Paper	Year	Summary
Anderson, Keith B. and David I. Kass, "Certificate Of Need Regulation of Entry Into Home Health Care: A Multi-Product Cost Function Analysis" (Washington, D.C.: Federal Trade Commission, 1986).	1986	They examined the effect of CON on economies of scale and cost in the home health care industry. They found: 1) Costs were 2 percent higher in CON states relative to non-CON states. 2) No substantial economies of scale in the home health industry overall, 3) Nor did they find a difference in economies of scale in CON and non-CON states.
Antel, John J., Robert L. Ohsfeldt, and Edmund R. Becker, "State Regulation and Hospital Costs," The Review of Economics and Statistics 77, no. 3 (1995): 416–22.	1995	They find that CON increases per-day and per-admission hospital expenditures but has no relationship to per capita hospital expenditures.
Bailey, James "Can Health Spending Be Reined in through Supply Restraints? An Evaluation of Certificate-of-Need Laws," Journal of Public Health 27, no. 6 (December 1, 2019): 755–60, https://doi.org/10.1007/s10389-018-0998-1	2019	States that eliminate CON experience 4 percent reductions in real per capita health care spending.
Bailey, James and Eleanor Lewin, "Certificate of Need and Inpatient Psychiatric Services," The Journal of Mental Health Policy and Economics 24, no. 4 (December 1, 2021): 117–24.	2021	They examine the effect of psychiatric service CONs. They find that psychiatric service CONs: 1) Reduce the number of psychiatric hospitals by 20 percent; 2) Reduce the likelihood that a hospital will accept Medicare by 5.35 percentage points; and 3) Reduce the number of psychiatric clients per capita by 56 percent.
Bailey, James and Tom Hamami, "Competition and Health-Care Spending: Theory and Application to Certificate of Need Laws," Contemporary Economic Policy 41 (1): January 2023, 128-145.	2019	CON causes spending on those with less than excellent health to be as much as 20% higher.
Bailey, James B., Thanh Lu, and Patrick Vogt, "Certificate of Need and Substance Use Treatment," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, December 29, 2020), https://doi.org/10.2139/ssrn.3757059.	2020	They measure how CON affects the number of substance abuse facilities and beds per capita in a state, and the effect of CON on the forms of payment that treatment facilities accept. They find that CON reduces the acceptance of private insurance and Medicaid.
Bailey, James, "Can Health Spending Be Reined In through Supply Constraints? An Evaluation of Certificate-of-Need Laws," Mercatus Working Paper (Arlington, VA: Mercatus Center at George Mason University, August 1, 2016),	2066	Removing CON reduces hospital charges by 5.5% five years after repeal.
Bailey, James, "The Effect of Certificate of Need Laws on All-Cause Mortality," Health Services Research 53, no. 1 (February 2018): 49–62., James, "The Effect of Certificate of Need Laws on All-Cause Mortality," Health Services Research 53, no. 1 (February 2018): 49–62.	2018	He uses fixed- and random-effects regressions to test how the scope of state Certificate of Need laws affects all-cause mortality within US counties. Though he finds a positive relationship between CON laws and all-cause mortality, the results are not statistically significant.
Bailey, James, Tom Hamami, and Daniel McCorry, "Certificate of Need Laws and Health Care Prices," Journal of Health Care Finance 43, no. 4 (2017).	2017	They find that prices are higher in CON states relative to non-CON states, but the difference isn't statistically significant.
Baker, Matthew C., and Thomas Stratmann, "Barriers to Entry in the Healthcare Markets: Winners and Losers from Certificate-of-Need Laws," Socio-Economic Planning Sciences, 2021, https://doi.org/10.1016/j.seps.2020.101007.	2021	They examine the effect of medical imaging CONs on medical imaging providers. They find: 1) CON laws are associated with 20 to 33 percent fewer providers; 2) Residents of CON states are 3.4 to 5.3 percentage points more likely to travel out of state to obtain these services; 3) CON laws are associated with 27-53 percent fewer scans by nonhospital providers per beneficiary, 23 to 70 percent fewer scans by new hospitals, and 6 to 21 percent more scans by older hospitals
Bates, Laurie J., Kankana Mukherjee, and Rexford E. Santerre, "Market Structure and Technical Efficiency in the Hospital Services Industry: A DEA Approach," Medical Care Research and Review 63, no. 4 (August 2006): 499–524, https://doi.org/10.1177/1077558706288842.	2006	CON hospitals are not any less efficient than non-CON hospitals.
Browne, James A. et al., "Certificate-of-Need State Laws and Total Knee Arthroplasty," The Journal of Arthroplasty 33, no. 7 (July 1, 2018): 2020–24.	2018	They examined the effect of CON on total knee arthroplasty (TKA) by comparing states with and without CON programs. They looked at 4 factors: 1) Average Medicare reimbursements were 5% to 10% lower in non-CON states, 2) CON was associated with lower TKA utilization per capita, but faster growth in utilization per capita. 3) CON was associated with TKA in higher-volume hospitals, 4) Examination of adverse events rates did not reveal any strong associations between any adverse outcome and CON status.
Campbell, Ellen S. and Melissa W. Ahern, "Have Procompetitive Changes Altered Hospital Provision of Indigent Care?," Health Economics 2, no. 3 (1993): 281–89, https://doi.org/10.1002/hec.4730020311.	1993	Private nonprofit hospitals that are more profitable offer more uncompensated care. This suggests the possibility of a quid pro quo, but they do not actually test CON.
Cancienne, Jourdan M. et al., "Certificate-of-Need Programs Are Associated with a Reduced Incidence, Expenditure, and Rate of Complications with Respect to Knee Arthroscopy in the Medicare Population," HSS Journal: The Musculoskeletal Journal of Hospital for Special Surgery 16, no. Suppl 2 (December 2020): 264–71, https://doi.org/10.1007/s11420-019-09693-z.	2020	They examine the effect of CON on knee arthroscopy, assessing its effect on: 1) Charges and reimbursements: in t-tests without controls they found that charges (which are the prices set before any negotiation) were lower in CON states, while reimbursements (which are actual payments) were not statistically significantly different. 2) Total volume: total volume and growth in total volume was lower in CON states than in non-CON states. 3) Volume within facilities: CON is associated with the presence of more high-volume facilities, and 4) Quality: There were more ER visits within 30 days of operation and more infections within 6 months of operation in CON than in non-CON states; there were no differences in in-hospital deaths or readmissions within 30 days of the operation between CON and non-CON states.
Cantor, Joel C. et al., "Reducing Racial Disparities In Coronary Angiography," Health Affairs 28, no. 5 (September 1, 2009): 1521–31, https://doi.org/10.1377/hlthaff.28.5.1521.	2009	The authors studied a 1996 New Jersey reform that created a pilot program to license additional hospitals to perform coronary angiography. They found that a large black-white disparity disappeared after the refor.
Carlson, Melissa D.A., et al., "Geographic Access to Hospice in the United States," Journal of Palliative Medicine 13, no. 11 (November 2010): 1331–38, https://doi.org/10.1089/jpm.2010.0209.	2010	This is a cross-sectional study of geographic access to U.S. hospices using multivariate logistic regression to identify gaps in hospice availability (measured by distance to hospice facilities) by community characteristics. CON was associated with longer travel distance to hospice care.
Casp, Aaron J. et al., "Certificate-of-Need State Laws and Total Hip Arthroplasty," The Journal of Arthroplasty 34, no. 3 (March 2019): 401–7.	2019	They study the effect of CON on total hip arthroplasty. They find: 1) CON is associated with a lower volume of total hip arthroplasty. 2) CON is associated with care in high-volume hospitals. 3) No difference in postoperative complications between CON and non-CON states.

Paper	Year	Summary
Chen, Chi-Chang, "Estimating Nursing Home Cost and Production Functions: Application of Stochastic Frontier Models for the Analysis of Efficiency," ProQuest Dissertations and Theses (Ph.D., New Orleans, LA, Tulane University, 2005), http://www.proquest.com/docview/305399421/abstract/F9AE5D67757C4ACAPQ/1.	2005	CON is associated with greater cost efficiency, but diminished technical efficiency.
Chiu, Kevin, "The Impact of Certificate of Need Laws on Heart Attack Mortality: Evidence from County Borders," Journal of Health Economics, 2021, https://doi.org/10.2139/ssrn.3678714.	2021	He uses a cross-border discontinuity design to study the effect of CON on heart attack mortality. He finds that it is associated with 6 to 10 percent higher mortality three years after enactment.
Choudhury, Agnitra Roy, Sriparna Ghosh, and Alicia Plemmons, "Certificate of Need Laws and Health Care Use during the COVID-19 Pandemic," Journal of Risk and Financial Management 15, no. 2 (2022)	2022	They examined the relationship between CON and mortality associated with illnesses that require similar medical equipment as COVID. They find that: 1) There are higher mortality rates in CON states than in non-CON states; and 2) States with high healthcare utilization that reformed their CON laws during the pandemic saw lower mortality rates resulting from natural death, septicemia, diabetes, chronic lower respiratory disease, influenza or pneumonia, Alzheimer's, and COVID.
Conover, Christopher J. and Frank A. Sloan, "Does Removing Certificate-of-Need Regulations Lead to a Surge in Health Care Spending?," Journal of Health Politics, Policy and Law 23, no. 3 (June 1, 1998): 455–81.	1998	CON has no effect on total per capita health expenditures; there is no evidence of a surge in spending after repeal.
Conover, Christopher J. and Frank A. Sloan, "Evaluation of Certificate of Need in Michigan. Volume II: Technical Appendices" (Raleigh, NC: Duke University Center for Health Policy, Law and Management, 2003).	2003	Dropping CON has 0% effect on all expenditures.
Custer, William S. et al., "Report of Data Analyses to the Georgia Commission on the Efficacy of the CON Program," Aysps.Gsu.Edu, November 2006.	2006	They use a cross-border design to study the effect of CON in hospital markets. This allows them to control for unobservable factors. They also used interviews and public information to develop an index measuring CON rigor based on fees, administrative requirements, reviewability, appeals, and administrative complexity. They assess the effects of CON on acute care, long term care, and home health markets. They find : 1) CON is associated with higher private inpatient acute care costs 2) Acute care costs rise with the rigor of the CON program for the most resource-intensive acute care diagnoses. 3) Some evidence that CON is associated with higher Medicaid costs for home health services. 4) There is weak evidence that CON is associated with higher private long term care costs. 5) There is weak evidence that CON is associated higher Medicaid long term care costs. 6) Some evidence that CON is associated with higher per-capita costs for home health services 7) CON is associated with fewer hospitals. 8) CON is associated with fewer hospital beds. 9) CON is associated with fewer home health agencies per 1000 residents. 10) CON is associated with fewer Medicare beneficiaries receiving home health services. 11) There is no significant relationship between the percent of hospital admissions that are self-pay, though when controlling for the number of uninsured and family income, CON is positively related to self-pay admission per uninsured. 12) There is no apparent difference in acute care quality in CON and non-CON markets 13) In long term care, CON is associated with better quality on two measures but worse quality on six measures. 14) In home health markets, they find no evidence that CON affects any of 10 outcome measures of quality. 15) They find that acute care markets are less competitive when CON is rigorous. 16) CON is associated with lower levels of competition in home health agency markets
Cutler, David M., Robert S. Huckman, and Jonathan T. Kolstad, "Input Constraints and the Efficiency of Entry: Lessons from Cardiac Surgery," American Economic Journal: Economic Policy 2, no. 1 (February 2010): 51–76.	2010	They assess the 1996 repeal of CON in Pennsylvania on Coronary Artery Bypass Graft (CABG). They found: 1) Repeal of CON reduced travel distanced by 9 percent; 2) There was no statistically significant effect on total volume following CON repeal; 3) There were mixed results on scale; following CON repeal, fewer surgeries were performed by high-volume hospitals, but more were performed by high-volume surgeons. 4) CON repeal led to a shift from standard quality to high quality surgeons; and 5) Incumbent hospital margins initially fell following repeal but these hospitals had regained profitability and were the most profitable by 2002.
D'Aunno, Thomas, Melissa Succi, and Jeffrey A. Alexander, "The Role of Institutional and Market Forces in Divergent Organizational Change," Administrative Science Quarterly 45 (2000): 679–703.	2000	They study the market and institutional determinants of radical organizational change in rural hospitals. In particular, they study the factors that make a rural hospital likely to change to provide other types of services. They find that stronger CON regulation makes a rural hospital 8 percent less likely to change.
DeLia, Derek et al., "Effects of Regulation and Competition on Health Care Disparities: The Case of Cardiac Angiography in New Jersey," Journal of Health Politics, Policy and Law 34, no. 1 (February 2009): 63–91, https://doi.org/10.1215/03616878-2008-992.	2009	This builds off of the authors' previous study by the same authors, confirming the result (the reforms eliminated the black-white disparity) using additional techniques (weighting zip codes by the number of black and white residents). They also study the mechanism by which the disparity was eliminated, finding that incumbent hospitals served more black patients as new entrants cut into their market share for white patients.
DiSesa, Verdi J. et al., "Contemporary Impact of State Certificate-of-Need Regulations for Cardiac Surgery: An Analysis Using the Society of Thoracic Surgeons' National Cardiac Surgery Database," Circulation 114, no. 20 (November 14, 2006): 2122–29.	2006	They study CON, volume, and mortality in coronary artery bypass grafting (CABG). They find: 1) CON is positively associated with CABG volume within hospitals, and 2) There is no direct relationship between CON and mortality.
Dobson, Al et al., "An Evaluation of Illinois' Certificate of Need Program" (Prepared for: State of Illinois Commission on Government Forecasting and Accountability, 2007).	2007	They find that safety-net hospitals in non-CON states had higher margins than those in CON states.
Eakin, B. Kelly, "Allocative Inefficiency in the Production of Hospital Services," Southern Economic Journal 58, no. 1 (1991): 240–48.	1991	CON hospitals are less efficient than non-CON hospitals.
Eichmann, Traci L, and Rexford E Santerre, "Do Hospital Chief Executive Officers Extract Rents from Certificate of Need Laws," Journal of Health Care Finance 37, no. 4 (January 1, 2011): 1–14.	2011	They study the effects of CON on access and rents. They find CON is associated with 1) 12 percent fewer beds per capita, 2) 48 percent fewer hospitals per capita, and 3) $91,000 more in urban hospital CEO pay.

Paper	Year	Summary
Ettner, Susan L. et al., "Certificate of Need and the Cost of Competition in Home Healthcare Markets," Home Health Care Services Quarterly 39, no. 2 (June 2020): 51–64.	2020	They examine the effects of home health agency CONs and nursing home CONs on home health agencies. They find that in states with home health agency CONs there are: 1) Lower per patient expenditures (they don't know if this is due to skimping or to economies of scale); 2) Higher expenditures per agency, 3) Higher expenditures per resident, 4) Slightly fewer home health agencies per capita, 5) Higher caseloads (volume) within agencies (this is what drives the higher expenditures per agency.
Falchook, Aaron D. and Ronald C. Chen, "Association Between Certificate of Need Legislation and Radiation Therapy Use Among Elderly Patients With Early Cancers," International Journal of Radiation Oncology, Biology, Physics 91, no. 2 (February 1, 2015): 448–50, https://doi.org/10.1016/j.ijrobp.2014.10.033.	2015	They examined utilization of radiation therapy when it is not warranted in CON and non-CON states, concluding that in CON states there is greater use of this treatment on elderly patients who may not need it.
Fayissa, Bichaka et al., "Certificate-Of-Need Regulation and Healthcare Service Quality: Evidence from the Nursing Home Industry," Healthcare (Basel, Switzerland) 8, no. 4 (October 23, 2020): E423, https://doi.org/10.3390/healthcare8040423.	2020	In an IV study, they find that CON is associated with: 1) 18 to 24 percent lower nursing home survey scores computed by healthcare professionals, and 2) The substitution of lower-quality certified nursing assistance care for higher-quality licensed practical nurse care
Ferrier, Gary D., Hervé Leleu, and Vivian Valdmanis, "The Impact of CON Regulation on Hospital Efficiency," Health Care Management Science 13, no. 1 (March 2010): 84–100.	2010	CON hospitals are more efficient than non-CON hospitals.
Ford, Jon M. and David L. Kaserman, "Certificate-of-Need Regulation and Entry: Evidence from the Dialysis Industry," Southern Economic Journal 59, no. 4 (1993): 783–91, https://doi.org/10.2307/1059739.	1993	They assess the effect of CON on the number of dialysis clinics and stations, finding that it has limited new firm entry and total capacity.
Fournier, Gary M. and Ellen S. Campbell, "Indigent Care as Quid Pro Quo in Hospital Regulation," The Review of Economics and Statistics 79, no. 4 (1997): 669–73, https://doi.org/10.1162/003465397557088.	1997	They found that Florida awarded CON licenses to hospitals providing more care to the poor, though they don't directly test whether CON increases indigent care.
Fric-Shamji, Elana C. and Mohammed F. Shamji, "Effect of US State Certificate of Need Regulation of Operating Rooms on Surgical Resident Training," Clinical and Investigative Medicine. Medecine Clinique Et Experimentale 33, no. 2 (April 1, 2010): E78.	2021	They evaluate the mean per capita rates of 26 diverse surgical procedures in 21 CON and 5 non-CON states between 2004 and 2006. The proportion of procedures performed in teaching facilities was also assessed. They found no significant difference in procedural rates between CON and non-CON states.
Garmon, Chris, "Hospital Competition and Charity Care," Forum for Health Economics & Policy 12, no. 1 (May 1, 2009), https://doi.org/10.2202/1558-9544.1130.	2009	This is not a direct test of CON. Instead, he tests whether hospital competition is associated with more or less charity care. He finds no evidence that increased competition reduces charity care. Furthermore, he finds some evidence that reduced competition leads to higher prices for uninsured patients.
Gertler, Paul J., "A Latent Variable Model of Quality Determination," Working Paper, Working Paper Series (National Bureau of Economic Research, October 1985).	1985	He finds that under a binding CON capacity constraint, increases in Medicaid rates are associated with lower quality in New York state nursing home facilities.
Grabowski, David C., Robert L. Ohsfeldt, and Michael A. Morrisey, "The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures," Inquiry: A Journal of Medical Care Organization, Provision and Financing 40, no. 2 (2003): 146–57.	2003	CON repeal: 1) Has no statistically significant effect on per diem Medicaid nursing home charges, 2) No effect on per diem Medicaid long-term-care charges, 3) No effect on days.
Harrington, Charlene et al., "The Effect of Certificate of Need and Moratoria Policy on Change in Nursing Home Beds in the United States," Medical Care 35, no. 6 (1997): 574–88.	1997	In a two-stage least squares regression, they assess the effect of CON, and/or moratoria on the growth of nursing home beds and Medicaid nursing home reimbursement rates. They found: 1) CON had no effect on Medicaid nursing home reimbursement rates. 2) CON reduced growth of beds.
Hellinger, Fred J., "The Effect of Certificate-of-Need Laws on Hospital Beds and Healthcare Expenditures: An Empirical Analysis," The American Journal of Managed Care 15, no. 10 (October 2009): 737–44.	2009	CON is associated with fewer hospital beds, which in turn are associated with slower growth in aggregate health expenditures per capita. But there is no direct relationship between CON and health expenditures per capita.
Hellinger, Fred J., "The Effect of Certificate-of-Need Legislation on Hospital Investment," Inquiry 13, no. 2 (1976): 187–93.	1976	CON legislation induced hospitals to increase investments before CON took effect. They interpret this as a bad result. We code it as positive since it did increase access (in the short run).
Herb, Joshua N. et al., "Travel Time to Radiation Oncology Facilities in the United States and the Influence of Certificate of Need Policies," International Journal of Radiation Oncology, Biology, Physics 109, no. 2 (February 1, 2021): 344–51.	2021	They measure the effect of CON on travel time to radiation oncology facilities, breaking down the effect by region. They find CON: 1) Has no association with prolonged travel in the West; 2) Is associated with lower odds of prolonged travel in both urban and rural tracts in the South; 3) Is associated with increased odds of prolonged travel in both urban and rural tracts in the Midwest and Northeast.
Ho, Vivian and Meei-Hsiang Ku-Goto, "State Deregulation and Medicare Costs for Acute Cardiac Care," Medical Care Research and Review 70, no. 2 (April 2013): 185–205.	2013	Removing CON decreases the cost of coronary artery bypass grafts, but not for percutaneous coronary intervention. In Ohio, reimbursements fell 2.8 percent following repeal of CON and in Pennsylvania, they fell 8.8 percent following repeal.
Ho, Vivian et al., "Cardiac Certificate of Need Regulations and the Availability and Use of Revascularization Services," American Heart Journal 154, no. 4 (October 2007): 767–75.	2007	They study the association between cardiac CON regulations, availability of revascularization facilities, and revascularization rates, focusing on differences between the general population and the elderly and on differences between procedures (coronary artery bypass graft surgery (CABG) or a percutaneous coronary intervention (PCI)). They find that: 1) CON is associated with fewer hospitals offering CABG and PCI, 2) CON has no effect on overall CABG utilization. 3) CON is associated with 19.2 percent fewer PCIs per 1,000 elderly.
Ho, Vivian, "Certificate of Need, Volume, and Percutaneous Transluminal Coronary Angioplasty Outcomes," American Heart Journal 147, no. 3 (March 2004): 442–48.	2004	She compares Florida, where there is a CON for percutaneous transluminal coronary angioplasty (PTCA) with California, where there is no such CON. She finds: 1) CON is associated with higher in-hospital volume for PTCA 2) There is a positive relationship between PTCA volume and mortality outcomes (though note that she does not directly study the relationship between CON and PTCA mortality outcomes).

Paper	Year	Summary
Ho, Vivian, "Does Certificate of Need Affect Cardiac Outcomes and Costs?," International Journal of Health Care Finance and Economics 6, no. 4 (March 6, 2007): 300–324.	2007	The study assesses the effect of CON on cardiac costs and outcomes. She finds: 1) While CON is associated with lower average costs per patient, it also seems to be associated with more procedures and this is enough to offset the savings from lower average costs; 2) CON is associated with greater volume within hospitals, 3) CON does not seem to be related to inpatient mortality.
Ho, Vivian, Meei-Hsiang Ku-Goto, and James G Jollis, "Certificate of Need (CON) for Cardiac Care: Controversy over the Contributions of CON," Health Services Research 44, no. 2 Pt 1 (April 2009): 483–500, https://doi.org/10.1111/j.1475-6773.2008.00933.x.	2009	They use difference-in-difference regression analysis to compare states that dropped CON during the sample period with states that kept the regulation. They focused on coronary artery bypass graft surgery (CABG) and percutaneous coronary interventions (PCI). They found that in states that dropped CON: 1) The number of hospitals in the state performing CABG and PCI went up following repeal; 2) Statewide procedural volume for CABG and PCI were unchanged; 3) Mean hospital volume declined for both procedures, and 4) Procedural CABG mortality declined after repeal, though the difference was not permanent
Joskow, Paul L., "The Effects of Competition and Regulation on Hospital Bed Supply and the Reservation Quality of the Hospital," The Bell Journal of Economics 11, no. 2 (1980): 421–47.	1980	He assesses the effects of regulations on bed supply and the probability that a hospital will turn away patients. He finds that CON reduces bed supply by about 6 percent and makes it more likely that a hospital will turn away patients.
Khanna, Abhinav et al., "Certificate of Need Programs, Intensity Modulated Radiation Therapy Use and the Cost of Prostate Cancer Care," The Journal of Urology 189, no. 1 (January 2013): 75–79.	2013	The authors focus on intensity modulated radiation therapy. They find that: 1) CON was not associated with any difference in cost growth 2) CON was associated with greater growth in intensity modulated radiation therapy which is an expensive and no more effective treatment, so they interpret this as a negative quality result.
Kolstad, Jonathan T., "Essays on Information, Competition and Quality in Health Care Provider Markets" (Ph.D. Dissertation, Boston, MA, Harvard University, 2009), https://healthpolicy.fas.harvard.edu/people/jonathan-kolstad.	2009	He examined how the 1996 repeal of CON legislation in Pennsylvania affected the market for coronary artery bypass graft (CABG) surgery in the state, finding: 1) The number of CABG facilities increased 46 percent and 2) Surgeries were more likely to be performed by high quality surgeons.
Lanning, Joyce A., Michael A. Morrisey, 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.	1991	They measure the effect of CON on hospital expenditures, finding that it is associated with 20.6 percent higher spending per capita.
Li, Suhui, and Avi Dor. "How Do Hospitals Respond to Market Entry? Evidence from a Deregulated Market for Cardiac Revascularization." Health Economics 24, no. 8 (August 2015): 990–1008. https://doi.org/10.1002/hec.3079.	2015	Removal of CON was associated with: 1) A substantial increase in the number of hospitals performing cardiac revascularization procedures, 2) An overall downward trend in CABG and an overall upward trend in the alternative procedure, PCI. 3) Entry led to a significant increase in the likelihood of CABG, relative to trend, but it did not contribute to the increase in PCI after adjusting for patient traits, market characteristics, and area-specific trends. 4) The probability of receiving PCI specifically at incumbent hospitals decreased with market entry, suggesting a volume shift from incumbents to entrants 5) Entry shifted a disproportionate volume of low-severity patients from incumbent hospitals to entrants. 6) Entry by new cardiac surgery centers tended to sort high-severity patients into the more invasive CABG procedure and low-severity patients into the less invasive PCI procedures, potentially improving quality of care.
Lorch, S. A., P. Maheshwari, and O. Even-Shoshan, "The Impact of Certificate of Need Programs on Neonatal Intensive Care Units," Journal of Perinatology: Official Journal of the California Perinatal Association 32, no. 1 (January 2012): 39–44.	2012	They studied NICU CONs. They found: 1) CON is associated with fewer units; 2) CON is associated with fewer beds; 3) CON was unrelated to very low birth weight (VLBW) infant mortality and low birth weight (LBW) infant mortality. 4) CON is associated with lower rates of all-infant mortality in states with a large metropolitan area.
Mendelson, D. N. and J. Arnold, "Certificate of Need Revisited," Spectrum 66, no. 1 (1993): 36–44.	1993	They found that Ohio denied CONs that could have had adverse effects on the financial viability of safety net hospitals. But it was not a direct test of CON
Miller, Nancy A., Charlene Harrington, and Elizabeth Goldstein, "Access to Community-Based Long-Term Care: Medicaid's Role," Journal of Aging and Health 14, no. 1 (February 2002): 138–59.	2002	They find that CON increases per capita Medicaid community-based care expenditures.
Mitchell, Matthew and Thomas Stratmann, "The Economics of a Bed Shortage: Certificate-of-Need Regulation and Hospital Bed Utilization during the COVID-19 Pandemic," Journal of Risk and Financial Management 15, no. 1 (January 2022): 1-18.	2022	They examine the effect of bed CON on statewide bed utilization rates and on individual hospital shortages. They find: 1) States that require CONs for beds had 12 percent higher bed utilization rates; 2) And 58 percent more days with more than 70% of their beds in use. 3) Hospitals in these states were 27% more likely to run out of beds. 4) States that relaxed these rules for COVID saw no difference in utilization rates or shortages.
Mitchell, Matthew, Thomas Stratmann, and James Bailey, "Raising the Bar: ICU Beds and Certificates of Need" (Arlington, VA: Mercatus Center at George Mason University, April 29, 2020), https://www.mercatus.org/publications/covid-19-crisis-response/raising-bar-icu-beds-and-certificates-need.	2020	They studied the relationship between CON and projected ICU bed shortages over the course of the COVID-19 pandemic. They found that compared with non-CON states, in CON states, expected shortages were more than twice as likely and the shortages were about 9 times greater in per capita terms.
Myers, Molly S. and Kathleen M. Sheehan, "The Impact of Certificate of Need Laws on Emergency Department Wait Times," Journal of Private Enterprise 35, no. 1 (Spring 2020): 59–75.	2020	They examine the effect of CON laws on wait times. They find CON programs: 1) Increase median wait times for medical examinations; 2) Increase wait times for pain medication administration; 3) Increase wait times for hospital admittance; and 4) Increase wait times for hospital discharge.
Noether, Monica, "Competition Among Hospitals," Journal of Health Economics 7, no. 3 (September 1988): 259–84.	1988	CON increases the average price and expense for several disease categories including: 1) Diabetes mellitus 2) Cataract surgery 3) Acute myocardial infarction 4) Congestive heart failure 5) Acute, cerebrovascular disease 6) Pneumonia 7) Respiratory system disease, other 8) Inguinal hernia 9) Diverticula of intestine 10) Hyperplasia of prostate 11) Fracture of neck and femure

Paper	Year	Summary
Noh, Shihyun and Catherine H. Brown, "Factors Associated with the Number of Substance Abuse Nonprofits in the U.S. States: Focusing on Medicaid Expansion, Certificate of Need, and Ownership," Nonprofit Policy Forum 9, no. 2 (July 1, 2018), https://doi.org/10.1515/npf-2017-0010.	2018	The study the effects of CON on substance abuse facilities, finding: 1) CON laws are negatively associated with the number of nonprofit substance abuse facilities; 2) But in states with both CON laws and Medicaid expansion, the number of nonprofit substance abuse facilities tended to increase.
Nyman, John A., "The Effects of Market Concentration and Excess Demand on the Price of Nursing Home Care," The Journal of Industrial Economics 42, no. 2 (1994): 193–204.	1994	He doesn't directly test CON, but rather tests the effect of market concentration and excess demand on nursing home prices. Since CON is likely to make both matters worse, he concludes that CON likely undermines its goals.
Ohsfeldt, Robert L. and Pengxiang Li, "State Entry Regulation and Home Health Agency Quality Ratings," Journal of Regulatory Economics 53, no. 1 (2018): 1–19.	2018	They examine the effect of CON on home health agency quality ratings from the Centers for Medicare and Medicaid Services (CMS). They find that: 1) HHAs in CON states were about 58% less likely to be rated as High quality ($p < .01$). 2) HHAs in CON states also were about 30% more likely to be rated as "Medium" quality compared to HHAs in states without CON for HHAs.
Paul, Jomon A., Huan Ni, and Aniruddha Bagchi, "A Study of the Effects of Certificate of Need Law on Inpatient Occupancy Rates," Service Science 11, no. 1 (March 1, 2019): 1–15, https://doi.org/10.1287/serv.2018.0228.	2019	States with CON laws have lower bed occupancy rates. The authors speculate that while CON reduces the number of beds, it may also shorten the length of patient stay and the net effect is to reduce the occupancy rate. Note that this is the opposite of the intention (which was to reduce unused capacity).
Paul, Jomon A., Huan Ni, and Aniruddha Bagchi, "Does Certificate of Need Law Enhance Competition in Inpatient Care Market? An Empirical Analysis," Health Economics, Policy and Law 14, no. 3 (July 2019): 400–420, https://doi.org/10.1017/S1744133117000184.	2019	They study the effect of CON on market concentration, as measured by a normalized Herfindahl–Hirschman Index (HHI) built using inpatient volume data of acute care hospitals in each health referral region (HRR). They find that CON is associated with less market concentration.
Polsky, Daniel et al., "The Effect of Entry Regulation in the Health Care Sector: The Case of Home Health," Journal of Public Economics 110 (February 2014): 1–14.	2014	They assess the effect of CON on home health agencies, using a research design that focuses on markets that straddle CON and non-CON states. They find that: 1) Medicare expenditures are not statistically significantly different between CON and non-CON states; 2) Non-CON states have roughly twice as many home health agencies per Medicare beneficiary, 3) CON states have 13.7 percent fewer home health admissions from hospitals; 4) 60 day (total) readmission rates are 5% higher in CON states than in non-CON states, though the effect is not sustained. 5) 60 day preventable readmission rates are 13 percent higher in CON states than in non-CON states, though the effect is not sustained. 6) In CON states there are fewer home health visits, fewer visits per week, and a lower proportion of visits by skilled nurses, but the effects are small and not statistically significant; 7) The Herfindahl Index in the home health market is approximately 1,000 points lower in non-CON states.
Popescu, Iona, Mary S. Vaughan-Sarrazin, and Gary E. Rosenthal, "Certificate of Need Regulations and Use of Coronary Revascularization After Acute Myocardial Infarction," The Journal of the American Medical Association 295, no. 18 (May 10, 2006): 2141–47.	2006	They studied access and quality outcomes in revascularization. They found that patients in CON states: 1) Were less likely to be admitted to hospitals offering revascularization, 2) Were less likely to undergo revascularization, and 3) Had no difference in 30-day mortality rates relative to patients in non-CON states
Rahman, Momotazur et al., "The Impact of Certificate-of-Need Laws on Nursing Home and Home Health Care Expenditures," Medical Care Research and Review: MCRR 73, no. 1 (February 2016): 85–105.	2016	CON increases the growth in Medicare and Medicaid expenditures on nursing home care but decreases growth in home healthcare expenditures.
Rivers, Patrick A., Myron D. Fottler, and Jemima A. Frimpong, "The Effects of Certificate of Need Regulation on Hospital Costs," Journal of Health Care Finance 36, no. 4 (2010): 1–16.	2010	They find that stringent CON programs increase hospital expenditures per admission.
Rivers, Patrick A., Myron D. Fottler, and Mustafa Zeedan Younis, "Does Certificate of Need Really Contain Hospital Costs in the United States?," Health Education Journal 66, no. 3 (September 1, 2007): 229–44, https://doi.org/10.1177/0017896907080127.	2007	They find CON laws increase hospital expenditures per adjusted admission.
Robinson, J. L. et al., "Certificate of Need and the Quality of Cardiac Surgery," American Journal of Medical Quality: The Official Journal of the American College of Medical Quality 16, no. 5 (October 2001): 155–60.	2001	They examined the effect of CON elimination in PA (comparing it with NJ, which maintained CON): 1) On the number of open-heart surgery programs, which increased 25 percent following elimination of CON; 2) The total volume of CABG surgeries which were unchanged following repeal, 3) Provider volume, which shifted from programs that had been established before CON repeal to programs that were established after CON repeal, and 4) Mortality rate, which was unchanged following repeal.
Rosko, Michael D. and Ryan L. Mutter, "The Association of Hospital Cost-Inefficiency With Certificate-of-Need Regulation," Medical Care Research and Review 71, no. 3 (January 22, 2014): 280–98.	2014	CON hospitals are more efficient than non-CON hospitals.
Ross, Joseph S. et al., "Certificate of Need Regulation and Cardiac Catheterization Appropriateness After Acute Myocardial Infarction," Circulation 115, no. 8 (February 27, 2007): 1012–19.	2007	They examine the effect of CON on the volume of cardiac catheterization after admission for acute myocardial infarction. In particular, however, they were interested in procedural volume under different levels of appropriateness (strongly, equivocally, or weakly indicated). While CON did not seem to decrease the volume of strongly-indicated catheterization, it did reduce the volume of equivocally and weakly indicated catheterization. Because their interest is both overall volume and rates of catheterization when it is not warranted, I categorize in both the volume and the quality sections.
Salkever, David S. and Thomas W. Bice, "The Impact of Certificate-of Need Controls on Hospital Investment," The Milbank Memorial Fund Quarterly. Health and Society 54, no. 2 (1976): 185–214.	1976	CON does not decrease investment but does change its composition.
Schultz, Olivia A., Lewis Shi, and Michael Lee, "Assessing the Efficacy of Certificate of Need Laws Through Total Joint Arthroplasty," Journal for Healthcare Quality: Official Publication of the National Association for Healthcare Quality 43, no. 1 (February 1, 2021): e1–7.	2021	They examined the effect of CON on total knee (TKA), hip (THA), and shoulder arthroplasty (TSA), finding: 1) TKA and TSA costs were higher in CON states than in non-CON states (and these results were statistically significant); THA costs were lower in CON states but these results were not statistically significant. 2) CON is associated with a lower volume of TKA and TSA procedures, though it was not statistically significant in the case of hip arthroplasty, and 3) CON has no statistically significant effect on complications (deep vein thrombosis and pulmonary embolism)

Paper	Year	Summary
Sherman, Daniel, "The Effect of State Certificate-of-Need Laws on Hospital Costs: An Economic Policy Analysis | Federal Trade Commission," Staff Report of the Bureau of Economics (Washington, D.C.: Federal Trade Commission, January 1988), https://www.ftc.gov/reports/effect-state-certificate-need-laws-hospital-costs-economic-policy-analysis.	1988	He estimates the effects of CON on cost functions using a sample of 3708 hospitals using data from 1983-84. Though he uses the term costs, he is actually measuring operating expenditures. He finds that spending would fall by 1.4 percent if states relaxed CON.
Short, Marah N., Thomas A. Aloia, and Vivian Ho, "Certificate of Need Regulations and the Availability and Use of Cancer Resections," Annals of Surgical Oncology 15, no. 7 (July 2008): 1837–45.	2008	They studied Medicare data on beneficiaries treated with one of six cancer resections and an associated cancer diagnosis from 1989 to 2002. They found: 1) CON is associated with fewer hospitals per cancer incident for colectomy, rectal resection, and pulmonary lobectomy; 2) CON has no effect on the number of procedures per cancer incident; 3) CON was associated with greater hospital volume.
Shortell, S. M. and E. F. Hughes, "The Effects of Regulation, Competition, and Ownership on Mortality Rates Among Hospital Inpatients," The New England Journal of Medicine 318, no. 17 (April 28, 1988): 1100–1107, https://doi.org/10.1056/NEJM198804283181705.	1988	They examined the effect of CON (among other factors) on hospital quality, finding that the ratio of actual to predicted mortality rates among Medicare patients were 5 to 6 percent higher in state with stringent CON regulation.
Sloan, Frank A., "Regulation and the Rising Cost of Hospital Care," The Review of Economics and Statistics 63, no. 4 (November 1, 1981): 479–87.	1981	CON has no effect on hospital expenditures per admission, per patient day, or per adjusted patient day.
Sloan, Frank A. and Bruce Steinwald, "Effects of Regulation on Hospital Costs and Input Use," The Journal of Law & Economics 23, no. 1 (1980): 81–109.	1980	Comprehensive CON programs have no effect on hospital expenditures per patient day, while noncomprehensive programs increase hospital expenditures by 5 percent per patient day.
Stratmann, Thomas and Christopher Koopman, "Entry Regulation and Rural Health Care: Certificate-of-Need Laws, Ambulatory Surgical Centers, and Community," Working Paper (Arlington, VA: Mercatus Center at George Mason University, February 18, 2016), http://mercatus.org/sites/default/files/Stratmann-Rural-Health-Care-v1.pdf.	2016	They study the effect of CON on overall supply of services as well as rural supply of services. In particular, they find: 1) CON programs are associated with 30 percent fewer hospitals per 100,000 residents across the entire state. 2) ASC-specific CONs are correlated with 14 percent fewer total ASCs per 100,000 residents. 3) CON programs are associated with 30 percent fewer rural hospitals per 100,000 rural residents. 4) ASC-specific CONs are correlated with 13 percent fewer rural ASCs per 100,000 rural residents.
Stratmann, Thomas and Matthew Baker, "Examining Certificate-of-Need Laws in the Context of the Rural Health Crisis," Mercatus Working Paper (Arlington, VA: Mercatus Center at George Mason University, July 29, 2020), https://www.mercatus.org/publications/healthcare/examining-certificate-need-laws-context-rural-health-crisis.	2020	They examine the effect of CON on two measures of spending and two measures of quality (all four are indicators of "overutilization or waste"): 1) Medicare spending per rural beneficiary (they found this was $295 higher in CON states than in non-CON states) 2) Ambulance spending per beneficiary ($2.54 higher in CON states) 3) Hospital readmission rates (1.2 percentage points higher in CON states) 4) Emergency room visits per 1,000 beneficiaries (35.1 more emergency department visits per 1,000 beneficiaries in CON states),
Stratmann, Thomas and Steven Monaghan, "The Effect of Interest Group Pressure on Favorable Regulatory Decisions: The Case of Certificate-of-Need Laws," Mercatus Working Paper (Arlington, VA: Mercatus Center at George Mason University, August 28, 2017).	2017	They examine the link between PAC contributions by applicants and the likelihood of CON approval in three states. They find: 1) The approval rate in Georgia is 57 percent, the approval rate in Michigan is 77 percent, and the approval rate in Virginia is 51 percent. 2) A 1 percent increase in contributions by an applicant firm increases the odds of approval by 6.7 percent in Georgia, 1.8 percent in Michigan, and 3.6 percent in Virginia.
Stratmann, Thomas, "The Effects of Certificate-of-Need Laws on the Quality of Hospital Medical Services," Journal of Risk and Financial Management 15 (6): 2022	2022	He studies the effect of CON 9 measures of hospital quality: 1) Death among surgical inpatients with serious treatable complications 2) Postoperative pulmonary embolism or deep vein thrombosis 3) Percent of patients giving their hospital a 9 or 10 overall rating 4) Pneumonia readmission rate 5) Pneumonia mortality rate 6) Heart failure readmission rate 7) Heart failure mortality rate 8) Heart attack readmission rate 9) Heart attack mortality rate Hospitals in CON states performed worse than those in non-CON states in 8 of the 9 categories, the exception being postoperative pulmonary embolism.
Stratmann, Thomas, and Jacob Russ, "Do Certificate-of-Need Laws Increase Indigent Care?," Working Paper (Arlington, VA: Mercatus Center at George Mason University, July 2014), http://mercatus.org/sites/default/files/Stratmann-Certificate-of-Need.pdf.	2014	They study the effects of CON on the supply of services and provision of services to indigent populations. They find: 1) CON programs are associated with 99 fewer hospital beds per 100,000 people 2) Bed-specific CONs are associated with 131 fewer beds per 100,000 people 3) There are 4.7 fewer beds per 100,000 persons for each additional service covered by CON 4) CON programs reduce the number of hospitals with MRI machines by 1 to 2 hospitals per 500,000 people 5) CON programs that require charitable care are uncorrelated with uncompensated care.
Taylor, Donald H. et al., "What Length of Hospice Use Maximizes Reduction in Medical Expenditures near Death in the US Medicare Program?," Social Science & Medicine (1982) 65, no. 7 (October 2007): 1466–78,	2007	Hospices are associated with savings of about $2,309 per user. Conover and Bailey use this to figure that "each hospice foregone in a market area represents $230,000 in potential annual savings lost."
Teske, Paul and Richard Chard, "Hospital Certificates-of-Need," in Regulation in the States, ed. Paul Teske (Washington, D.C.: Brookings Institution, 2004), 125–32.	2004	This study examines several political factors to determine the likelihood of a state retaining CON regulation. They find that the following factors are associated with CON regulation: 1) Democrats in upper and lower houses, 2) Higher hospital costs, 3) More affluent and better-educated citizens, 4) Fewer physicians 5) A variable measuring hospital interests: the number of hospital industry–related interest groups active in a particular state multiplied by their average political action committee spending: This was found to be significantly associated with retention of CON, but legislative party makeup is more important.

Paper	Year	Summary
Vaughan Sarrazin, Mary S., Levent Bayman, and Peter Cram, "Trends during 1993-2004 in the Availability and Use of Revascularization after Acute Myocardial Infarction in Markets Affected by Certificate of Need Regulations," Medical Care Research and Review: MCRR 67, no. 2 (April 2010): 213–31, https://doi.org/10.1177/1077558709346565.	2010	In a study design that exploits the fact that some markets cross boundaries between CON and non-CON states, they find: 1) A greater increase in coronary artery bypass graft surgery programs in states that reduced CON regulation, and 2) No change in percutaneous coronary intervention (PCI) programs in states that reduced CON.
Vaughan-Sarrazin, Mary S. et al., "Mortality in Medicare Beneficiaries Following Coronary Artery Bypass Graft Surgery in States with and without Certificate of Need Regulation," JAMA 288, no. 15 (October 16, 2002): 1859–66.	2002	They assess the effect of CON on coronary artery bypass graft (CABG) surgery, finding: 1) Mean annual hospital volume is lower in states without CON. 2) More patients undergo CABG surgery in low-volume hospitals in states without CON, and 3) Mortality following CABG is higher in states without CON.
Wu, Bingxiao et al., "Entry Regulation and the Effect of Public Reporting: Evidence from Home Health Compare," Health Economics 28, no. 4 (April 2019): 492–516.	2019	They assess the effect of CON regulation on several measures of quality in home health care, using a cross-border design to control for endogeneity. They find that CON is uniformly associated with worse outcomes including: 1) Patients perform worse on functional improvement measures (bathing, ambulating, transferring to bed, managing oral medication, and less pain interfering with activity) and 2) They are more likely to be admitted to the ER and 3) More likely to be admitted to an acute care hospital.
Yuce, Tarik K. et al., "Association of State Certificate of Need Regulation With Procedural Volume, Market Share, and Outcomes Among Medicare Beneficiaries," JAMA 324, no. 20 (November 24, 2020): 2058, https://doi.org/10.1001/jama.2020.21115.	2020	The assess the effect of CON on measures of volume and of quality. They found: 1) No significant difference between CON and non-CON states in county-level procedures per 10,000 persons, 2) No significant difference between CON and non-CON states for hospital procedural volume, 3) No difference in hospital market share, 4) No difference in risk-adjusted 30-day postoperative mortality, 5) No difference in surgical cite infection, and 6) No difference in readmission
Zhang, Lei, "Uncompensated Care Provision and the Economic Behavior of Hospitals: The Influence of the Regulatory Environment" (Ph.D. Dissertation, Atlanta, Georgia, Georgia State University, 2008), http://scholarworks.gsu.edu/pmap_diss/19.	2008	He examined the effect of three regulatory policies—CON laws, uncompensated care pools, and community benefit requirement laws. CON is associated with small increases in uninsured admissions, though the results were small (0.07%) and not statistically significant when he attempted to control for endogeneity. Furthermore, he found that in the presence of all three policies, the number of uninsured admissions by nonprofit hospitals fell.
Ziino, Chason, Abiram Bala, and Ivan Cheng, "Does ACDF Utilization and Reimbursement Change Based on Certificate of Need Status?," Clinical Spine Surgery 33, no. 3 (April 2020): E92.	2020	The paper looks at reimbursements for spinal surgery in CON and non-CON states, finding that reimbursements fell the most in non-CON outpatient settings (-11% compound annual growth) in non-CON states.
Ziino, Chason, Abiram Bala, and Ivan Cheng, "Utilization and Reimbursement Trends Based on Certificate of Need in Single-Level Cervical Discectomy," The Journal of the American Academy of Orthopaedic Surgeons 29, no. 10 (May 15, 2021): e518–22, https://doi.org/10.5435/JAAOS-D-19-00224.	2021	They studied inpatient cervical discectomy in CON and non-CON states in inpatient and outpatient setting. It appears that they did not use any controls, however. Regarding reimbursements, they find: 1) In the inpatient setting, reimbursement was lower in non-CON states ($1,128.40) than in the CON states ($1,223.56). But reimbursements in the CON states were falling faster over time. 2) In the outpatient setting reimbursement was higher in Non-CON states ($4,237.01) than in CON states ($3,859.31) and reimbursements were growing in the non-CON states but falling in the CON states. Regarding access: 3) In the inpatient setting, there were more patients in the CON setting than in the non-CON setting (657 compared with 231) and utilization of the procedure was growing faster in CON than in non-CON states but this does not appear to control for the larger population of CON states than non-CON states. 4) Similarly, in the outpatient setting, there were more patients in the CON setting than in the non-CON setting (435 compared with 257) and utilization of the procedure was growing faster in CON than in non-CON states but again this does not appear to control for the larger population of CON states than non-CON states.
Zinn, J. S., "Market Competition and the Quality of Nursing Home Care," Journal of Health Politics, Policy and Law 19, no. 3 (1994): 555–82.	1994	She examined the determinants of nursing home quality. One of her explanatory variables was nursing home construction moratoria. She found these to be associated with lower RN staffing ratios and greater use of physical restraint.