

Certificate of Need and Emergency Department Wait Times

May 1, 2018

Molly Myers, *Gail Werner-Robertson Fellow*
Faculty Mentor: Dr. Kate Sheehan

EXECUTIVE SUMMARY

Certificate of Need (CON) laws were first implemented in 1979 with the intention to decrease healthcare spending by requiring prospective healthcare firms to provide proof of substantive need when proposing facility expansion in a given market. Under CON laws, firms face a rigorous approval process that leads to a reduction in the supply of facilities which results in an overall decrease in healthcare supplied in the market.

CON laws were motivated by the intention to reduce hospital stays, a major cost component of healthcare expenditure. However, plenty of prior research has been done showing how costs have not decreased in relation to hospital stays, as the policies intended. This paper looks into a different major component of overall healthcare costs with an investigation of how CON laws have affected emergency department visits.

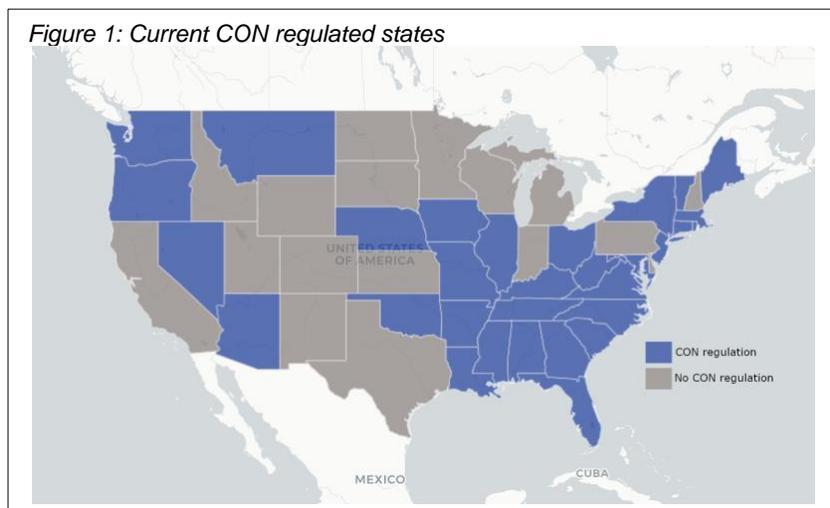
In the United States, emergency department overcrowding has become a serious problem, with volume increasing significantly and resulting in overcrowding. Knowing that CON laws restrict the market from increasing supply, this paper explores specific examples as to how CON laws increase ED utilization and overcrowding. A multifaceted approach to a survey of research indicates that CON laws appear to increase wait times in emergency departments by restricting lower-urgency supply, which causes increased usage of the ED.

Through this multifaceted analysis of the current market, it's clear that states should repeal CON Laws and address emergency department crowding both for a patient's financial and physical well-being.

INTRODUCTION

Certificate of Need (CON) laws have been an issue relevant in healthcare and American politics since their national implementation in 1979. These laws intended to decrease healthcare spending by requiring prospective healthcare firms to petition for proof that substantive need for a facility exists where the facility intends to enter. Through these laws, legislators intended to decrease total healthcare expenditures by limiting unnecessary hospital beds and services. 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 healthcare supplied. Data supports that as number of hospital beds increase, so do hospital stays. Initially linked to Medicaid and Medicare funding, states were required to have certification programs in place or risk losing funding for healthcare (National Health Planning and Resources Act of 1974).

Limiting supply seems like a reasonable strategy to diminish potentially unnecessary costs, especially faced with evidence found in Roemer's Law. According to Roemer's research, limiting hospital beds would reduce hospital stays, which would decrease costs. However, several studies have 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 et al., 1991; Khanna et al., 2013; Stratmann and Wille, 2018). Although repealed nationally in 1987, 35 states and the District of Columbia continue to have CON laws, visualized in Figure 1. These laws range from restrictions only on nursing homes, like in Nebraska, to strict and widespread regulations, such as those in New Jersey and Hawaii, entailing harsh restrictions on everything from hospitals to substance abuse treatment centers (Koopmann, 2016).



Although the effects of CON laws on costs have been widely studied, the impact of CON laws on emergency department (ED) visits has not. In the United States, emergency department overcrowding has become a serious problem. Volume has increased significantly over the past 12 years, which has resulted in overcrowding, which can manifest in usage of hallway hospital beds, extended wait times, and walk-out rates (American College of Emergency Physicians (ACEP), 2018). Overcrowding tends to result from a shortage. Normally, the market would correct itself by increasing supply. However, CON laws provide a tangible barrier to executing this response by requiring incoming healthcare firms to spend hundreds of thousands of dollars and several years just to testify for entry. 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 restricting lower-urgency supply, which causes increased usage of the ED. This is another explanation as to why CON Laws are correlated with reduced quality and efficiency of care, leading to worse health outcomes.

Analyzing emergency department wait times as impacted by CON laws is a multi-step 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. By exploring specific examples as to how CON laws may increase ED utilization and overcrowding, the impacts will become clearer. Further, overcrowding, especially in terms of hallway beds and wait times in emergency situations, are correlated with worse and more expensive health outcomes. 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 both for patients' financial and physical well-being.

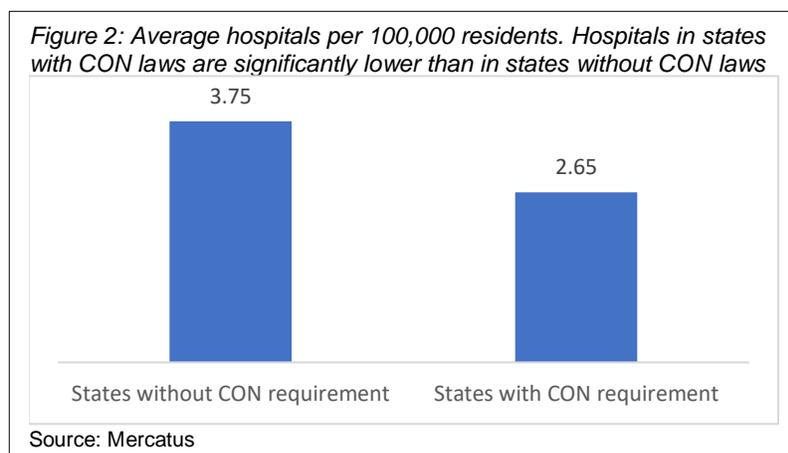
LITERATURE REVIEW ON CON LAWS

Certificate of Need (CON) laws have regulated healthcare facilities since 1964 when New York State first instituted its CON program (Burt, 2012). Later, Congress enacted the National Health Planning and Resources Development (NHPRDA) Act, which required all states to have their own CON regulations or lose federal funding in the form of Medicaid and Medicare (Mitchell, 2016). The goal of Certificate of Need came largely from overutilization of hospital beds beginning in 1946 following the Hill-Burton Act (Clark et al., 1980). This increase resulted in the Roemer Effect, the famous theory that more hospital beds correlate to more utilization of hospital beds. Roemer himself expressed this by stating, "a hospital bed is a filled bed" (Page, 2012). Although on the surface additional hospital bed utilization does not appear to be a bad thing, Roemer's research found a positive correlation between hospital beds available and number of hospital beds per capita. His findings suggested that, to increase revenue, hospitals may encourage unnecessary hospital stays. Several studies agree and find that increasing hospital beds by 10% can increase Medicare spending by 4% (Ginsberg and Koretz, 1983; Delametter et al., 2013). Discoveries such as these led to the institution of national Certificate of Need programs by 1979. CON laws initially intended to limit spending, arguing that increased costs from expanded healthcare facilities did not provide healthcare access for all and instead created "costly surpluses" of health resources (Health Planning and Resources Development Act of 1974). Further, CON laws intended to exploit economies of scale through hospital specialization. Legislators believed that hospitals could provide expensive services at a lower cost due to increased volume and utilization. Thus, due to these arguments and the successful passage of the NHPRDA Act, CON Laws expanded from just New York to the entire United States.

The financial drawbacks of CON Laws have been well-publicized. Several studies have examined the impact on cost and have found different outcomes in terms of CON Law spending. For a specific treatment for a specific condition, such as intensity modulated radiation therapy to care for prostate cancer, the cost remains the same between states with CON Laws and those without (Khanna et al., 2013). Several other studies have found that CON Laws do not decrease costs, instead maintaining them at levels like those found in non-CON states (Mitchell, 2016). Hospitals in monopolistic environments, such as those sometimes created by CON Laws, have

15% higher costs than hospitals with four or more competitors (Mitchell, 2016). CON Laws, therefore, have not found their utility in reducing costs as initially intended.

However, although monopolistic healthcare firms should prioritize lower costs, they do not always do so. Several studies have demonstrated that healthcare facilities in CON regulated states do not necessarily have lower costs than those in non-regulated states. 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). A historic journal review shows that CON Laws increase or do not impact price per procedure, per capita hospital spending, and spending per hospital admission, specifically working against its stated goal (Mitchell, 2016). Clearly, literature behind CON Laws demonstrates lack of efficacy in reducing healthcare costs, instead maintaining or increasing current cost levels while also reducing supply, making attaining care more difficult for patients. Finally, CON Laws reduce supply of both hospitals and ambulatory surgery centers – the Mercatus Center finds that states with CON requirements have 30% fewer hospitals and have 30% fewer rural hospitals, as seen in Figure 2 (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). Next, to understand how reducing supply can harm the healthcare environment, one must see how CON Law restrictions may result in higher ED utilization.

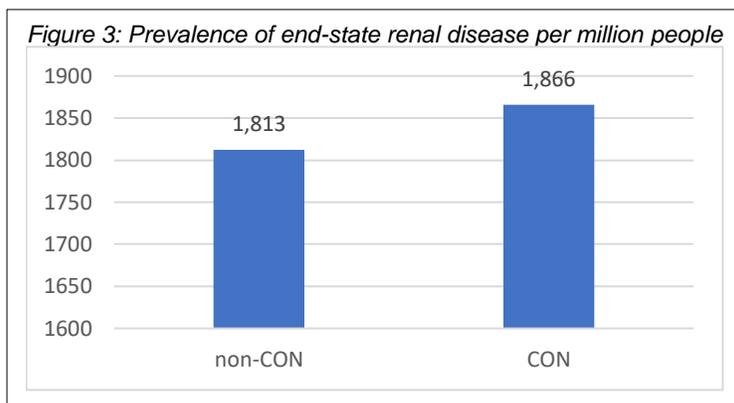


ECONOMIC THEORY – HOW CON LAWS IMPACT ED UTILIZATION

EDs in the United States have not expanded to account for additional volume, and ED wait times are on the rise – currently, the CDC reports that only 32.2% of patients are seen in fewer than 15 minutes, the recommended wait time for acute conditions (National Hospital Ambulatory Medical Care Survey, 2014). Wait times in the ED range widely between states and facilities, with average wait time around 28 minutes and total treatment time around or over two hours (Medicare Data, 2017). CON laws, as a supply restriction, can cause healthcare restrictions that, consequently, may increase ED volume and wait times. The model works in three main steps. First, CON laws restrict more common forms of care, like dialysis, for example, by placing restrictions on new market entrants. Second, these restrictions result in patients who struggle to obtain timely care 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 may cause increased ED utilization.

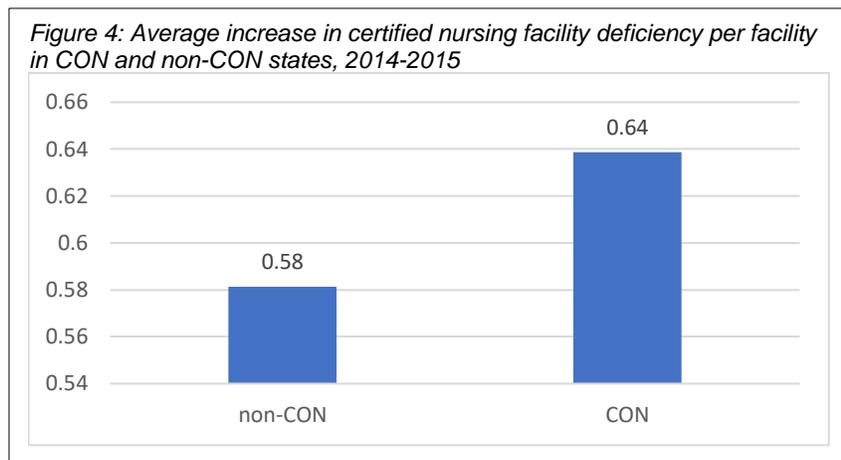
A specific example of CON law limitations comes from examining kidney failure treatment. United States has the second highest dialysis utilization rate in the world, as well as the highest kidney-related mortality rate (Johnson, 2014). End-Stage Renal Disease (ESRD) programs, utilized frequently in patients suffering from kidney failure and kidney disease, are a high cost procedure; annually, it costs between \$70,000 and \$100,000 per patient. Further, 20% of American ESRD patients die annually. These figures are higher than global figures. CON laws may limit dialysis and kidney disease treatment for US citizens, leaving increasing demand unaddressed and explaining the United States' high utilization of ESRD programs. With CON laws, as new entry is restricted, existing firms do not have as much competition, and thus quality of care declines due to lack of competitive incentives (Ford and Kaserman, 1993). To compare this to the model, one can explore how a patient with ESRD may face CON restrictions. First, a patient with renal disease requires dialysis for sufficient kidney function. Second, as CON laws restrict dialysis facilities and machines, patients run into 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, delay treatment completely. Third, without necessary treatment, patients' conditions worsen and require emergency intervention when kidney function deteriorates. Figure 3 illustrates how, in CON states, the average prevalence of ESRD is higher than in non-CON states, supporting this model.



Another example area where CON Laws may increase ED utilization comes from nursing home and home health restrictions. Accounting for the largest area of CON Law restriction, with 34 states restricting 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 home 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 by around 30%, while Medicaid spending on nursing home and home health care remains the same. Also, both Medicare and Medicaid spending on home health care increases at a faster rate in states without CON (Rahman et al., 2015). Although this data looks like CON Laws may help reduce nursing homes' costs, a lack of nursing home or home health access could be detrimental to the healthcare of elders.

One impact on ED utilization not previously considered comes from the individual healthcare needs by those who utilize nursing homes and home health care. Elders represent a population with more comprehensive needs that could be better addressed in a comprehensive care

facility. Although the price of long-term care beds looks daunting – at an egregious price of \$225 a day, Medicare only covers a 100-day stay maximum (Mullin and Esposito, 2016). With these prices, many families, individuals, and insurance companies choose to opt out of the higher-cost solution, not pursuing long-term or skilled nursing care at all. Further, even for families who choose to pursue nursing home and home health care, shortage in both caregivers and care facilities plagues patients in need of care. As of 2008, the amount of nursing home closures exceeds the amount of nursing home openings (Assisted Living Today). This statistic appears more urgent in states with CON Laws, as Figure 4 demonstrates the amount of deficiencies in certified nursing facilities varies across states with nursing CON. The situation is dire in all states, however, as 93% of facilities across the US experience some sort of deficiency, or a resident safety issue such as improper staffing or poor quality of care (Kaiser Family Foundation).



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 supply of nursing homes through CON laws exacerbates an already urgent condition. Reducing competition incentivizes lower care quality, and without Medicare or Medicaid incentives to support patients after 100 days, nursing homes do not have any incentive to keep these patients. When patients opt to not utilize nursing home care, they seek other avenues for care.

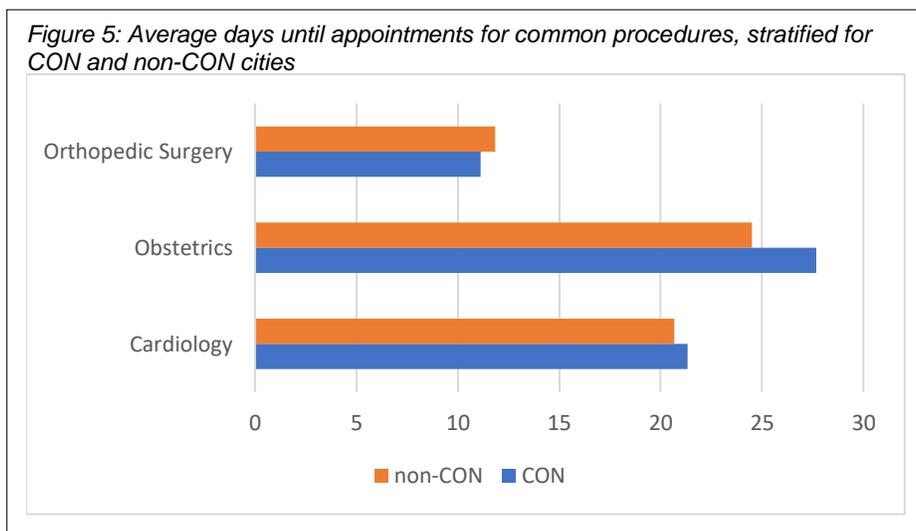
A specific example of how nursing home CON could contribute to ED visits is evident in hip fractures. One-third of people ages 65 and older fall every year, and 10% of these falls result in a hip fracture. The health outcome for hip injuries is poor; 25% of patients die within the first year after the 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. Ideally, nursing homes should provide an avenue to reduce falls due to staff assisting with risky activities like transfers and walking. However, the literature disagrees, as high fall rates are reported in nursing homes (Berg, 1992). To apply the relevant model, first, patients with difficulty with 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, and without care, patients 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 advanced long-term 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 28 states, and substance abuse, regulated in 24 states. Although each condition’s impact on ED utilization works differently, the idea remains: if healthcare access is restricted earlier in the disease process, the disease will culminate in the ED.

IMPACTS OF EMERGENCY DEPARTMENT OVERCROWDING

Emergency departments (EDs) have witnessed an upward trend in volume in recent decades. In the past 12 years, ED volume has grown 16% in the United States (ACEP, 2018). Lower copays, convenience, and required treatment, a legal requirement enacted by the Emergency Medical Treatment and Labor Act in 1986, factor into this statistic. Supply-side failures from CON Laws may result in 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 outcome: outlying patients have longer hospital stays, at eight days versus seven days, and 27% of outlying patients are readmitted to the hospital within 28 days, compared to 17% non-outlying (Stowell et al., 2014).

Although many healthcare facilities and legislators worry about healthcare expenditures, the impacts of supply restrictions on healthcare can surface in more alarming ways. Patients are finding it harder to convenient care visits as wait times for office visits are skyrocketing (Merritt Hawkins, 2017). For example, a patient in need of cardiac services can expect to wait three weeks for a visit. This phenomenon is not isolated to cardiac care facilities, as Figure 5 illustrates. 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 with acute, more urgent, and more costly conditions (Enard and Ganelin, 2013). CON laws, although not completely to blame for (ED) utilization increases, play their role in stifling supply necessary to address ED volume.



Finally, one element and perhaps the most relevant component of ED overcrowding is increased wait time. Hospitals consistently do not meet recommended wait time for acute conditions in the ED. In 2009, Horwitz examined US hospitals' wait times. Among acutely ill patients, the median wait time was 27.5 minutes, compared to the recommended average of 15 minutes. Only 13.8% reached the target wait for at least 90% of their patients. Fewer than half of hospitals consistently admitted patients within 6 hours, and less than a quarter of hospitals admitted patients within 4 (Horwitz et al., 2009). The study also suggests that increasing availability of inpatient beds could alleviate ED length of stay, citing several studies to support that claim. These claims demonstrate preliminarily that CON Laws restricting inpatient beds could negatively impact ED wait times.

Although wait times impact patient outcome, to what extent is this the case? ED wait times have been correlated with short-term mortality – patients admitted in 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). Sun examines the impact of “ED saturation,” including patient diversion and ambulance diversion. Admittance during ED crowding was associated with 5% greater odds of inpatient death and 1% increased costs per admission. (Sun et al., 2012). Extended length of stay resulting from increased wait time alone increases total ED costs by around \$9.8 million (Foley et al., 2011). So, although CON laws, on the surface, may not appear to affect costs, by looking further into supply-side failures due to CON laws, one can easily see the potential hidden increased costs.

Establishing a link between CON laws and ED wait times provides a unique insight and argument for getting rid of artificial supply restrictions. By demonstrating first how CON laws might impact ED wait times, and then providing evidence of how increased wait times worsen health outcomes and increase healthcare costs, one can see why repealing CON Laws will improve healthcare.

CONCLUSION

CON laws' artificial supply restrictions might cause an increase in ED wait times due to increased utilization and overcrowding. Wait times and overcrowding have been correlated with higher mortality rates, longer length of stay, and higher hospital readmission rates. By showing that CON laws restrict supply of institutions like nursing homes, radiation therapy, dialysis, and other specific institutions, as well as demonstrating that CON laws increase ED wait times, a convincing argument can be made to abolish CON laws. Financial reasons have been widely studied and have shown that CON laws do not decrease costs, so linking CON laws to poorer health outcome strengthens the argument against CON laws.

A final piece not studied that could strengthen the argument against CON Laws is comparing healthcare spending or health outcomes in states that have recently repealed CON Laws. New Hampshire, for example, became the most recent state to repeal its CON Laws in 2016, the only state to do so in the 21st century aside from Wisconsin. Analyzing ED wait times before and after CON Laws could supplement the highly supported financial case against CON Laws. Law

Obviously, repealing CON Laws alone will not solve the current ED crisis in the United States. Lack of primary care providers, an aging population, health insurance factors, and more all possibly increase the levels of ED utilization faced today. However, when minutes count for

patients in the ED and each additional minute has a chance of resulting in death or a more expensive hospital visit, every factor that can be minimized is vital to creating an efficient and safe ED network. In a country where Emergency Department wait times are dubbed a “national epidemic” by the Institute of Medicine, creating long-term supply solutions through repealing Certificate of Need laws may help alleviate a problem that never needed to exist in the first place.

REFERENCES

- Bateman, Laura, Srinivas Vuppala, Patricia Porada, William Carter, Charitraheen Baijnath, Kabeer Burman, Ryan Lee, and Jodie Hargus. *The Ochsner Journal* 12, no. 2 (Summer 2012): 101-10.
- Berg, Robert L. *The second fifty years: promoting health and preventing disability*. Washington, DC: National Acad. Press, 1992.
- Burt, Jessica C. "Certificate of Need (CON) Law Series: Part I - A Controversial History." *Health Capital* 5, no. 9. (2012).
- Chan, Kitty, Winnie Li, Gaylene Medlam, Jane Higgins, Amanda Bolderston, Qilong Yi, and Julie Wenz. "Investigating Patient Wait Times for Daily Outpatient Radiotherapy Appointments (A Single-Centre Study)." *Journal of Medical Imaging and Radiation Sciences* 41, no. 3 (September 2010): 145-51. doi:10.1016/j.jmir.2010.06.001.
- Clark, Lawrence J., Marilyn J. Field, Theodore L. Koontz, and Virginia L. Koontz. "The Impact of Hill-Burton: An Analysis of Hospital Bed and Physician Distribution in the United States, 1950-1970." *Medical Care* 18, no. 5 (June 1980): 532-50. doi:10.1097/00005650-198005000-00006.
- Data.Medicare.gov, "Timely and Effective Care Measures" (2013). Centers for Medicare and Medicaid Services. Retrieved from <https://projects.propublica.org/emergency/>.
- Delamater, Paul L., Joseph P. Messina, Sue C. Grady, Vince Winklerprins, and Ashton M. Shortridge. "Do More Hospital Beds Lead to Higher Hospitalization Rates? A Spatial Examination of Roemer's Law." *PLoS ONE* 8, no. 2 (2013). doi:10.1371/journal.pone.0054900.
- "Emergency Department Utilization." American College of Emergency Physicians. Accessed February 3, 2018. https://www.acep.org/uploadedFiles/ACEP/Clinical_and_Practice_Management/innovated/Innovation/FreemanWhite%20Education%203.pdf.
- Enard, Kimberly R., and Deborah M. Ganelin. "Reducing Preventable Emergency Department Utilization and Costs by Using Community Health Workers as Patient Navigators." *Journal of Healthcare Management* 58, no. 6 (2013): 412-27. doi:10.1097/00115514-201311000-00007.
- Foley, Matthew, Nizar Kifaieh, and William K. Malton. "Financial Impact of Emergency Department Crowding." *Western Journal of Emergency Medicine* 12, no. 2 (2011): 192-97.
- Ford, Jon M., and David L. Kaserman. "Certificate-of-Need Regulation and Entry: Evidence from the Dialysis Industry." *Southern Economic Journal* 59, no. 4 (April 1993): 783. doi:10.2307/1059739.
- Ginsburg, Paul B., and Daniel M. Koretz. "Bed Availability and Hospital Utilization: Estimates of the 'Roemer Effect'." *Health Care Financial Review* 5, no. 1 (1983): 87-92.
- Guttman, Astrid, Michael J. Schull, Marian J. Vermeulen, and Therese A. Stukel. "Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada." *BMJ* 342 (June 1, 2011). doi:10.1136/bmj.d2983.
- Harrington, Charlene, Brian Olney, Helen Carrillo, and Taewoon Kang. "Nurse Staffing and Deficiencies in the Largest For-Profit Nursing Home Chains and Chains Owned by Private Equity Companies." *Health Services Research* 47, no. 1pt1 (2011): 106-28. doi:10.1111/j.1475-6773.2011.01311.x.

"Health Planning and Resources Development Act of 1974." *Journal of the National Medical Association* 67, no. 6 (November 1975): 489-94.

Horwitz, Leora I., Jeremy Green, and Elizabeth H. Bradley. "US Emergency Department Performance on Wait Time and Length of Visit." *Annals of Emergency Medicine* 55, no. 2 (February 1, 2010): 133-41. doi:10.1016/j.annemergmed.2009.07.023.

Khanna, Abhinav, Jim C. Hu, Xiangmei Gu, Paul L. Nguyen, Stuart Lipsitz, and Ganesh S. Palapattu. "Certificate of Need Programs, Intensity Modulated Radiation Therapy Use and the Cost of Prostate Cancer Care." *The Journal of Urology* 189, no. 1 (January 1, 2013): 75-79. doi:10.1016/j.juro.2012.08.181.

Johnson, Steven Ross. "Dialysis demand strong as kidney disease grows." *Modern Healthcare*, October 11, 2014.

Koopmann, Christopher, Anne Philpot, and Gregory Burns. "Regulated Services by State, 2016" (2016). Mercatus Center. Retrieved from https://www.mercatus.org/system/files/con_table_2_regulated_services.pdf

Lanning, Joyce A., Michael A. Morrissey, and Robert L. Ohsfeldt. "Endogenous hospital regulation and its effects on hospital and non-hospital expenditures." *Journal of Regulatory Economics* 3, no. 2 (June 1991): 137-54. doi:10.1007/bf00140955.

"Many Emergency Department Visits Among Patients With Cancer Appear Preventable." *The ASCO Post*, June 7, 2017. <http://www.ascp.com/News/55724>.

Marquez de la Plata, Carlos, Tessa Hart, Flora M. Hammond, Alan Frol, Anne Hudak, Caryn R. Harper, Therese O'Neil-Pirozzi, John Whyte, Mary Carlile, and Ramon Diaz-Arrastia. *Archives of Physical Medicine and Rehabilitation* 89, no. 5 (May 2008): 896-903. doi:10.1016/j.apmr.2007.12.030.

Merritt Hawkins (AMN Healthcare), "2017 Survey of Physician Appointment Wait Times and Medicare and Medicaid Acceptance Rates." Merritt Hawkins, 2017.

Mitchell, Matthew D. "Do Certificate-of-Need Laws Limit Spending?" *SSRN Electronic Journal*, September 2016. doi:10.2139/ssrn.2871325.

Mullin, Emily, and Lisa Esposito. "How to Pay for Nursing Home Costs." *US News*, November 16, 2016.

National Health Planning and Resources Development Act of 1974, Pub. L. No. 93-641 (1975)

"Nursing Home Closures." Chart. *Assisted Living Today*. September 24, 2011. <http://assistedlivingtoday.com/p/resources/nursing-homes-closures-infographic/>.

Page, Dan. "Obituary: Milton I. Roemer, Pioneering UCLA Health Services Professor and Professional Who Defined Health Policy in U.S., Abroad." *UCLA School of Public Health* January 8, 2001. <https://web.archive.org/web/20120304021055/http://www.ph.ucla.edu/pr/miroemer.html>

Rahman, Momotazur, Omar Galarraga, Jacqueline S. Zinn, David C. Grabowski, and Vincent Mor. "The Impact of Certificate-of-Need Laws on Nursing Home and Home Health Care Expenditures." *Medical Care Research and Review* 73, no. 1 (2015): 85-105. doi:10.1177/1077558715597161.

Rui, Pinyao, and K. Kang. "National Hospital Ambulatory Medical Care Survey: 2014 Emergency Department Summary Tables." *National Hospital Ambulatory Medical Care Survey*, 2014.

Stratmann, Thomas, and Christopher Koopman. "The Impact of Certificate-of-Need Laws on Community Hospitals and Ambulatory Surgery Centers." March 15, 2016.

Stratmann, Thomas, and David Wille. "Certificate-of-Need Laws and Hospital Quality."

Mercatus Working Paper, September 27, 2016. Accessed February 3, 2018.

Stowell, Andrew, Pierre-Geraud Claret, Mustapha Sebbane, Xavier Bobbia, Charlotte Boyard, Romain Genre Grandpierre, Alexandre Moreau, and Jean-Emmanuel De La Coussaye. "Hospital out-lying through lack of beds and its impact on care and patient outcome." *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 21, no. 1 (March 14, 2014): 17. doi:10.1186/1757-7241-21-17.

Sun, Benjamin C., Renee Y. Hsia, Robert E. Weiss, David Zingmond, Li-Jung Liang, Weijuan Han, Heather McCreath, and Steven M. Asch. "Effect of Emergency Department Crowding on Outcomes of Admitted Patients." *Annals of Emergency Medicine* 61, no. 6 (December 6, 2013). doi:10.1016/j.annemergmed.2012.10.026.

Treatment Choices for Men with Early-Stage Prostate Cancer. US Department of Health and Human Services.