Review of the Literature on Hospital Mergers, 2009:

Impact of Hospital Mergers on
Access to Affordable Health Care,
Access to Care for Underserved Populations,
Balanced Health Care System,
and Market Share

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The following review of the literature on hospital mergers and related articles is arranged by HCA review criterion. In some cases the articles may touch on more than one criterion. In these cases, comments will appear in more than one section.

Criterion 2: Access to Affordable Health Care

One of the aspects to be considered in reviewing a proposed affiliation of hospitals is the consequence of denying the proposed merger or affiliation. One possibility of the denial is that one or more of the hospitals will close. During the early 1990s a number of hospitals closed. Lindrooth and colleagues observe that between 1989 and 1998, there were 496 closures of short-term general hospitals in the U.S. They study a subset of these hospitals: those that were in urban areas and had a neighboring hospital within 5 miles. They found 120 hospitals that closed between 1991 and 1996 that met these criteria and had complete data. They studied the efficiency of closed hospitals relative to their competitors within 5 miles, from 5-10 miles, and from 10-20 miles of the closed hospital. Costs were studied for 3 years prior to closings, and for competitors for 3 years after the closings. Major findings of the study were that when a hospital closed, competitors within 5 miles, from 5-10 miles and from 10-20 miles all experienced increases in hospital inpatient admissions and emergency room visits. However, outpatient visits at neighboring hospitals were not significantly affected by the closure. Hospitals that closed had lower occupancy rates (48% versus 64%, on average) than their competitors. The study found a reduction in average costs of competitors of 2% to 4% realized on all adjusted admissions (not just for the patients who would have been treated in the closed hospital). The authors link the savings to costs of empty beds and to efficiencies that result from closing empty beds. They conclude that hospital closures in urban markets are welfare-improving as long as access is not severely restricted. (Lindrooth et al, 2003)

Los Angeles County, California has 10 million residents spread over 4,000 square miles. Out of 131 short-term general open in 1997, 13 closed between 1997 and 2003. Buchmueller and colleagues studied how cause-specific mortality for emergent conditions (heart attacks and unintentional injuries) for patients who lived near the closed hospitals were affected after the hospitals closed. Deaths from chronic heart disease and cancer were used as controls. On average, the driving distance to the nearest hospital in the full sample was 2.65 miles. Hospital closures increased the driving distance from 2.4 miles to 4.2 miles (about 2 miles). Increasing the distance to a hospital by one mile increased AMI deaths by 6.5% (about one death per zip code per year). This is consistent with American Heart Association estimates that survival probability decreases by 7-10% for every minute without treatment. Increasing the distance to a hospital by one mile may have increased the number of deaths from unintentional injuries by 11-20%. This implies that a hospital closure increased the number of such deaths by 0.5 per zip code year. There were no clear impacts on other causes of death. One effect of the closures was to shift care from hospitals to doctors' offices, generally considered an effective and cost-effective source of regular care. (Buchmueller et al, 2006)

Criterion 3: Access for Underserved Populations

Robinson and Dratler report on Catholic Healthcare West—a large U.S. nonprofit hospital system with 40 acute care facilities and numerous ambulatory, physician, and ancillary services spread over California, Arizona, and Nevada. Financial problems forced it to reconsider finances and divestment priorities to balance its charitable mission with its financial abilities. Although this article looks at divesture rather than merger, it offers a perspective on how the hospital chain changed its management strategy from an integrated delivery system model to a selective diversification model and discusses how the hospital balanced divestment of facilities in some high need areas in order to continue its charitable mission in other geographic areas. The Catholic hospital chain's strained financial circumstances required that charitable activities be directed with analytical rigor. The services and markets where the nonprofit can make its most important social contributions are those with the weakest economic position . The article favorably reviews the changes made by the hospital chain. (Robinson and Dratler, 2006)

Town and colleagues looked at the changes in health insurance coverage from 1990 to 2003 in MSAs with from 100,000 to 4.5 million in 1990 population. The effects of hospital consolidation in these markets on the extent of insurance coverage for whites versus nonwhites and Hispanics and for three household income categories ($15,000- $45,000; $45,000-$75,000; and over $75,000) were investigated. Lowest income and nonwhite categories had lowest rates of health insurance enrollment and their rates declined most in the study period. All insurance market categories saw similar increases in hospital consolidation over the period 1990-2003. Nonwhites, who had the higher uninsurance rate in 1990, had a decrease of 2.0% in their insurance rate, relative to an estimated decline of 0.9% if no hospital consolidations had taken place. Whites had a decrease of 1.4% and would have had a greater decrease (1.7%) if consolidations had not taken place. The lowest income category experiences a decrease of 5%, relative to middle income (2.5% increase) or higher income (no change) categories. Of the 5% decrease, 0.8% is accounted for by hospital consolidation. Hospital market competition is linked to health care access disparities, possibility because nonwhites and low income people may be more sensitive to insurance price increases and possibility because their employers are more sensitive to health insurance costs. (Town et al, 2007)

Criterion 7: Balanced Health Care

Ho and Hamilton looked at the effects of hospital consolidations in California from 1991 to 1996 on the outcomes of heart attack and stroke patients and newborns. Quality measures included inpatient mortality, readmission rates, and early discharge (< 48 hours) for newborns. There were 256,193 heart attack patients (in 461 hospitals); 268,506 stroke patients in 476 hospitals, and 510,572 newborns (in 335 hospitals). This study did not find evidence that hospital consolidation had an impact on inpatient mortality for heart attack or stroke patients. This was true for both private insurance and Medicare patients. However, the sample size was small leading to large standard errors. For readmission, mergers increase the probability of readmission by 1.7%, while acquisition of an individual hospital increases

readmissions by 0.9% and acquisition of chains by chains increased readmissions by 0.7%. Overall, consolidations raised the probability of readmissions for heart attack patients by 10%. Some hospital acquisitions led to an increase in early discharge for newborns, especially in highly concentrated hospital markets. (Ho and Hamilton, 2000)

Sloan and colleagues looked at the outcomes of patients covered by Medicare fee-for-service to see if outcome is related to whether a patient is treated in a for-profit (N=1,164), government (N=1,324), or non-profit (N=5,915) hospital. Since hospital mergers were <u>not</u> studied, is study is only of indirect interest. The study sample was drawn from the National Long-Term Care Survey panel of 35,800 Medicare beneficiaries. Persons admitted to hospitals for less than 91 days with primary diagnoses of hip fracture, stroke, coronary heart disease, or congestive heart failure were studied. Outcome measures included total Medicare payments and mortality. Respondents with at least one limitation in ADL or IADL that lasted or were expected to last 3 months had full NLTCS interviews. Medicare payments were divided into those made in the first 6 months and payments made afterwards. Probability of death at 1 month, 6 months, and 1 year were measured. Whether the patient lived in the community or a nursing home was measured as was the number of ADLs and IADLs. Average Medicare payments were $13,500 (1994 dollars). By 1 year, 27% had died. Two-fifths had ADLs and IADLs. Medicare payments to non-profit hospitals were 5-6% less than for-profit hospitals and government hospitals were paid 9-16% less than for-profit hospitals. Mortality was not associated with hospital ownership type. Probability of living in the community was not significantly different nor was functional status as was measured by ADLs and IADLs. (Sloan et al, 2001)

Huckman observes that in some hospital mergers, one hospital provides types of service not provided by the other hospital. (In our case, St. Joseph Health Services provides rehabilitation services not provided by Roger Williams Hospital; while Roger Williams provides cardiac cath services and bone marrow transplant services that are not provided by St. Joseph.) He studies 28 acquisitions in which one hospital with CABG and PTCA programs merges with another hospital that does not provide these services, in New York State over the period 1992-1999. The study first investigates "business-stealing," that is, increases in the market share of cardiac services that are obtained as a consequence of acquiring a hospital that does not provide cardiac services. Risk-adjusted inpatient mortality and costs for both CABG and PTCA patients measure quality and costs. Analysis of average market share indicated that hospitals with CABG and PTCA services increase their market shares by acquiring hospitals that do not provide these services. (The average acquirer hospital adds roughly 7 CABG procedures from 7 competing facilities, or one per year per competing facility.) Data analysis shows that risk-adjusted mortality falls as volume increases for CABG. For PTCA, this relationship is not statistically significant. Cost regressions find that costs fall as volume increases and that the results are small, but significant for both CABG and PTCA. When effects of competing hospitals are also included, the volume-outcome effects suggest small declines in mortality and costs at acquirer hospitals that are almost entirely offset by increases at non-local acquirers and non-acquirers. The aggregate impact of these volume-outcome effects is very small. (Huckman, 2006)

Criterion 8: Market Share.

Economic theory predicts that consolidation within hospital markets will lead to an increase in the margin between costs and prices. Whether this is accomplished by reducing costs, increasing prices, or a combination of the two is an empirical question. This has led to a number of different approaches in evaluating the effects of hospital consolidations. Some studies focus on costs (departmental, aggregate, or multi-product), and others focus on prices.

Connor and colleagues investigated 122 hospitals mergers that occurred over the period, 1986-94 in the U.S. They compared merged hospitals to 3,400 hospitals that did not merge. They look at hospital costs and average net patient revenue per adjusted (for outpatient activity) admission. Case mix adjustments were considered, but rejected because a.) bivariate and multivariate analyses were more consistent without casemix adjustment, and b.) expenses and revenues are not 100% variable with casemix. They find that these mergers were generally beneficial providing average price reductions of 7% (68.4% versus 75.5%-- during the 8 period). Compounded annual rates would be 6.73% versus 7.28%. (It should be noted that their merging hospitals were in markets with much lower HHIs—1,665 for merging hospitals versus 2,353 for non-merging hospitals.) Merger-related price reductions were considerably less (or even negative) in market areas with higher market concentration levels (HHI above 1800). There was a lack of savings in mergers involving teaching hospitals. Hospitals were more likely to merge in a.) markets with less market concentration; b.) markets with more HMO penetration; c.) more urban markets. Hospital types more likely to merge include:

a.) For- profit ownership	g.) Higher occupancy rate
b.) Not government-owned	h.) Smaller percent of total
c.) Member of system	revenue from OP activity
d.) Teaching hospital	i.) Higher case-mix index
e.) Larger bed size	j.) Higher revenue and costs
f.) Larger annual admissions	per OP-adjusted admission
	(with/without casemix)

Hospitals were less likely to save money: a.) in concentrated markets (prices up rather than down); b.) in areas with low group-model HMO penetration; c.) if occupancy rates (premerger) were above 55%; d.) if hospitals were for-profit. (Connor et al, 1997)

Dranove looked at 14 non-revenue-producing departments in California hospitals in 1992 to see if larger hospitals had lower costs due to scale effects. These departments account for about 15% of total expenses in a typical hospital. Economies of scale exist to some extent in all departments. He found that economies of scale are relatively small where activities are easily outsourced, like public relations, printing and duplicating, and credit and collection. Economies are relatively larger in centers dependent on professional staff, like hospital administration, general accounting, and communications. There appear to be substantial scale economies in "hotel" services, like cafeteria, laundry, and housekeeping. Aggregating all departments, there seems to be substantial scale economies through 7500 discharges (about 200 beds). A hospital of that size has 6% lower costs per discharge than a hospital of 5000 discharges (about 136 beds) and 32% lower costs that a hospital with 2500 discharges (100 beds). There appear to be minimal scale economies over the range from

7500 discharges (about 200 beds) through 15,000 discharges (about 310 beds). Hospitals that are small may realize substantial economies of scale, but mergers of hospitals having more than 7500 discharges (200 beds) are not likely to realize substantial economies of scale in these 14 non-revenue producing departments. (Dranove, 1998)

The Province of Ontario, Canada did a large scale restructuring of hospitals in the province in 1996/1997. The number of hospitals were reduced from 223 to 150. Due to the inconclusive economic literature at the time, the restructuring adopted an accounting-based framework. This study seeks to determine whether an economic analysis would have detected the potential economic efficiencies that the hospital restructuring produced. The study uses a multi-product production function with 4 output categories: primary/secondary inpatient days, tertiary inpatient days, sub-acute inpatient days, and ambulatory care. Estimated cost functions for pre-consolidation hospitals showed the existence of economies of scope and scale with substantial opportunities to save money through consolidations. The estimated model does a good job of predicting costs for bed size ranges: 400-499, 200-399, 100-199, 50-99, and <49; but not bed sizes >499 or for specialty hospitals. Larger hospitals were not necessarily more efficient than small hospitals over all configurations of output. Among hospitals with similar levels of tertiary and sub-acute care, hospitals treating a greater number of primary/secondary care cases were more efficient at providing ambulatory care. Hospitals that treat a greater number of tertiary care cases were less efficient at treating outpatient and emergency care holding constant the levels of primary/secondary and sub-acute care. (Preyra and Pink, 2006)

Cuellar and Gertier studied hospitals in Arizona, Florida, Massachusetts, and Wisconsin, 1995-2000 (1,377 hospital years of data). They investigated managed care patients and indemnity patients in hospitals who are members systems vs. non-system hospitals. They look at price per day; volume measured by inpatients admissions by payer; quality measured by rates of mortality for selected diagnoses, rates of overused procedures, and patient safety indicators; efficiency measured by spending per patient day and per admission; and charity care relative to volume of admissions. They found that system hospitals' price was $103 per day higher for managed care patients (7.7%); and $99 per day for indemnity patients (4.1%). Hospitals that joined systems had sizable increases in managed care volume (14 %) on average; there was no change in indemnity patients. There was no change in mortality rates, but there was 1.2% decrease in overused procedures by managed care patients. There was no change in adverse patient safety events. No difference in average spending per day was found for hospitals that joined systems; spending per admission was 2.8% higher. There was no change is charity care. "Following consolidation, hospital market power, not the efficiency of care delivery, increased; and hospitals gained higher prices but did not translate them into higher quality of inpatient care or provision or more community goods."(Cuellar and Gertier, 2003)

Dranove and Lindrooth studied the combination of single hospitals that consolidated into a single merged entity or formed a system between 1989 and 1996 in the U.S. Integration into preexisting systems were excluded. Comparison hospitals were selected based on having similar characteristics to merged hospitals (called "propensity to merge"). There were 122 consolidations matched to 1,220 controls (pseudo-consolidations). There

were 81 mergers under one license and 41 system formations. Hospitals were followed one year pre-consolidation and at 2, 3, and 4 years post consolidation. They found that consolidation into systems does not generate savings even after 4 years. Significant, robust, and persistent savings resulted from mergers into a single entity. Mergers in which hospitals consolidate financial reporting and licenses generate savings of approximately 14% at 2, 3, and 4 years after the merger. This is one of the best cost studies, specifically designed to meet many of the criticisms of other studies. Results were robust under different cost function specifications and difference forms of regression. Other findings were that merger effects were not sensitive to clinical services overlap, distance between merger partners, degree of HMO penetration in the market, or HHI. (Dranove and Lindrooth, 2003)

In contrast to the studies above that investigate costs, Melnick and Keeler look at the behavior of prices paid by private insurance over the period 1998-2003. Average net price per inpatient day for private pay patients were studied in 3 systems classes for hospitals: non-system hospitals; small (1-14 hospitals) systems; or large hospital (>15 hospitals) systems. At the beginning of the period, system hospitals did not receive substantially higher prices relative to hospitals that were not parts of systems. By 2003, prices were estimated to be 34% higher for hospitals that were members of large systems, on average; and members of small systems had prices that were 17% higher than non-system hospitals. Hospitals in the same system that were close to other systems hospitals did not have higher prices than systems hospitals that were not close to other systems hospitals. This study finds that systems hospitals in California were able to extract significantly higher prices from private insurance companies than non-system hospitals. (Melnick and Keeler, 2007)

Krishnan also studies prices of merged hospitals. Using data from California and Ohio for 1994-1995, he examines changes in prices at the DRG level for private insurance and private pay patients. His findings are that prices at the DRG level increased for hospitals that merged or were acquired relative to non-merging hospitals. Price increases were greatest where the hospital gained substantial market share (>20% relative to the share of the largest merging hospital). Hospitals that became monopolies after the merger were excluded from the analysis. However, prices for DRGs in which the merged hospital had smaller increases in market share also increased relative to non-merging hospitals indicating that market power was not restricted to large increases in market share. (Krishnan, 2001)

Capps and Dranove obtained confidential price data from insurers in 4 markets (1997-2001) in which there were hospital consolidations involving 12 hospitals. The market areas include one state in the Midwest; another in the Southwest; and two metropolitan areas, one on which was in the Northeast. Nine of the 12 hospitals had price increases greater then the median. For example, in the Midwest state, prices were increased by $668 per admission (11.6%); the median increase was $164 (2.86%). Non-profit and for-profit hospitals seem equally to exploit market power. The two markets with the most significant relationship between change in HHI and price had virtually no for-profit hospitals. The authors point out that hospital merger studies have limitations because 1.) they cannot examine actual prices received by hospitals; 2.) they have cross section rather than time series data; 3.) they don't distinguish between market power resulting from superior quality and market power resulting from provider concentration; and/or 4.) they fail to control for patient severity (which usually

means hospitals in urban markets have higher prices because they treat patients who are more severely ill). This study addresses these limitations in methodology. (Capps and Dranove, 2004)

The Robert Wood Johnson Synthesis Project aims to produce relevant, concise, thought-provoking briefs and reports on today's important health policy issues. Vogt and Town reviewed empirical studies concerning how hospital consolidation affected the price and quality of hospital care. Specifically, this synthesis addresses the following questions: 1.) What are the reasons for the wave of hospital consolidations during the 1990s? 2.) What are the effects of hospital consolidations on the price of inpatient care? 3.) What are the effects of hospital consolidation on the quality of inpatient care? 4.) What are the effects of hospital consolidation on hospital costs? Research does not provide conclusive evidence on why the merger wave occurred. On balance, evidence from quantitative studies suggests that the rise of managed care is not correlated with hospital merger activity. The balance of the evidence indicates that 1990-2003 consolidation in metropolitan areas raised hospital prices by at least 5% and likely by significantly more. There is evidence from several studies indicating that consolidation among hospitals close to one another led to large price increases. Studies have found consolidation-specific price increases of 40% of more. Although the results in the literature are mixed, a narrow balance of evidence and evidence from the best studies indicates that hospital consolidation more than likely decreases quality than increases it.
Although the literature is mixed, the balance of the evidence indicates that hospital facility consolidation produces cost savings for the consolidated hospitals. However, there is little evidence that hospitals achieve significant cost savings via ownership consolidation alone (Vogt and Town 2006).

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