	-2	Missouri	14	13	-1
Alaska	19	17	-2	Montana	7	7	0
Arizona	0	0	—	Nebraska	2	2	0
Arkansas	6	6	0	Nevada	4	4	0
California	0	0	—	New Hampshire	13	0	-13
Colorado	0	0	—	New Jersey	12	11	-1
Connecticut	17	15	-2	New Mexico	0	0	—
Delaware	8	8	0	New York	19	17	-2
District of Columbia	29	24	-5	North Carolina	24	23	-1
Florida	11	10	-1	North Dakota	0	0	—
Georgia	17	17	0	Ohio	1	1	0
Hawaii	27	25	-2	Oklahoma	4	4	0
Idaho	0	0	—	Oregon	4	4	0
Illinois	18	14	-4	Pennsylvania	0	0	—
Indiana	0	0	—	Rhode Island	21	19	-2
Iowa	9	8	-1	South Carolina	20	19	-1
Kansas	0	0	—	South Dakota	0	0	—
Kentucky	18	16	-2	Tennessee	20	20	0
Louisiana	3	3	0	Texas	0	0	—
Maine	24	21	-3	Utah	0	0	—
Maryland	16	15	-1	Vermont	26	26	0
Massachusetts	14	12	-2	Virginia	19	17	-2
Michigan	18	15	-3	Washington	17	16	-1
Minnesota	0	0	—	West Virginia	21	19	-2
Mississippi	18	18	0	Wisconsin	3	3	0
				Wyoming	0	0	—

*Source:* Created by authors with previously described data.

Due to multicollinearity concerns, the control variables for education—bachelor’s degree and high school equivalency—are included only in separate regressions. Similarly, the controls for economic well-being—the percent of the population living below the poverty line and per capita income—are also never regressed together due to multicollinearity concerns. The analysis presented below is a fully balanced panel data set with 102 observations and utilizes ordinary least squares.

All data are measured in 2013, the first available year for emergency room time performance, and in 2016, the last year data are available. While data are available yearly from 2013 through 2016, since CON laws do not vary much from one year to the next, only data from 2013 and 2016 were used. The empirical results for all years, 2013 through 2016, for a total of four years and 204 observations, are very similar to the initial specification and are available upon request.

## V. Empirical Results

Table 3 shows the result of the regression of the CON laws index with median time until examination by a medical professional, *lnExamination*, and with median time until administration of pain medication in fracture patients, *Medication*. For both wait time measures, stronger CON laws have a statistically significant increase in the median wait time. This result holds regardless of the controls included. An increase in the number of CON laws a state has increases median wait times for patient care.

**Table 3. OLS results for CON index on examination and medication times**

Variable	(1) ln (Examin- ation)	(2) ln (Examin- ation)	(3) ln (Examin- ation)	(4) ln (Examin- ation)	(5) Medi- cation	(6) Medi- cation	(7) Medi- cation	(8) Medi- cation
<i>CONin</i>	0.009** (0.004)	0.012*** (0.003)	0.011*** (0.003)	0.012*** (0.003)	0.260*** (0.087)	0.301*** (0.082)	0.292*** (0.083)	0.319*** (0.079)
<i>Black</i>	0.010*** (0.003)	0.010*** (0.003)	0.012** (0.005)	0.014*** (0.004)	0.312*** (0.064)	0.316*** (0.063)	0.275*** (0.087)	0.306*** (0.078)
<i>Hispanic</i>	0.003 (0.003)	0.006* (0.003)	0.005 (0.004)	0.008** (0.004)	0.087 (0.081)	0.195** (0.086)	0.089 (0.087)	0.200** (0.090)
<i>NoInsur</i>	0.003 (0.012)	-0.009 (0.011)	0.006 (0.012)	-0.002 (0.010)	0.081 (0.268)	-0.122 (0.230)	0.136 (0.265)	-0.031 (0.220)
<i>Plus65</i>	0.014 (0.023)	0.000 (0.020)	0.017 (0.022)	0.006 (0.023)	0.269 (0.422)	-0.208 (0.452)	0.280 (0.426)	-0.157 (0.454)
<i>ln_pcgdp</i>	-0.292 (0.325)	-0.033 (0.293)			-9.148 (7.294)	-5.516 (6.620)		
<i>Poverty</i>			-0.013 (0.021)	-0.023 (0.018)			0.218 (0.378)	0.026 (0.338)
<i>Bach</i>	0.015* (0.008)		0.009 (0.008)		0.099 (0.175)		0.054 (0.181)	
<i>HSgrad</i>		-0.001 (0.010)		0.003 (0.011)		0.341 (0.223)		0.371 (0.228)
<i>Constant</i>	5.318 (3.613)	3.303 (3.406)	2.377*** (0.593)	2.856*** (0.338)	134.360* (77.936)	96.449 (74.733)	35.085*** (12.223)	34.511*** (6.684)
R <sup>2</sup>	0.453	0.420	0.451	0.441	0.417	0.429	0.409	0.425
Adj R <sup>2</sup>	0.412	0.377	0.410	0.399	0.374	0.387	0.365	0.382

Notes: Robust standard errors are in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

Due to the limited number of years in the study, two years for a total of 102 observations, the magnitude of any regression should be discussed with caution; however it is still important to look at the possible size of the effect. Column 2 shows that one additional CON law in a state is associated with a 1.2 percent increase in the median wait time to be examined by a medical professional. Column 6 suggests the impact is much larger for medication, where one

additional CON law increases the median wait time to receive pain medication by 30.1 percent.

Table 4 shows the results of the regression of the CON laws with median time until discharge from the emergency department, *lnDischarge*, and with median time until admission to the hospital, *lnAdmittance*. Similar to the results in table 3, stronger CON laws again have a statistically significant increase in emergency department wait times and the results are not sensitive to the changes in control variables. While the magnitude of increase in wait times for both is small, the consistency of the increase in wait times is still troubling for patient care.

**Table 4. OLS results for CON index on discharge and admittance times**

Variable	(1) ln(Dis-charge)	(2) ln(Dis-charge)	(3) ln(Dis-charge)	(4) ln(Dis-charge)	(5) ln(Admit-tance)	(6) ln(Admit-tance)	(7) ln(Admit-tance)	(8) ln(Admit-tance)
<i>CONin</i>	0.004** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.010*** (0.002)	0.012*** (0.002)	0.011*** (0.002)	0.012*** (0.002)
<i>Black</i>	0.003* (0.002)	0.004** (0.002)	0.004 (0.003)	0.006** (0.002)	0.005*** (0.001)	0.005*** (0.001)	0.008*** (0.002)	0.009*** (0.002)
<i>Hispanic</i>	0.007*** (0.001)	0.008*** (0.002)	0.008*** (0.002)	0.009*** (0.002)	0.010*** (0.002)	0.014*** (0.002)	0.012*** (0.002)	0.016*** (0.002)
<i>NoInsur</i>	-0.004 (0.006)	-0.011** (0.005)	-0.002 (0.005)	-0.007* (0.004)	-0.005 (0.005)	-0.015*** (0.005)	-0.004 (0.005)	-0.011** (0.004)
<i>Plus65</i>	0.010 (0.008)	0.005 (0.008)	0.011 (0.007)	0.008 (0.008)	0.009 (0.008)	-0.006 (0.009)	0.012 (0.008)	-0.002 (0.009)
<i>ln_pgdpp</i>	-0.187 (0.142)	-0.028 (0.161)			-0.030 (0.146)	0.175 (0.139)		
<i>Poverty</i>			-0.007 (0.011)	-0.013 (0.009)			-0.018** (0.007)	-0.027*** (0.007)
<i>Bach</i>	0.010*** (0.003)		0.007* (0.004)		0.010*** (0.003)		0.005 (0.003)	
<i>HSgrad</i>		-0.005 (0.005)		-0.003 (0.005)		0.005 (0.005)		0.008* (0.004)
<i>Constant</i>	6.347*** (1.520)	5.228*** (1.764)	4.450*** (0.255)	4.873*** (0.124)	5.255*** (1.558)	3.506** (1.564)	5.159*** (0.235)	5.385*** (0.129)
R <sup>2</sup>	0.579	0.529	0.574	0.553	0.665	0.641	0.687	0.691
Adj R <sup>2</sup>	0.547	0.494	0.542	0.519	0.640	0.614	0.663	0.668

Notes: Robust standard errors are in parentheses. \*, \*\*, and \*\*\* denote, respectively, significance at the 10, 5, and 1% levels.

The results from tables 3 and 4 show that the presence of stronger CON laws has a positive and statistically significant effect on emergency room department wait times. In states with stronger CON laws, patients should expect to wait longer to receive care and attention in the ED. In acute care conditions the recommended maximum wait time is 15 minutes. Even small increases in wait times

can hinder patient care, potentially leading to worse patient outcomes.

**Table 5. Robustness check with CON binary variable**

Variable	(1) ln(Examination)	(2) Medication	(3) ln(Discharge)	(4) ln(Admission)
CON	0.144** (0.063)	2.338 (1.680)	0.085** (0.036)	0.159*** (0.034)
Black	0.010*** (0.003)	0.344*** (0.067)	0.003* (0.002)	0.005*** (0.001)
Hispanic	0.002 (0.003)	0.039 (0.083)	0.007*** (0.001)	0.010*** (0.002)
NoInsur	0.001 (0.013)	0.049 (0.279)	-0.005 (0.006)	-0.007 (0.006)
Plus65	0.011 (0.025)	0.295 (0.449)	0.007 (0.009)	0.005 (0.009)
ln_pcgdp	-0.493* (0.293)	-15.695** (7.115)	-0.275* (0.139)	-0.245* (0.144)
Bach	0.019** (0.007)	0.245 (0.172)	0.012*** (0.003)	0.014*** (0.003)
Constant	7.401** (3.339)	200.956** (76.541)	7.270*** (1.494)	7.498*** (1.550)
R <sup>2</sup>	0.436	0.374	0.580	0.631
Adj R <sup>2</sup>	0.394	0.328	0.549	0.604

Notes: Robust standard errors are in parentheses. \*, \*\*, and \*\*\* denote, respectively, significance at the 10%, 5%, and 1% levels.

Table 5 shows the results of the robustness checks when the regression is run using CON as a dummy variable and using a bachelor's degree as an educational attainment statistic. The results are examined for all measures of ED wait times. The presence of CON laws in a state appears to increase the median wait time for examination by a medical professional, median time for discharge, and the median time until admission to the hospital. Results for these measures are statistically significant at the 5 percent level or better. Only the median wait time to receive pain medication is no longer statistically significant. The robustness results suggest that the presence of CON laws can increase wait times from 8 percent to 16 percent. Even when only looking for the presence of a CON law, it appears that CON laws increase the median wait times in emergency departments, potentially leading to worse patient outcomes.

## VI. Conclusion

CON laws were initially conceived as a method to control extraneous health care spending to improve the quality of health care for everyone. However, the data suggest that CON laws may negatively

impact patient outcomes by increasing emergency department wait times. The results suggest that CON laws are associated with increased emergency department wait times, time until admission to the hospital, time until discharge from the ED, and time to receive medication in the ED. These metrics indicate that multiple CON laws could be a significant detriment to patient outcomes in terms of hospital cost and patient mortality even though the laws' stated benefits are to help patients.

Previous research on CON laws focuses on the financial impacts and hospital impacts. This paper examines CON laws' impact on wait times and patient outcomes when admitted to the emergency department. The data suggest a statistically significant negative impact on ED wait times. The findings provide additional support to the idea that a freer market for health care through the reduction of CON laws could help patient outcomes. The field remains open for further research on how CON laws can affect patient outcomes in other ways, as well as the effects on ED wait times after a state repeals CON laws.

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