

EXPLORING HEALTH POLICY AND PERFORMANCE USING SECONDARY DATA

David D. Dobrzykowski

University of Toledo, College of Business and Innovation, Information Operations and Technology Management Dept., School of Healthcare Business Innovation and Excellence, 2801 W. Bancroft, Toledo, Ohio 43606, U.S.A.

david.dobrzykowski@utoledo.edu, (419) 530-2342

ABSTRACT

While Certificate of Need (CON) aims to balance cost and access in healthcare, its consequent outcomes appear mixed. This study analyzes data from three publicly available sources, suggesting that hospitals in CON states enjoy larger capacity, higher volume activity or throughput, and better financial performance than hospitals in non-CON states. Taken together, the findings from this study should be of interest to policy makers, hospital executives, and patient advocates interested in the effectiveness of CON in managing key outcomes of the healthcare delivery system; namely quality, cost, and access.

Keywords: Hospital Management, Policy

INTRODUCTION

Certificate of Need (CON) is a state mandated and state specific legislative program broadly aimed at balancing quality, cost, and access to healthcare services within a particular state (Langley et al., 2010). This is achieved primarily by constraining the growth of certain healthcare services (e.g., beds, diagnostic imaging, among others) by employing a needs-based evaluation system, whereby all construction projects involving said services require approval from a state oversight agency (Grabowski and Angelelli, 2004). “In a state with a CON, a healthcare facility is forbidden from undertaking a reviewable project unless it obtains planning agency approval based on review of the project against a set of planning criteria and a finding of community need,” (Simpson, 1985: p. 1225).

While CON is intended to balance quality, cost, and access (Langley et al., 2010), achievement of the outcomes associated with the legislation appear to be mixed. For example, CON is expected to lead to higher procedure volumes per facility, and higher procedure volumes are associated with improvements in quality (Ross et al., 2010). However, many believe that CON “...may have negative implications toward the provision of quality,” (Grabowski and Angelelli, 2004: p. 794). This is owing to the potential for decreased competition in constrained markets. In a quality study of Medicaid patients in nursing homes, Grabowski and Angelelli (2004: p. 810) found “...strong evidence that a repeal of CON and moratorium policies would encourage greater quality competition for the care of Medicaid residents in the most restrictive markets.”

Research related to cost and access appears to be equally mixed. Steen (1997) discussed the findings of an Alpha Center study which found that CON had little measurable effect on

reducing costs, however was beneficial for maintaining access for underserved populations and promoting better quality. In addition, a study conducted by Georgia State University examined 37 papers examining CON and concluded with this statement: "Our review of the research literature indicates that Certificate of Need programs have not only failed to achieve lower hospital costs, but they may have contributed to higher costs, greater inefficiency and lower quality of care. Although there have been no major studies of CON laws in the last five years, the evolution of the healthcare delivery system has removed much of the rationale for these programs' existence," (Steen, 1997). Perhaps, this is why in their study of new hospital orthopaedic surgery programs, Lu et al. (2010) found that utilization of services is similar in markets with and without new programs. Given these findings, it is not surprising that advocates exist on both sides of the CON debate (see AHPA, 2004a; 2004b for detailed descriptions of the positions for and against CON legislation).

In sum, it appears that a lack of empirical evidence is available to inform the CON debate with regard to some of the key consequences of the legislation. At minimum, the extant research appears to have produced mixed findings. Therefore, the aim of this study is to inform the curiosity that exists with regard to key consequences of CON legislation. This aim is fulfilled by examining key differences between CON and non-CON states, with a particular interest in states that enforced CON for acute hospital beds in 2010. This analysis is framed around three important research questions. *First, how, if at all, do CON and non-CON states differ? Second, how, if at all, does hospital performance differ in CON and non-CON states? Finally, how, if at all, is the healthcare experience (cost and access) different for residents in CON and non-CON states?* These findings provide important insights for policy makers, healthcare executives, patient advocates, and others interested in healthcare delivery.

BACKGROUND, THEORY, AND HYPOTHESES

CON has its roots in the notion of the *market imperfections economic approach* which suggests that in environments "...where both producers and consumers are insulated from [the] financial consequences of their decisions, unregulated markets will not yield socially desirable results. In this environment of excess, it was left to the government to provide restraint that market forces would not," (Madden, 1999: p. 1658). The state of New York adopted the first CON in 1964 and in the decade that followed an additional 25 states passed similar CON laws (Simpson, 1985). By 2010, CON laws were enacted in 37 states in the U.S.A. and 30 different healthcare service lines ranging from acute hospital beds to medical office buildings (MOBs) to diagnostic equipment such as ultra-sound units were subject to CON regulation (AHPA, 2011). See tables 1 and 2.

In understanding how CON may influence hospital performance, it is useful to briefly review an appropriate theoretical explanation for such phenomena. Organizations behave differently, often in ways that are contingent upon the environment within which they operate. Galbraith (1973) emphasizes this notion when describing contingency theory, suggesting that there is not a clear, singular best approach to organize a structure, be it an individual firm, or a chain of structured relationships. As such, firms in different operational environments may make different decisions with regard to the management of the organization which influence performance. In this way, contingency theory is capable of explaining linkages between operations and performance (Li et al., 2002; Koufteros et al., 2005; Jayaram et al., 2010).

Table 1. States with at least one category of CON in 2010 (AHPA, 2011).

States			
1 Alabama*	11 Iowa*	21 Nebraska	31 South Carolina*
2 Alaska*	12 Kentucky*	22 Nevada*	32 Tennessee*
3 Arkansas	13 Louisiana	23 New Hampshire*	33 Vermont*
4 Connecticut*	14 Maine*	24 New Jersey*	34 Virginia*
5 Delaware*	15 Maryland*	25 New York*	35 Washington*
6 Dist. Of Columbia*	16 Massachusetts	26 North Carolina*	36 West Virginia*
7 Florida*	17 Michigan*	27 Ohio	37 Wisconsin
8 Georgia*	18 Mississippi*	28 Oklahoma	
9 Hawaii*	19 Missouri*	29 Oregon	
10 Illinois*	20 Montana	30 Rhode Island*	

* States with CON for acute hospital beds.

Table 2. Services/equipment covered under CON in 2010 (AHPA, 2011).

Service/Equipment	Service/Equipment
Acute hospital beds	MRI scanners
Air ambulance	NICU
Ambulatory surgery centers	Obstetric services
Burn care	Open heart surgery
Cardiac catheterization	Organ transplant
CT scanners	PET scanners
Gamma knives	Psychiatric services
Home health	Radiation therapy
Hospice	Rehab
ICF/MR	Renal dialysis
LTAC	Res care / Assisted living
Lithotripsy	Subacute services
Nursing home beds / LTC beds	Substance abuse
Medical office buildings (MOBs)	Swing beds
Mobile Hi Tech	Ultra-sound

At the heart of CON is a focus on restraining the development of excess capacity given the belief that this leads to an increase in aggregate market costs (Madden, 1999). This approach in effect creates a barrier to entry for entrepreneurs interested in entering CON designated service lines. One consequence of CON therefore is a restriction of the number of providers and thus less competition. Thus, the present study hypothesizes the following.

H1: Hospitals located in CON states face less competition than hospitals located in non-CON states.

Generally, it is believed that the health needs of residents in CON states do not vary substantially from residents of non-CON states. Similarly, it is logical to expect that the population size of CON states and non-CON states does not differ. Given this, considering that demand characteristics between CON and non-CON states should be similar, while competition is constrained in CON states, it is reasonable to expect that the capacity of hospitals in CON states would thus be larger than hospitals located in non-CON state in an effort to accommodate similar

demand levels. This is consistent with data collected during expert interviews opining on the difficulty associated with receiving a certificate (see also Grabowski and Angelelli, 2004). The expert interviews suggest that given the difficulty in obtaining a certificate that when a hospital does receive a certificate, it is in the providers best interest to maximize the associated capacity allowance. In other words, this can lead to over-building. Thus, the present study hypothesizes the following.

H2: Hospitals located in CON states have higher capacity than hospitals located in non-CON states.

Given that hypotheses one and two hold, this would infer that the operating environment of hospitals in CON and non-CON states would indeed be different. More specifically, hospitals located in CON states have less competition and higher capacity to serve patients. Recognizing these contingencies in the operating environment, hospitals in CON states should treat more patients, in other words experience higher activity levels in terms of the number of patients discharged from the facility. Thus, the present study hypothesizes the following.

H3: Hospitals located in CON states experience higher activity levels (discharges) than hospitals located in non-CON states.

When considering the financial performance of a firm, gross revenue is a function of the number of units sold and the sales price per unit. For a hospital, gross revenue should be positively associated with patient volume which is often measured in terms of discharges. Thus, the present study hypothesizes the following.

H4: Hospitals located in CON states generate higher revenue than hospitals located in non-CON states.

METHODS

Data analysis and results

Data were retrieved from three publicly available secondary sources; the American Hospital Directory (AHD), the United States Census Bureau (Census Bureau), and the AHPA. The dataset was analyzed using IBM SPSS version 19. Descriptive statistics were calculated for each of the key variables under study and will be presented at DSI 2012.

The sample of 52 states was next bifurcate into two subsamples; one containing states which employed CON for acute hospital beds in 2010 ($n=28$) and a second subsample of those states which did not ($n=24$). T-tests were employed to examine differences between the two groups (CON states and non-CON states). T-tests are a statistical procedure commonly used to assess differences between group or sample means (see Hair et al., 2006; Hong et al., 2010). The statistical results will be presented at DSI 2012.

The results reveal that the mean state population per hospital in CON states (81,600) is statistically different (higher) than the mean state population per hospital in non-CON states

(68,500). This provides support for hypothesis one indicating that hospitals located in CON states face less competition than hospitals located in non-CON states. The mean number of beds per hospital in CON states (198.8) is statistically different (higher) than the mean number of beds per hospital in non-CON states (149.0). This provides support for hypothesis two, suggesting that hospitals located in CON states have higher capacity than hospitals located in non-CON states. The mean number of annual discharges per hospital in CON states (8,606.5) is statistically different (higher) than the mean number of annual discharges per hospital in non-CON states (6,527.1). This provides support for hypothesis three, indicating that hospitals located in CON states experience higher activity levels (discharges) than hospitals located in non-CON states. Finally, the mean revenue per hospital in CON states (\$496,072,600) is statistically different (higher) than the mean revenue per hospital in non-CON states (\$367,166,900). This provides support for hypothesis four, suggesting that hospitals located in CON states generate higher revenue than hospitals located in non-CON states.

Additional analysis reveals further interesting and useful insights about the performance of hospitals located in CON and non-CON states. The mean population in CON states (5,625,800) is not statistically different from the mean population in non-CON states (6,456,200). Likewise, the mean number of hospitals in CON states (69.2) is not statistically different than the mean number of hospitals in non-CON states (88.0). The mean number of acute hospital beds in CON states (14,694.5) is not statistically different than the mean number of acute hospital beds in non-CON states (14,533.6). The mean number of discharges in CON states (622,815.1) is not statistically different than the mean number of discharges in non-CON states (641,842.1). The mean gross patient revenue in CON states (\$36,376,596,100) is not statistically different than the mean gross patient revenue in non-CON states (\$40,940,643,300). The mean patient revenue per population in CON states (\$6,121.3) is not statistically different than the mean patient revenue per population in non-CON states (\$5,356.7). Finally, the mean discharges per population in CON states (0.11) is not statistically different than the mean discharges per population in non-CON states (0.10).

DISCUSSION

CON regulation has been the topic of some debate, fueled by sparse, yet mixed empirical results from researchers. This study set out to inform curiosity regarding some key consequences of CON regulation. While the hypotheses have been conceptualized specifically around the hospital operating context, this study more broadly provides insights informing three important research questions capable of providing insights at the state level, the hospital level, and individual resident level. Data were collected and analyzed from three publicly available secondary sources; the American Hospital Directory, the United States Census Bureau, and the American Health Planning Association to address the research questions under study.

First, how, if at all, do CON and non-CON states differ? Five variables were selected to assess CON and non-CON states for differences in terms of demand (measured by state population), capacity (measured by the number of hospitals per state, and beds per state), volume activity or throughput (measured by discharges per state), and healthcare spend/cost (measured by gross patient revenue per state). The results reveal that statistically speaking, CON and non-CON states do not differ on any of these measures. While on the face, non-CON states have more

residents, more hospitals, more discharges, and higher aggregate healthcare spend, they ironically have fewer beds than CON states. Although these results may appear mixed, statistically these findings suggest that CON does not influence demand, capacity, volume activity or throughput, or healthcare spend/cost at the state level.

Second, how, if at all, does hospital performance differ in CON and non-CON states? Three variables were selected to examine differences in hospital performance between hospitals operating in CON states and those operating in the absence of CON laws. These variables assessed hospital size or capacity (measured by the number of beds per hospital), hospital volume activity or throughput (measured by discharges per hospital), and hospital financial performance (measured by revenue per hospital). These results suggest that hospitals operating in CON states are statistically different from hospitals operating in non-CON states on all three measures. Specifically, hospitals in CON states are nearly 50 beds (or approximately 33%) larger than hospitals in non-CON states. This supports the notion that when hospitals in CON states are awarded a certificate, they are likely to build larger facilities than their counterparts in non-CON states. This larger capacity appears to perhaps enable higher levels of volume activity or throughput, as hospitals in CON states generate more than 2,000 additional annual discharges than their non-CON counterparts. This is a likely contributor to the higher financial performance enjoyed by hospitals in CON states. These findings suggest that hospitals located in CON states generate nearly \$130,000,000 (or approximately 35%) more annual revenue than hospitals in non-CON states. Thus, statistically these findings suggest that CON regulation does positively influence size or capacity, volume activity or throughput, and financial performance at the hospital level.

Finally, how, if at all, is the healthcare experience (cost and access) different for residents in CON and non-CON states? Three variables were selected to examine differences in cost and access for residents residing in CON states and those residing in non-CON states. These variables assessed healthcare cost (measured by revenue per state population), utilization (measured by discharges per state population), and access to care (measured by state population per hospital) at the individual resident level. This study finds that, statistically, residents in CON states do not differ from residents in non-CON states in terms of annual healthcare spend and utilization. While the difference is not statistically significant, it is interesting to note that residents in non-CON states actually spend less annually on healthcare per resident (approximately \$5,367) than do residents of CON states (approximately \$6,121). A statistically significant difference is found when considering access to care for residents in CON versus non-CON states. This study finds that residents in CON states access care in hospitals with substantially larger catchment areas (approximately 81,600 residents) as compared to catchment areas of 68,500 residents in non-CON states. Therefore, while cost and utilization appear to be statistically the same for residents in CON and non-CON states, access to care is more constrained in CON states.

Taken together, the findings from this study should be of interest to policy makers, hospital executives, and patient advocates interested in the effectiveness of CON in managing key outcomes of the healthcare delivery system; namely quality, cost, and access. These findings suggest that CON does not appear to have a substantial effect at the state level in managing demand, capacity, volume activity or throughput, or healthcare spend/cost. At the same time for

hospitals, these results show that facilities in CON states enjoy larger size or capacity, higher volume activity or throughput, and better financial performance than hospitals in non-CON states. For residents, while cost and utilization appear to be statistically the same regardless of their state's CON status, access to care is more constrained for residents in CON states. While the evidence found herein for increased hospital volume associated with CON may support the claims of Ross et al. (2010) linking volume and quality, these findings appear to provide support for additional evaluation and rethinking of the role of CON in balancing quality, cost, and access (Langley et al., 2010).

LIMITATIONS

Next, the aim of this study was to conduct a cross-sectional investigation into the effects of CON regulation by analyzing data from all of the states in the U.S.A. While this aim was achieved, it is worthy to note that states differ in a variety of ways that could not be controlled for in this study. First, the implementation of CON regulation, even with regard to the narrow scope of acute hospital beds, varies from state to state. For instance, states such as Illinois, New York, Iowa, and Michigan have all implemented CON laws to govern inpatient bed need, however, the methodology for calculating bed need differs substantially (see Chapter 203, 1987; Part 709..., 1993; Illinois Health..., 2010; Langley et al., 2010) and may influence the results described in this study. In a similar fashion, the cross-sectional data analyzed in the course of this study was captured as a snap shot in time and does not control for the maturity of a particular state's CON program. Finally, states may also differ in terms of the health status of their residents. Given that health status is suggested to influence utilization, another limitation of this study exists in that it does not control for health status in the cross-sectional data analysis.

REFERENCES

- American Health Planning Association (AHPA). (2011). *National Directory: State Certificate of Need Programs Health Planning Agencies 2011*. Retrieved on December 27, 2011 at http://www.ahpanet.org/matrix_copn.html
- American Health Planning Association (AHPA). (2004a). Improving Healthcare: A Dose of Competition AHPA Response. Arguments in favor of planning and CON regulation. Retrieved on January 2, 2012 from <http://www.ahpanet.org/files/AHPAargfavorCON.pdf>
- American Health Planning Association (AHPA). (2004b). Improving Healthcare: A Dose of Competition AHPA Response. Arguments against FTC assertions and assumptions. Retrieved on January 2, 2012 from <http://www.ahpanet.org/files/AHPAargagainstFTC.pdf>
- American Hospital Directory (AHD) (2011). Definitions and Methodology. Retrieved on September 14, 2011 at <http://www.ahd.com/definitions/statistics.html>.
- Chapter 203: Standards for Certificate of Need Review. (1987). Retrieved on January 2, 2012 at <http://www.legis.state.ia.us/Rules/Current/iac/641iac/641203/641203.pdf>
- Galbraith, J. (1973). *Designing complex organizations*. Reading, MA: Addison Wesley.

- Grabowski, D.C. and Angelelli, J.J. (2004). The relationship of Medicaid payment rates, bed constraint policies, and risk-adjusted pressure ulcers. *Health Service Research*, 39(4), part I, 793-812.
- Hair, J., Black, W., Babin, B., Anderson, R., and Tatham, R. (2006), *Multivariate Data Analysis, Sixth edition*, Pearson Prentice Hall, Upper Saddle River, New Jersey.
- Hong, P., Dobrzykowski, D. and Vonderembse, M. (2010). Integration of supply chain IT and lean practices for mass customization: benchmarking of product and service focused manufacturers. *Benchmarking: An International Journal*, 17(4), 561-592.
- Illinois Health Care Facilities Plan: Narrative and Planning Policies: Medical-Surgical Care and Pediatric Care (2010). Amended at 34 Ill. Reg. 6067, effective April 13, 2010. Retrieved on January 2, 2012 at <http://www.ilga.gov/commission/jcar/admincode/077/077011000D05200R.html>
- Jayaram, J., Ahire, S.L. and Dreyfus, P. (2010). Contingency relationships of firm size, TQM duration, unionization, and industry type on TQM implementation – A focus on total effects. *Journal of operations Management*, 28, 345-356.
- Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling, Third Edition*. New York, NK: Guilford Press.
- Koufteros, X., Vonderembse, M. and Jayaram, J. (2005) Internal and External Integration for Product Development: The Contingency Effects of Uncertainty, Equivocality, and Platform Strategy. *Decision Sciences*, 36 (1), 97-133.
- Langley, S.A., Fuller, S.P., Messina, J.P., Shortridge, A.M., and Grady, S.C. (2010). A methodology for projecting hospital bed need: a Michigan case study. *Source Code for Biology and Medicine*, 5(4), 1-10.
- Li, L. X., Benton, W.C. and Leong, G. K. (2002). The impact of strategic operations management decisions on community hospital performance. *Journal of Operations Management*, 20, 389–408.
- Lu, X., Hagen, T.P., Vaughan-Sarrazin, M.S., and Cram, P. (2010). The impact of new hospital orthopaedic surgery programs on total joint arthroplasty utilization. *The Journal of Bone and Joint Surgery*, 92, 1353-1361.
- Mackun, P. and Wilson, S. (2011). Population distribution and change: 2000 to 2010. *2010 Census Briefs*, C2010BR-01, March 2011, 2 pages.
- Madden, C.W. (1999). Excess capacity: markets, regulation, and values. *Health Services Research*, 33(6), 1651-1668.

Part 709 Determination of Public Need for Medical Facility Construction. (1993). Retrieved on January 2, 2012 from <http://www.health.ny.gov/nysdoh/rules/709.htm>

Ross, J.S., Normand, S.T., Wang, Y., Ko, D.T., Chen, J., Drye, E.E., Keenan, P.S., Lichtman, J.H., Bueno, H., Schreiner, B.S., and Krumholz, H.M. (2010). Hospital volume and 30-day mortality for three common medical conditions. *New England Journal of Medicine*, 362(12), 1110-1118.

Steen, J. (1997). Certificate of Need: A review. *American Health Planning Association*. Retrieved on December 20, 2011 at <http://www.ahpanet.org/files/CON%20A%20REVIEW.pdf>