Hospital Market Concentration and Market Share in Rhode Island

FINAL REPORT

Harvey Zimmerman
Spectrum Research Services, Inc.
2845 Post Road, Suite 216
Warwick, RI 02889

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Hospital Market Concentration and Market Share

Private nonprofit short term acute inpatient hospitals services in Rhode Island are provided by two affiliated groups of hospitals (Lifespan and Care New England) and seven other hospitals: Memorial Hospital of Rhode Island, South County Hospital, Westerly Hospital, Rehabilitation Hospital of Rhode Island, Landmark Medical Center, St. Joseph Health Services, and Roger Williams Hospital. If the affiliation between St. Joseph Health Services, Roger Williams Hospital, and associated parties results in the formation of Charter CARE Health Partners, then the market penetration of this new group and each of the other hospital groups and independent hospitals is depicted in Table 1 by city or town using calendar year 2007 hospital discharges (not including newborns).

The two hospitals affiliating to form the Charter CARE group have a combined market penetration exceeding 5% for all of the cities and towns of Providence County, Kent County, and Bristol County. For the cities and towns of Washington County and Newport County, their combined market penetration is less than 5% with two exceptions. Their combined market penetration in North Kingstown is 5.3% and in Tiverton is 5.7%. It is notable that the combined market penetration for the Charter CARE hospitals is greater than 50% in Smithfield; greater than 40% in Johnston and North Providence; greater than 30% in Glocester; greater than 20% in Burrillville, Cranston, and Providence; and greater than 10% in Bristol, East Providence, Foster, Lincoln, North Smithfield, Situate, and Warren.

Table 2 shows the distribution of patient discharges by city and town for each discharge. Please note that whereas the denominator in Table 1 is discharges per city or town from Rhode Island hospitals or hospital groups, the denominator in Table 2 is total discharges for each of the specified hospital. In other words, Table 1 shows where residents of Rhode Island cities and towns get their instate hospital inpatient services. Table 2 shows where the hospitals get their patients. By rounding the difference to the nearest whole percent, it is easily seen that the percentage of inpatients that each hospital draws from corresponding cities and towns differ by 2% or less with the exceptions that St. Joseph gets relatively more of its patients from North Providence and Johnston while Roger Williams Hospital gets relatively more of its patients from Providence.

The last column of Table 2 shows the market penetration of the two Charter CARE hospitals based on their combined market penetration. Discharges from 8 cities and towns (shown in bold face type) account for 75% of their total discharges. In order of numerical importance, they are Providence, North Providence, Johnston, Cranston, Smithfield, Warwick, East Providence, and Pawtucket.

Table 1
Sources of Instate Inpatient Care for Residents of
Rhode Island Cities and Towns, CY 2007

City or Town	Lifespan	Care New England	Memorial Hospital	South County Hospital	Westerly Hospital	Rehab Hospital	Landmark Medical Center	Charter CARE
Barrington	67%	19%	6%	0%	0%	0%	1%	6.6%
Bristol	72%	13%	1%	0%	0%	0%	0%	13.0%
Burrillville	25%	13%	1%	0%	0%	2%	38%	20.7%
Central Falls	34%	23%	33%	0%	0%	0%	1%	7.6%
Charlestown	21%	9%	0%	45%	19%	0%	0%	4.4%
Coventry	22%	68%	0%	1%	0%	0%	0%	7.5%
Cranston	51%	27%	1%	0%	0%	0%	0%	20.5%
Cumberland	37%	15%	15%	0%	0%	2%	21%	9.1%
East Greenwich	29%	61%	1%	4%	0%	0%	0%	5.4%
East Providence	63%	17%	7%	0%	0%	0%	0%	11.6%
Exeter	23%	32%	1%	38%	1%	0%	1%	4.8%
Foster	48%	31%	0%	0%	0%	1%	2%	17.1%
Glocester	35%	19%	1%	1%	0%	1%	6%	36.9%
Hopkinton	18%	15%	0%	15%	46%	0%	1%	4.8%
Jamestown	68%	13%	0%	15%	0%	0%	0%	3.2%
Johnston	36%	14%	1%	0%	0%	0%	1%	48.0%
Lincoln	44%	15%	12%	0%	0%	2%	16%	12.0%
Little Compton	79%	14%	2%	1%	1%	0%	1%	3.0%
Middletown	92%	4%	0%	1%	0%	0%	0%	2.6%
Narragansett	22%	12%	0%	61%	1%	0%	0%	3.4%
Newport	90%	7%	0%	1%	0%	0%	0%	2.2%
New Shoreham	36%	10%	0%	35%	14%	0%	0%	4.2%
North Kingstown	29%	32%	0%	33%	0%	0%	0%	5.3%
North Providence	36%	13%	2%	0%	0%	1%	1%	47.1%
North Smithfield	24%	12%	1%	0%	0%	3%	49%	10.7%
Pawtucket	37%	20%	34%	0%	0%	0%	1%	7.3%
Portsmouth	84%	12%	1%	0%	0%	0%	0%	2.6%
Providence	52%	24%	1%	0%	1%	0%	1%	20.2%
Richmond	21%	17%	1%	37%	20%	0%	0%	4.3%
Scituate	50%	30%	0%	0%	0%	1%	0%	18.3%
Smithfield	31%	12%	2%	0%	0%	1%	2%	51.4%
South Kingstown	19%	11%	0%	66%	1%	0%	0%	3.3%
Tiverton	75%	17%	0%	0%	0%	0%	0%	5.9%
Warren	67%	15%	2%	0%	0%	0%	0%	15.9%
Warwick	30%	59%	1%	1%	0%	0%	0%	9.4%
Westerly	15%	8%	0%	4%	68%	0%	0%	3.7%
West Greenwich	32%	57%	0%	1%	2%	0%	0%	7.1%
West Warwick	21%	70%	0%	1%	0%	0%	1%	6.2%
Woonsocket	16%	11%	1%	0%	0%	2%	63%	6.8%

Data source: Rhode Island Department of Health Hospital Discharge Data
*In this table, 0% means < 0.5%.

Table 2
Comparison of Market Distribution of Discharges for St. Joseph Health Services and Roger Williams Hospital by City or Town, 2007

City or Town	St. Joseph	Roger Williams	Difference	Combined
Barrington	0.51%	0.76%	0%	0.62%
Bristol	0.69%	2.51%	-2%	1.49%
Burrillville	2.57%	0.94%	2%	1.86%
Central Falls	1.15%	0.78%	0%	0.99%
Charlestown	0.20%	0.14%	0%	0.18%
Coventry	1.34%	1.86%	-1%	1.57%
Cranston	9.87%	10.81%	-1%	**10.28%**
Cumberland	1.82%	1.36%	0%	1.62%
East Greenwich	0.35%	0.36%	0%	0.35%
East Providence	3.90%	4.20%	0%	**4.03%**
Exeter	0.11%	0.18%	0%	0.14%
Foster	0.39%	0.32%	0%	0.36%
Glocester	2.27%	1.00%	1%	1.71%
Hopkinton	0.22%	0.20%	0%	0.21%
Jamestown	0.10%	0.08%	0%	0.09%
Johnston	13.53%	7.69%	**6%**	**10.98%**
Lincoln	1.58%	1.25%	0%	1.43%
Little Compton	0.00%	0.05%	0%	0.02%
Middletown	0.20%	0.36%	0%	0.27%
Narragansett	0.16%	0.40%	0%	0.26%
Newport	0.19%	0.49%	0%	0.32%
New Shoreham	0.01%	0.05%	0%	0.03%
North Kingstown	0.63%	1.01%	0%	0.79%
North Providence	16.61%	5.78%	**11%**	**11.88%**
North Smithfield	0.71%	0.70%	0%	0.70%
Pawtucket	3.75%	3.59%	0%	**3.68%**
Portsmouth	0.12%	0.27%	0%	0.19%
Providence	16.34%	31.00%	**-15%**	**22.74%**
Richmond	0.14%	0.20%	0%	0.17%
Scituate	0.77%	1.10%	0%	0.92%
Smithfield	8.51%	5.02%	3%	**6.99%**
South Kingstown	0.46%	0.46%	0%	0.46%
Tiverton	0.08%	0.27%	0%	0.17%
Warren	0.73%	1.58%	-1%	1.10%
Warwick	4.68%	6.61%	-2%	**5.52%**
Westerly	0.57%	0.46%	0%	0.52%
West Greenwich	0.11%	0.23%	0%	0.16%
West Warwick	1.28%	1.34%	0%	1.31%
Woonsocket	1.80%	2.37%	-1%	2.05%
Massachusetts	1.04%	1.60%	-1%	1.28%
Connecticut	0.17%	0.38%	0%	0.26%
Other & unknown	0.33%	0.25%	0%	0.30%

Data source: Rhode Island Department of Health Hospital Discharge Data
*In this table, 0% means < 0.5%.

Market Concentration for Hospital Services

Since 1982, the U.S. Department of Justice, the Federal Trade Commission, and state attorneys general have used the Herfindahl-Hirschman Index (HHI) to measure market concentration for purposes of antitrust enforcement. According to the DOJ-FTC 1992 Horizontal Merger Guidelines, markets in which post-merger HHI is below 1000 is considered "unconcentrated", between 1000 and 1800 are considered "moderately concentrated" and those above 1800 are considered "highly concentrated." A merger potentially raises "significant competitive concerns" if it produces an increase in the HHI of more than 100 points in a moderately concentrated market or more than 50 points in a highly concentrated market. A merger is presumed "likely to create or enhance market power or facilitate its exercise" if it produces an increase in the HHI of more than 100 points in a highly concentrated market (Bazzoli et al. 1995).

The Herfindahl-Hirschman Index (also called the Herfindahl Index) is calculated by squaring the market share (measured by percentage) of each of the 50 largest firms competing in a market and summing the squares. If less than 50 firms are in the market, the squares of the market shares of all firms are summed. Thus the HHI can take values ranging from 200 in a market with 50 equal sized firms to 10,000 in a monopoly market. A major benefit of this index is that it gives more weight to larger firms in measuring concentration.

Geographic Market for Inpatient Hospital Services in Rhode Island

Appropriate use of this statistic depends on proper definition of the market (a question of substitutability of services) and on the appropriate geographic scope of the market. Geopolitical boundaries are a convenient, but sometimes meaningless, basis for defining the market for hospital services. Geographic markets are limited to a greater or lesser extent by 1.) the cost of transportation and 2.) legal barriers, such as those imposed by entry regulation that may regulate trade between areas. On the conceptual level, Department of Justice Guidelines define a market for antitrust purposes as the smallest geographic area, and group of producers that, if combined could profitably exercise monopoly power (i.e., set prices at levels above the competitive prices) (Morrisey et al. 1988).

Economists have suggested different empirical measures to determine market power. One method is to look at residual demand for a cartel (or merged firms). The residual demand faced by a firm is the aggregate market demand minus the amounts supplied by non-cartel firms in the market. The market power of the cartel is inversely related to the price elasticity of demand. A second means of gauging market power is to look at price tests. If a merged firm is able to sustain a "small but significant and non-transitory increase in price" (SSNIP) (e.g., increase prices by 5% for a year) without losing enough customers to make the price increase unprofitable, this indicates market power.

Another empirical method for defining markets dates back to research by Elzinga and Hogarty in the late 1970s. Consequently, these methods have been called the Elzinga-Hogarty test. The Elzinga-Hogarty test (E-H test) specifies two criteria for an area to be a geographic market. There must be few shipments of the product into an area ("little in from outside" or LIFO) and few shipments from the area to other areas ("little out from inside" or LOFI). For hospital services, this means that few patients living inside the hospital market receive services from hospitals outside the area (LIFO) and few patients from outside the area are treated by hospitals inside the market (LOFI). Elzinga and Hogarty proposed an arbitrary 75% standard for both criteria with an alternative 90% to define the smallest geographic area that constitutes a market. Using the 90% criteria will always result in a larger market area than the 75% rule (Morrisey et al. 1988).

Table 3
Patient Origin of Inpatient Hospital Discharges
from Rhode Island Hospitals, CY 2007

Hospital Group	Patients from Rhode Island	Patients from Massachusetts	Patients from Connecticut	All Other Patients
Lifespan	91%	7%	1%	1%
Care New England	93%	6%	1%	1%
Landmark	92%	7%	0%	0%
Memorial	93%	7%	0%	0%
South County	98%	0%	1%	1%
Rehab Hospital of RI	87%	11%	0%	1%
Westerly	64%	0%	34%	2%
Roger Williams	97%	2%	0%	0%
St. Joseph	98%	1%	0%	0%
Total**	**92%**	**6%**	**2%**	**1%**

Data source: Rhode Island Department of Health Hospital Discharge Data
*In this table, 0% means < 0.5%.
**Items may not add to totals due to rounding.

Table 3 shows that 92% of the patients discharged from Rhode Island hospitals in 2007 came from Rhode Island. The second largest source of patients was from Massachusetts. This accounted for only 6% of the patients. A few patients (primarily treated at Westerly Hospital) came from Connecticut (2%) and a few others (1%) were from other places. Thus, the state of Rhode Island clearly passes the LIFO criterion of the E-H test as a well defined market.

A recent report on out-of-state utilization of inpatient hospital services by Rhode Islanders found that 99.5% of all Rhode Island residents hospitalized in the 37 states reporting data to the Hospital Cost and Utilization Project used hospitals in Rhode Island, Massachusetts, or Connecticut. In 2003, there were 6,132 discharges from Massachusetts hospitals and 632 discharges from Connecticut hospitals. These data exclude newborns. Over the 7-year period, 1997-2003, the annual percent of Rhode Island residents discharged from Massachusetts hospitals varied between 4.6% and 5.0%. The percentage discharges from hospitals in Connecticut was a constant 0.5%. On average, 117 patients living in Massachusetts used Rhode Island hospitals for every 100 Rhode Island residents using Massachusetts hospitals. For Connecticut, 635 Connecticut residents used Rhode Island hospitals for every 100 Rhode Island residents using Connecticut hospitals. The towns with the lowest proportion of patients seeking care out-of-state were West Warwick (1.7%), Providence (2.0%), and Johnston (2.0%). Almost three fourths of the hospitalized residents of Tiverton and Little Compton used out-of-state hospitals, primarily in Massachusetts. About 9% of Westerly patients used Connecticut hospitals (Williams and Buechner 2006). Thus, the state of Rhode Island also passes the LOFI criterion of the E-H test as a well defined market.

Hospital Market Concentration in Rhode Island

During the 1990s, hospitals consolidations were widespread in the U.S. leading to an increased concentration of hospitals as is measured by the HHI. Between 1990 and 2003, the population-weighted HHI increased from 1623 to 2323. This is roughly equivalent to moving from 6 equal-sized organizations to 4 equal-sized organizations (Town et al. 2007). Hospital consolidation was national in scope, but varied significantly by geographical region. The table below reports the average HHI by region and the change from 1990 to 2003. Both the level and the increase in the HHI were greatest in the South.

Table 4
Changes in Hospital Consolidation by Region

Region	Average HHI in 2003	Increase in HHI: 1990-2003
East	1982	697
Midwest	2356	743
South	3016	939
Southwest	2494	674
West	2242	548

Source: Vogt and Town 2006

Table 5 below reports Rhode Island market share and the HHI for private non-governmental hospitals in calendar years 2006 and 2007. If all hospitals in Rhode Island were independent in 2007, the HHI for all short term general hospital discharges (excluding newborns) would have been equal to 1268 (detail not shown). This implies that the market for these services would be considered moderately concentrated if all hospitals were independent. With the Lifespan group affiliation and the Care New England group affiliation, the HHI increased to 2600. Thus the market may be characterized as highly concentrated. DOJ-FTC guidelines indicate that a merger that produces an increase in the HHI of more than 50 points in a highly concentrated market raises "significant competitive concerns."

In the case of the proposed Roger Williams-St. Joseph affiliation, the HHI is increased by 103 points as is shown in Table 6 below. Such an affiliation is presumed "likely to create or enhance market power or facilitate its exercise." Comparing the hospital concentration in Rhode Island (as is measured by the HHI) to the other geographical regions shows that Rhode Island hospitals are more highly concentrated than the average for New England as well as other regions in the U.S. except the South.

Table 5
Market Concentration of Inpatient Hospital Discharges
in Rhode Island, CY 2006 and 2007

Hospital Group	Market Share 2006	HHI 2006	Market Share 2007	HHI 2007
Lifespan	40.5%	1641.3	42.0%	1759.8
Care New England	26.0	676.2	25.6	652.8
Landmark	5.8	33.2	5.4	29.1
Memorial	5.4	29.1	5.0	25.5
South County	4.1	17.0	4.0	15.8
Rehab Hospital of RI	0.5	0.2	0.5	0.2
Westerly	3.2	10.5	3.2	9.9
Roger Williams	6.5	42.0	6.3	39.9
St. Joseph	8.0	64.1	8.2	66.6
Total	**100.0%**	**2513.6**	**100.0%**	**2599.6**

Data source: Rhode Island Department of Health Hospital Discharge Data
*Items may not add to totals due to rounding.

Table 6
Market Concentration of Inpatient Hospital Discharges
in Rhode Island with Affiliation, CY 2006 and 2007

Hospital Group	Market Share 2006	HHI 2006	Market Share 2007	HHI 2007
Lifespan	40.5%	1641.3	42.0%	1759.8
Care New England	26.0	676.2	25.6	652.8
Landmark	5.8	33.2	5.4	29.1
Memorial	5.4	29.1	5.0	25.5
South County	4.1	17.0	4.0	15.8
Rehab Hospital of RI	0.5	0.2	0.5	0.2
Westerly	3.2	10.5	3.2	9.9
Roger Williams-St. Joseph	14.5	209.9	14.5	209.7
Total	**100.0%**	**2617.4**	**100.0%**	**2702.7**

Data source: Rhode Island Department of Health Hospital Discharge Data
*Items may not add to totals due to rounding.

Table 7 below reproduces the statistics given in Table 5 with inpatient hospital days substituted for hospital discharges and newborn days included.

Table 7
Market Concentration of Inpatient Hospital Days
in Rhode Island, CY 2006 and 2007

Hospital Group	Market Share 2006	HHI 2006	Market Share 2007	HHI 2007
Lifespan	38.4%	1474.6	39.6%	1568.2
Care New England	29.0	841.0	28.3	800.9
Landmark	5.1	26.0	4.8	23.0
Memorial	5.2	27.0	5.1	26.0
South County	2.8	7.8	2.7	7.3
Rehab Hospital of RI	1.3	1.7	1.2	1.4
Westerly	2.4	5.8	2.2	4.8
Roger Williams	5.6	31.4	5.5	30.2
St. Joseph	10.3	106.1	10.6	112.4
***Total**	**100.0%**	**2521.4**	**100.00%**	**2574.2**

Data source: Rhode Island Department of Health Hospital Discharge Data
*Items may not add to totals due to rounding.

Similarly, Table 8 below provides inpatient day data rather than the discharge data in Table 6. The affiliation of Roger Williams and St. Joseph increases the HHI by about 115 points in the highly concentrated market range. This again could raise "significant competitive concerns" and be presumed "likely to create or enhance market power or facilitate its exercise."

Table 8
Market Concentration of Inpatient Hospital Days
in Rhode Island with Affiliation, CY 2006 and 2007

Hospital Group	Market Share 2006	HHI 2006	Market Share 2007	HHI 2007
Lifespan	38.4%	1474.6	39.6%	1568.2
Care New England	29.0	841.0	28.3	800.9
Landmark	5.1	26.0	4.8	23.0
Memorial	5.2	27.0	5.1	26.0
South County	2.8	7.8	2.7	7.3
Rehab Hospital of RI	1.3	1.7	1.2	1.4
Westerly	2.4	5.8	2.2	4.8
Charter CARE	15.9	252.8	16.1	259.2
***Total**	**100.0%**	**2636.7**	**100.0%**	**2690.8**

Data source: Rhode Island Department of Health Hospital Discharge Data
*Items may not add to totals due to rounding.

Hospital Service

Although hospital discharges or inpatient hospitals days are the usual unit of measurement of hospital services, some researchers have proposed using a hospital-service based definition (Morrisey et al. 1988). The Rhode Island hospital discharge data set reports the hospital service for inpatients. The following list shows the different hospital services included:

Hospital Service
00 – Data not reported
02 – Pediatrics
10 – Medicine
22 – Cardiology
38 – Psychiatry
40 – General Surgery
48 – Ophthalmology
50 – ENT
54 – Oral Surgery
58 – Orthopedics
62 – Urology
70 – Gynecology
75 – Abortion
76 – OB-Not delivered
77 – OB-Delivered
80 – Newborn
98 – Rehabilitation

The hospital market share in Rhode Island will vary from service to service. It may be of interest to look at services for which the market share may be affected by the affiliation of Roger Williams Hospital and St. Joseph Hospital. The calendar year hospital discharge database is incomplete for some services for calendar year 2007. For that reason, data for calendar year 2006 are investigated here. Five services are of interest: medicine, cardiology, psychiatry, general surgery, and orthopedics. The other services individually account for less than 4% of the discharges and less than 3% of the patient days of the two hospitals considered together.

Table 9
Effect of Affiliation of Roger Williams and St. Joseph Hospitals on Concentration of Hospital Services, 2006

Service	Market Share, Roger Williams	Market Share, St. Joseph	Market Share, Combined	Statewide HHI, Hospitals Separated	Statewide HHI, Hospitals Combined
Discharges					
Medicine	7.8%	9.2%	17.1%	2396	2541
Cardiology	5.7%	8.2%	13.9%	2284	2377
Psychiatry	13.7%	13.9%	27.6%	2818	3199
General Surgery	6.3%	7.2%	13.5%	3719	3810
Orthopedics	8.9%	8.6%	17.5%	3151	3303
IP Days					
Medicine	7.4%	10.9%	18.3%	2442	2604
Cardiology	5.5%	11.0%	16.5%	2265	2387
Psychiatry	8.5%	17.8%	26.3%	2925	3226
General Surgery	6.2%	8.4%	14.6%	3711	3815
Orthopedics	7.1%	8.8%	15.9%	3189	3314

It may be seen that the HHI indicates highly concentrated (greater than 1800) HHI for all of the major services. General surgery is the most concentrated. However, psychiatry service would be affected the most—increasing by more than 300 points whether output is measured by discharges or inpatient days. For this service in particular, looking at only non-governmental hospitals omits an important segment of the market supplied by a state government hospital. Since many of the patients in Eleanor Slater Hospital are long stay patients, including discharges will have little effect on the calculated HHI. However, including inpatient days for adult psychiatry patients (but not geri-psych patients) at Eleanor Slater Hospital would decrease the market share measured for IP days to 6.6% for Roger Williams Hospital; 13.9% for St. Joseph Health Services, and 20.6% for the two combined. The statewide HHI for the two separate psychiatric units is 2264 and increases to 2449 if the two are combined. The market is still highly concentrated, but the affiliation would increase the HHI by 185 points.

Expected Source of Payment

Table 10 below shows the expected primary source of payment for inpatients at Rhode Island short term general hospitals in calendar year 2007. At the aggregate level, there is little remarkable about the Charter CARE hospitals. Medicare payments cover a smaller percent of patients than at other community hospitals, but that may be expected given the large number of psychiatric care patients at each hospital. What is not apparent in the combined data is the large differences in expected source of payment between the two hospitals.

Table 10
Expected Sources of Payment for Inpatient Discharges, CY 2007

Expected Source of Payment	Lifespan	Care New England	Memorial Hospital	South County Hospital	Westerly Hospital	Rehab Hospital	Landmark Medical Center	Charter CARE
Medicare	44.1%	30.6%	55.4%	53.5%	54.3%	67.1%	60.0%	47.0%
Medicaid, not RIte Care	7.4%	6.6%	9.9%	2.4%	2.5%	3.9%	7.1%	8.5%
RIte Care	7.3%	15.9%	7.5%	4.0%	3.9%	0.0%	6.6%	1.7%
Workers Comp.	0.6%	0.2%	0.0%	0.5%	0.4%	1.3%	0.1%	0.2%
Blue Cross	17.3%	25.7%	11.0%	18.8%	18.0%	11.4%	9.7%	23.9%
Commercial Ins.	5.4%	8.6%	7.2%	4.4%	9.5%	11.2%	10.0%	5.1%
CHAMPUS	1.2%	0.4%	0.4%	0.7%	1.8%	0.3%	0.2%	0.1%
United	7.4%	4.7%	0.7%	9.9%	5.0%	0.0%	0.0%	7.9%
Blue Chip/HMO	4.1%	3.6%	2.7%	1.9%	1.1%	3.2%	2.8%	1.1%
Self Pay	5.0%	2.5%	5.4%	3.4%	3.3%	0.0%	3.4%	3.2%
Other/unknown	0.1%	1.2%	0.0%	0.6%	0.1%	0.0%	0.0%	1.2%

Data source: Rhode Island Department of Health Hospital Discharge Data

Table 11 shows the data for each of the Charter CARE hospitals and the combined data. Roger Williams Hospital has a greater proportion of its patients covered by Medicare, Medicaid and commercial insurance. More St. Joseph patients are covered by Blue Cross and United health insurances. Considering the similarity in services offered and the degree of overlap in the catchment areas of the two hospitals, this finding is unexpected.

Table 11
Expected Sources of Payment for Charter CARE
Hospitals Inpatient Discharges, CY 2007

Expected Source of Payment	Roger Williams Hospital	St. Joseph Health Services	Charter CARE
Medicare	56.0%	40.1%	47.0%
Medicaid, not RIte Care	10.1%	7.3%	8.5%
RIte Care	3.8%	0.0%	1.7%
Workers Comp.	0.3%	0.2%	0.2%
Blue Cross	14.2%	31.4%	23.9%
Commercial Ins.	8.5%	2.4%	5.1%
CHAMPUS	0.1%	0.2%	0.1%
United	0.0%	14.0%	7.9%
Blue Chip/HMO	2.6%	0.0%	1.1%
Self Pay	4.4%	2.4%	3.2%
Other/unknown	0.0%	2.1%	1.2%

Trends in Utilization

The total number of discharges (excluding newborns) has increased from 126,707 in 2003 to 133,368 in 2007, an increase of 6,661 (5.26%). Over this 5 year period, the number of inpatient days (including newborns) has increased from 742,443 patient days in 2003 to 773,919 patient days in 2007, an increase of 31,476 days (4.24%). During this period, Roger Williams reported an increase of 532 discharges (6.74%) and 3,840 inpatient days (9.87%). St. Joseph reported a decrease of 140 discharges (-1.27%) and an increase of 3,994 inpatient days (5.13%). Their combined experience was an increase of 392 discharges (2.07%) and an increase of 7,834 in inpatient days (6.71%). For the 5 year period, this is the equivalent of 0.41% increase per year is hospital discharges and of 1.31% increase per year in inpatient days.

Hospital Consolidation and Prices

Hospital consolidations can have two contradictory effects on consumers. Some may help consumers by generating efficiencies that allow hospitals to lower prices which may be passed on to consumers in the form of lower insurance premiums. Others may increase the hospitals market power allowing hospitals to raise prices which will increase the cost of health insurance in turn. More accurately, market power increases the price-cost margin (Gaynor 2006). Whether the cost is lowered enough to avoid an increase in price is an empirical question.

Some studies have reported that combinations in which hospitals operate under a single license generates substantial savings, while system formation in which hospitals retain their individual licenses do not. Dranove and Lindrooth looked at all single hospital consolidations between 1989 and 1996 in the U.S. Of the 122 consolidations, 81 involved merging the two hospitals into a single hospital with consolidated financial reporting and operating under a single license. The other 41 consolidations involved the two separate hospitals remaining distinct but formed a system. In the well-controlled study, the authors selected 10 control hospitals having similar characteristics for each consolidating hospital. Hospital costs were followed for one year pre-consolidation and 2, 3, and 4 years after consolidation. Consolidation into systems did not generate savings, even after 4 years. On the other hand, merged hospitals operating under one license generated savings of approximately 14% at 2, 3, and 4 years after the merger (Dranove and Lindrooth 2003).

Measuring the effects of hospital consolidation on prices is difficult because hospital prices paid by private insurance companies is generally considered proprietary trade secrets and this accounts for the largest source of revenue that is negotiable. A recent study concealed the identity of insurers and obtained price data from four areas that had hospital consolidations. Before and after consolidation prices were determined for inpatient services adjusted for casemix complexity. Three of the areas had significant price increases after consolidation and the other had constant prices. A 10% increase in the HHI was estimated to result in a 6% increase in prices (Capp and Dranove 2004).

A recent Research Synthesis Report for the Robert Wood Johnson Foundation looked at three approaches to price competition research: the structure-conduct-performance (SCP) approach, the event study approach, and the simulation approach. The SCP approach does not analyze actual mergers, but investigates the relationship between price and HHI and uses that to predict how the merger will affect price. The event studies investigate the effects of actual mergers. The synthesis report found that the best event studies concluded that prices for merged hospitals, relative to controls, rose 10% or more after mergers. One recent event study found that consolidation raised prices by 40%. The strongest simulation studies found that mergers of hospitals close together generate greater price increases than mergers of distant hospitals. The most recent study reviewed found that consolidated hospitals have prices 15% higher than independent counterparts. The study concludes that research on hospital consolidation in the 1990s raised prices by at least 5% and likely significantly more (Vogt and Town 2006).

Hospital Consolidation and Quality

There are few studies that look at the effects of hospital consolidation on quality. In one of the first such study, Ho and Hamilton look at California hospital markets that had hospital consolidations in the period, 1991-1996. They distinguished three types of consolidations: hospital mergers, acquisition of individual hospitals by a hospital system, and acquisition of hospital systems by another hospital system. There looked at quality for three types of patients: heart attack patients, stroke patients, and newborns. Quality was indicated by in-hospital mortality for heart attack and stroke patients; hospital readmission within 90 days for heart attack patients, and length of stay for newborns. Hospital consolidation did not significantly impact inpatient mortality for either heart attack or stroke patients. This was true for both private insurance and Medicare patients. However, the authors note that the standard errors were relatively large due to sample sizes. For readmissions which the authors associate with lower quality, the authors found that consolidations raised the probability of readmissions for heart attack patients by 10%. In addition, this study found that early discharge for newborns (in less than 48 hours after birth) was associated with hospital acquisitions especially in concentrated hospital markets (Ho and Hamilton 2000).

In a study of hospital consolidations in Arizona, Florida, Massachusetts, and Wisconsin in the years, 1995-2000, Cuellar and Gertier use 1,377 hospital years of data to investigate the effects of hospital consolidation. Quality measures used were 1.) rates of inpatient mortality following certain hospital conditions and procedures, 2.) rates of utilization of procedures considered overused, and 3.) twenty patient safety indicators. Rates of avoidable inpatient mortality and inadequate patient safety did not change for either managed care patients or for indemnity patients. For managed care patients, the rate of overused procedures was reduced by 1.2%. A separate assessment of casemix found that casemix complexity did not change after consolidations (Cuellar and Gertier 2003).

Conclusions

This analysis of market concentration and market share in Rhode Island indicates that the market for inpatient hospitals services is already consolidated to the point of meeting the FTC/DOJ criterion of being highly concentrated. Furthermore, the affiliation of these two hospitals would increase concentration in a way "likely to create or enhance market power or facilitate its exercise." In this analysis, the state of Rhode Island has been considered the relevant market for hospitals. Roger Williams and St. Joseph hospitals do not provide extensive services outside Providence and Kent Counties. Yet, the hospitals that they compete with do provide extensive services statewide. For this reason, the statewide market was used here. Choosing a smaller market area would increase both the perceived market concentration and its increase.

These hospitals are similar in size and too big to expect the affiliation to result in increases in efficiency or decreases in cost due to economies of scale or scope. Some more modest cost reductions may be possible through combining some none clinical operations. Studies of previous hospital ownership consolidations report that such savings are more likely to be a savings to the hospital and not to the consumer. Consolidation of facilities and clinical programs are more likely to report significant cost savings (Vogt and Town 2006).

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