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The Influence of Specialized Cancer Hospitals in Florida on Mortality, Length of
Stay, and Charges of Care

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Public Health
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Dedication

To my dear children Diego, Matías, Valentina and Rafael, and my beloved husband Raúl.

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The Influence of Specialized Cancer Hospitals in Florida on Mortality, Length of Stay, and Charges of Care

Patricia L. Spencer, MD, MBA

ABSTRACT

This thesis analyzes the influence of specialized cancer hospitals in Florida on the outcomes of the mortality risk, length of stay, and charges of care among patients diagnosed with cancer, and performed a mastectomy, lumpectomy or radical prostatectomy, after controlling for age, gender, race, severity, type of hospital ownership, payment options, type of admission, and presence or absence of residency programs.

The Florida Agency for Health Care Administration inpatient hospital discharge dataset of 2005 was used to extract data. Analysis of covariance was used to compute the differences on the three outcomes as a function of the specialization/volume of the treatment facility. The treatment facility categories were defined as (1) specialized cancer hospital; (2) general hospital with high volume (100 or more cancer treatment discharges per defined cancer); (3) general hospital with medium volume (50 to 99 cancer treatment discharges per defined cancer); (4) general hospital with low volume (25 to 49 cancer treatment

discharges per defined cancer); and (5) general hospital with very low volume (less than 25 cancer treatment discharges per defined cancer).

There were no deaths in any of the three procedures at specialized cancer hospitals. Being hospitalized at a specialty cancer hospital for a radical prostatectomy for prostate cancer was associated with 0.93 fewer days in mean length of stay (mean = 2.68 overall), but length of stay was not significantly different for mastectomy and lumpectomy (mean = 2.21 and 1.86 overall respectively) compared to general hospitals with very low volumes. Charges for care were not significantly different for lumpectomy and radical prostatectomy (mean = \$22,097 and \$25,220 overall respectively) for a specialty cancer hospital compared to general hospitals with very low volumes, where for mastectomies it was \$4,850 on average lower (mean = \$24,608 overall).

In this study, patients managed at specialized cancer hospitals sometimes had better outcomes (i.e. shorter lengths of stay for radical prostatectomies and lower charges for mastectomies) compared to very low volume hospitals, while not having any significantly worse outcomes.

Introduction

Numerous studies have suggested that outcomes for surgical procedures are better if they are performed by high volume surgeons. Similar results have been found for prostate oncology.¹

The majority of studies evaluate the influence of specific surgical procedures on the primary outcome of hospital mortality. Considering in-hospital mortality as the outcome, there is strong evidence of association between volume of activity and outcome for surgery of prostate cancer. The evidence of association is weaker for breast, lung and gastric cancer. For surgery of colorectal cancer there may be no association².

The hypothesis of this study is whether there is a positive association between receiving treatment from specialized cancer hospitals and higher volume treatment facilities in Florida on mortality risk, length of stay, and charges for care for breast and prostate cancer patients than in lower volume treatment facilities.

Background

Specialized Cancer Hospitals

In the state of Florida there is only one hospital recognized by the National Cancer Institute as a Comprehensive Cancer Center - the H.Lee Moffitt Cancer Center located in Tampa. It provides patient services; conducts basic, population sciences, and clinical research; and engages in outreach and education activities³. For the rest of the hospitals in Florida there is no formal accreditation process to provide cancer treatments.

Cancer Types

Breast Cancer: Breast cancer is a cancer that starts in the cells of the breast in women and men. Breast cancer screening is an attempt to find undiagnosed cancers. The most common screening methods are self and clinical breast exams, x-ray mammography, and breast magnetic resonance imaging (MRI). Genetic testing may also be used. Breast cancer is staged according to the TNM (tumor/lymph node/metastasis) system. Prognosis is closely linked to results of staging, and staging is also used to allocate patients to treatments both in clinical trials and clinical practice. The mainstay of breast cancer treatment is surgery when the tumor is localized, with possible adjuvant hormonal therapy (with tamoxifen or an aromatase inhibitor), chemotherapy, and/or radiotherapy.

Surgical removal of the breast, or mastectomy, is the most common procedure; in cases of early stages it is possible to perform a lumpectomy, which only removes a portion of the breast.

Prostate Cancer: Prostate cancer is a disease in which cancer develops in the prostate, a gland in the male reproductive system. It is one of the most common types of cancer in men. Prostate cancer develops most frequently in men over fifty years old. However, many men who develop prostate cancer never have symptoms, undergo no therapy, and eventually die of other causes. Prostate cancer is most often discovered by PSA (prostate specific antigen) screening and less commonly by physical examination or by symptoms. Treatment options for prostate cancer with intent to cure are primarily surgery and radiation therapy. Other treatments such as hormonal therapy, chemotherapy, proton therapy, cryosurgery, high intensity focused ultrasound (HIFU) also exist depending on the clinical scenario and desired outcome. Surgical removal of the prostate, or prostatectomy, is a common treatment either for early stage prostate cancer, or for cancer which has failed to respond to radiation therapy. The most common type is radical retropubic prostatectomy, in which case the surgeon removes the prostate through an abdominal incision. Another type is radical perineal prostatectomy, in which case the surgeon removes the prostate through an incision in the perineum, the skin between the scrotum and anus. Radical prostatectomy can also be performed laparoscopically, through a series of small (1cm) incisions in the abdomen, with or without the assistance of a surgical robot. Radical prostatectomy is effective

for tumors which have not spread beyond the prostate.

Outcomes

Health services research has focused on the treatment of survival (mortality rate), length of stay in the treatment facility, charges for the treatment, and functional status contingent on survival. These analyses focus on the first three outcomes.

Data and Methods

The Florida Agency for Health Care Administration (AHCA) collects data on all admissions to Florida hospitals. Patient data include demographic and case-mix-related characteristics such as age, sex, race, up to ten diagnoses and procedures, length of stay, source and type of admission, charges, and discharge status of all patients admitted to the state's community hospitals. Functional status is not available. This study extracted data from the Florida AHCA inpatient hospital discharge dataset of 2005.

Florida had 278 hospitals in the 2005 AHCA dataset. The list of Florida hospitals ordered by name can be found in Appendix A along with the information of the county, city and number of beds. The hospitals were categorized as a function of the specialization/volume of the treatment facility. The rationale for this categorization is based on a learning curve experience where it can be considered that more than two procedures performed per week, equivalent to 100 or more procedures per year, allows a high degree of specialization and experience in any given technique. Continuing with this rationale, having on average one to two procedures done per week, equivalent to 50 to 99 procedures per year, allows enough experience, but then less than one per week, equivalent to 25 to 49 per year, and less than one per two weeks, the same as 1 to 24 per year, would be considered in both cases not sufficient. The

treatment facility categories are thus defined in five categories as follows: (1) specialized cancer hospital, (2) general hospital with high volume (100 or more cancer treatment discharges per defined cancer), (3) general hospital with medium volume (50 to 99 cancer treatment discharges per defined cancer), (4) general hospital with low volume (25 to 49 cancer treatment discharges per defined cancer), and (5) general hospital with very low volume (less than 25 cancer treatment discharges per defined cancer).

The principal diagnosis code was used to extract the cancer discharges from the AHCA dataset in accordance to the topography: breast or prostate. See Table 1 for details.

Table 1. ICD9-CM Codes

Codes	Breast Cancer	Prostate Cancer
Principal Diagnosis	CPT 1740-1749; 2330	CPT 1850-1859; 2334
Procedures included	CPT 8541-8549 = mastectomy CPT 8520-8523 = lumpectomy	CPT 605 = radical prostatectomy
Procedures excluded	CPT 851-859 not 852 nor 854 = other breast procedure CPT "" = none_procedure CPT else = else_procedure	CPT 600-609 not 605 = other prostate procedure CPT "" = none_procedure CPT else = else_procedure

ICD9-CM International Classification of Diseases, Ninth Revision, Clinical Modification

The surgical procedure codes performed by each category of hospital were analyzed using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD9-CM) which classifies 17 broad categories of diseases and injuries, one being cancer.

For breast cancer, the treatments identified as mastectomies and lumpectomies were analyzed; other procedures such as biopsies or transfusions, among many others, for breast cancer patients were not counted as treatment procedures with curative intent. For prostate cancer, radical prostatectomy was

considered the only cancer treatment; other procedures such as laser treatment, catheterization, biopsies or transfusion, among others, for prostate cancer patients were not counted as treatment procedures with intent to cure for the purpose of this study. See Table 1 for details for the procedure codes used for breast and prostate cancer.

A one-way analysis of variance (ANOVA) was used to analyze the dependent continuous variables of charges and length of stay, with a categorical independent variable hospital category with more than 2 levels; in this case there were 5 levels. For the binary dependent variable of mortality, a multiple logistic regression model was used. A general linear model (glm) was used in all cases because of the existence of unbalanced categories. The statistical analysis system software utilized was SAS version 9.2.

Control variables were used to adjust the models using a variation of ANOVA – analysis of covariance (ANCOVA) - which combines features of ANOVA and regression. These control variables are grouped into four categories: (1) sociodemographic characteristics such as age (exact age in years) and race [white (reference group), black non Hispanic, Hispanic, all others]; (2) a measure of severity [mild (reference group), moderate, severe, critical] and type of admission [elective (reference group), urgent, emergency] of the hospitalized patient; (3) monetary factors such as hospital type of ownership [non-for-profit, investor (reference group), public] and insurance of patient [Medicare, Medicaid, commerce (reference group), all other]; (4) and lastly, a measure of provider of educational activities as per the presence or not of

residents in the hospital [no residents (reference group), presence of residents].

The type of hospital such as general hospital, teaching hospital or specialty hospital was not used because it was highly correlated with the operational definition fo the independent variable.

The measure of severity was calculated using the 3M Severity-adjustment Software Schematics (PC Grouper version 01.2)4. This formula used secondary diagnoses to calculate the severity score and adjusted for age and operating room procedures.

Results

Breast Cancer:

The ACHA dataset of 2005 had 3,756 mastectomy and 631 lumpectomy discharges for female breast cancer as the principal diagnosis. Only 186 of the 278 (67%) hospitals had at least one treatment discharge code for breast cancer (Table 2).

Table 2. Categories of Florida Hospitals

		Breast Cancer		Prostate Cancer	
Category	Description (by defined cancer)	N hospitals	Total discharges	N hospitals	Total discharges
1	specialized cancer hospital	1	225	1	156
2	≥ 100 cancer treatment discharges - high	7	925	5	854
3	50 - 99 cancer treatment discharges - medium	12	832	13	837
4	25 - 49 cancer treatment discharges - low	34	1,144	12	372
5	1-24 cancer treatment discharges - very low	132	1,261	151	949
Total		186	4,387	182	3,168

Within these treatment discharges the hospitals were distributed in the different categories in accordance to the description given in the methods section. The distribution is shown in Table 2: (1) specialized cancer hospital (n=1 hospital; H. Lee Moffitt Cancer Center), (2) general hospital with high volume (n=7 hospitals; Orlando Regional Medical Center, Florida Hospital, Baptist Hospital of Miami, Jackson Memorial Hospital, Memorial Regional Hospital, Tallahassee Memorial Hospital and Boca Raton Community Hospital), (3) general hospital with medium volume (n=12 hospitals; among them Holmes Regional Medical Center, Mount Sinai Medical Center, Shands Hospital, etc), (4) general

hospital with low volume (n=34 hospitals), and (5) general hospital with very low volume (n=132 hospitals).

The descriptive characteristics of the sample are provided in Table 3.

Mortality Rates: Analyzing the in-hospital mortality for all Florida hospitals that performed at least one mastectomy per year, the probability of dying was 0.08% overall. There were three deaths, one at the category 3 hospitals (patient aged 51 years old, white, stayed 8 days in the hospital, and had a commercial insurance), and two at the category 5 hospitals (one patient aged 90 years old, white, with length of stay of 8 days, and the other patient was aged 83 years old, white, with 13 days in the hospital; both were Medicare). For lumpectomies, the in-hospital probability of dying by the procedure in Florida hospitals was 0.16% overall. There was only one death reported for the category 4 hospitals (patient aged 61 years old, black, length of stay 10 days, and had commercial insurance). There were too few data to perform any significant statistical test on mortality (Table 3).

Length of Stay: The mean length of stay for all hospitals was 2.68 days for mastectomies, and 1.86 days for lumpectomies. The mean length of stay for mastectomies ranged from 2.09 days for category 1 hospital to 2.22 days for category 5 hospitals. After adjusting for the control variables, there was a significant increase of 0.15 days for category 2 hospitals compared to category 5 hospitals.

The mean length of stay for lumpectomies ranged from 1.36 days for category 1 hospital to 2.51 days for category 5 hospitals. When controlling for

Table 3. Sample Characteristics

Characteristic	Breast Cancer (n = 4,387)				Prostate Cancer (n = 3,168)		
	(n = 3,756) Mastectomy		(n = 631) Lumpectomy		(n = 3,168) Radical Prostatectomy		
	%	n	%	n	%	n	
Independent Variable							
Hospital Categories							
	1	6	211	2	14	5	156
	2	22	816	17	109	27	854
	3	18	687	23	145	26	837
	4	25	949	31	195	12	372
	5	29	1093	27	168	30	949
Control Variables							
Age (mean years)			62		66		61
Gender							
	M	-	-	-	-	100	3168
	F	100	3756	100	631	-	-
Race							
	White	73	2753	74	467	72	2283
	Black	10	391	11	66	13	402
	Hispanic	12	465	13	84	11	359
	Else	5	147	2	14	4	124
Severity							
	mild	63	2382	96	609	74	2330
	moderate	35	1296	2	10	24	756
	severe	2	72	2	10	2	70
	critical	0	6	0	2	0	12
Type of admission							
	elective	86	3237	81	511	93	2932
	urgent	12	445	16	100	7	227
	emergency	2	74	3	20	0	9
Hospital ownership							
	not-for profit	60	2079	52	300	58	1627
	investor	27	941	35	206	32	910
	public	13	448	13	75	10	274
	missing	8	288	8	50	11	357
Payer							
	Medicare	45	1675	60	380	35	1112
	Medicaid	5	196	5	33	1	34
	commercial	42	1575	29	178	57	1791
	selfpay	4	141	2	13	3	104
	other	4	169	4	27	4	127
Residents							
	Yes	40	1667	33	241	49	1730
	missing	8	288	8	50	11	357
Dependent Variables							
Length of Stay (mean)			2.21 days		1.86 days		2.68 days
Charges (mean)			\$24,608		\$22,097		\$ 32,301
Mortality		0.08	3	0.16	1	0.03	1

Table 4. Summary of Outcomes for Breast Cancer

Variables	Mastectomy			Lumpectomy		
	estimate	p	r ²	estimate	p	r ²
Length of Stay	(days)	< 0.0001	0.285216	(days)	< 0.0001	0.428711
category		< 0.0001			0.2948	
cat1		0.7637			0.7344	
cat2	0.15	0.0024			0.2063	
cat3		0.9354		-0.21	0.0275	
cat4		0.5399			0.0909	
age		0.6804			0.1385	
black	0.42	< 0.0001		0.65	0.0349	
hispanic		0.6921		0.68	0.0221	
race other		0.6558			0.9748	
moderate	0.69	< 0.0001		3.81	< 0.0001	
severe	4.76	< 0.0001		3.63	< 0.0001	
critical	14.36	< 0.0001		22.43	< 0.0001	
non-for-profit		0.4544			0.3291	
public		0.9801			0.4139	
medicare	-0.26	0.0052			0.1101	
medicaid		0.2488		0.93	0.0355	
selfpay		0.1128			0.7496	
other payer	-0.39	0.0068			0.1229	
urgent	0.38	< 0.0001			0.0859	
emergency	3.49	< 0.0001		5.14	< 0.0001	
yes residents	-0.17	0.0174			0.8362	
Charges	(\$)	< 0.0001	0.278316	(\$)	< 0.0001	0.521748
category		< 0.0001			0.3018	
cat1	-4,850	< 0.0001			0.5273	
cat2	1,626	< 0.0001			0.9255	
cat3	583	0.0067			0.3659	
cat4		0.0691			0.6549	
age	-172	< 0.0001			0.1600	
black		0.9511			0.2456	
hispanic	5,877	< 0.0001		7,185	0.0011	
race other		0.1391			0.8134	
moderate	5,863	< 0.0001		15,101	0.0047	
severe	26,616	< 0.0001		19,650	0.0003	
critical	100,388	< 0.0001		263,321	< 0.0001	
non-for-profit	-5,137	< 0.0001		-5,417	0.001	
public	-6,346	< 0.0001		-6,145	0.0237	
medicare	-4,067	< 0.0001			0.3470	
medicaid	-5,138	< 0.0001			0.3975	
selfpay	-3,349	0.0085			0.6369	
other payer	-3,953	0.0002			0.0652	
urgent		0.5148			0.8142	
emergency	10,855	< 0.0001		23,713	< 0.0001	
yes residents	-1,098	0.0376			0.3904	

other variables however, only the category 3 hospitals had a significant decrease of 0.21 days of stay (refer to Table 4 for more details).

Charges for Care: The mean charges for all hospitals were \$24,608 for mastectomies and \$22,097 for lumpectomies. For mastectomies (86% of the treatment volume), the mean charges were \$19,824, \$26,857, \$23,058, \$25,444 and \$23,913 from category 1 to category 5 hospitals respectively. There were significant differences among the category hospitals after adjusting for the control variables. The specialty cancer hospitals category charged on average \$4,850 less per mastectomy compared to category 5 hospitals; category 2 and 3 hospitals charged \$1,626 and \$583 more respectively.

As for lumpectomies (14% of the treatment volume), the mean charges for care were \$14,879, \$21,572, \$17,710, \$23,904, and \$27,310 from category 1 through category 5 hospitals. There were no significant differences after adjusting for the control variables for the category hospitals.

Control Variables: Among these the following findings are worthy of attention (see Table 4 for further details). The mean age for lumpectomies ranged from 56 years old for category 1 hospitals to 69 years old for category 5 hospitals; for mastectomies the mean age ranged from 53 years old for category 1 hospitals to 66 years old for category 5 hospitals. There were significant differences among race, where blacks compared to whites would stay on average 0.42 and 0.65 more days for mastectomy and lumpectomy procedures respectively; Hispanics would stay on average 0.68 more days when a mastectomy was performed, and were charged \$5,877 and \$7,185 more on

average for mastectomy and lumpectomy procedures respectively, the latter not being associated to a longer stay. Non-for profit and public hospitals compared to investor hospitals would charge on average less per mastectomy, \$5,137 and \$6,356 respectively; \$5,417 and \$6,145 less per lumpectomy respectively. For mastectomies length of stay and charges were significantly lower for type of health insurance (Medicare 0.26 days and \$4,067; other payer 0.39 days and \$3,953 respectively; only lower charges of care for Medicare \$4,067 and selfpay \$3,349, both not associated to lower length of stay) compared to commercial health insurance. As expected, there were significant increases on length of stay and charges for care associated to severity and type of admission.

Overall, 29% of the variance in length of stay and 28% for charges for mastectomies were explained by the fully controlled model, and 43% of the variance in length of stay and 52% of charges for lumpectomies.

Prostate Cancer:

The ACHA dataset of 2005 had 3,168 radical prostatectomy discharges for prostate cancer as the principal diagnosis. Only 182 of the 278 (65%) hospitals had at least one treatment discharge code for prostate cancer. For these treatment discharges, the hospitals were distributed in the different categories in accordance to the description given in the methods section. The distribution is shown in Table 2: (1) specialized cancer hospital (n=1 hospital; H. Lee Moffitt Cancer Center), (2) general hospital with high volume (n=5 hospitals; Florida Hospital, Cedars Medical Center, West Marion Community Hospital,

Aventura Hospital and Medical Center, Saint Lukes Hospital), (3) general hospital with medium volume (n=13 hospitals; among them, Jackson Memorial Hospital, Tallahassee Memorial Hospital, St. Joseph's Hospital, Morton Plant Hospital, etc), (4) general hospital with low volume (n=12 hospitals), and (5) general hospital with very low volume (n=151 hospitals).

The descriptive characteristics of the sample are described in Table 3.

Mortality Rates: Analyzing the in-hospital mortality for all Florida hospitals that performed at least one radical prostatectomy per year, the probability of dying was 0.03% overall. Only one death occurred at the category 5 hospitals (patient was 70 years old, white, stayed 7 days in the hospital, and had Medicare as health insurance). There were not enough end points to perform any significant statistical test on mortality (Table 3).

Length of Stay: The mean length of stay for all hospitals was 2.68 days for radical prostatectomy. The mean length of stay for radical prostatectomy ranged from 2.46 days for category 1 hospitals to 3.40 days for category 5 hospitals. There was a positive linear relation between category of hospitals and length of stay. Being hospitalized at a specialized cancer hospital was associated with 0.93 fewer days in length of stay, 0.73 fewer days for category 2 hospitals, and 0.26 fewer days for category 3 hospitals compared to category 5 hospitals. Further details are shown on Table 5.

Charges for Care: The mean charges for care for all hospitals where a radical prostatectomy was performed was \$32,301. The mean charges for care for each category were \$25,220, \$35,689, \$28,711, \$32,179, and \$34,530 from

category 1 through category 5 hospitals respectively. Being hospitalized in a specialty cancer hospital was associated with a mean reduction of \$9,301, while being in category 3 hospitals was associated with a \$1,939 mean reduction compared to category 5 hospitals. However, after adjusting the model, only the category 3 hospitals' mean charge of \$774 less was statistically significant (see Table 5).

Table 5. Summary of Outcomes for Prostate Cancer

Variables	Radical Prostatectomy					
	Length of Stay			Charges		
	estimate	p	r ²	estimate	p	r ²
	(days)	< 0.0001	0.33869	(\$)	< 0.0001	0.317561
category		< 0.0001			0.0002	
cat1	-0.93	< 0.0001			0.1288	
cat2	-0.73	< 0.0001			0.2019	
cat3	-0.26	< 0.0001		-774	0.0014	
cat4		0.0638			0.1441	
age		0.1112			0.9003	
black	0.74	< 0.0001		2,074	0.0099	
hispanic	0.47	< 0.0001		4,912	< 0.0001	
race other	0.51	0.0009				
moderate	0.89	< 0.0001		3,922	< 0.0001	
severe	3.31	< 0.0001		26,373	< 0.0001	
critical	11.83	< 0.0001		110,048	< 0.0001	
non-for-profit	0.17	0.0136		-9,236	< 0.0001	
public	-0.35	0.0029		-11,820	< 0.0001	
medicare		0.6061			0.4564	
medicaid		0.1374			0.1948	
selfpay		0.3682			0.2400	
other payer		0.1405		2,675	0.0474	
urgent		0.9619			0.0718	
emergency		0.3342			0.7469	
yes residents	0.16	0.0339		-2,168	0.0008	

Control Variables: Among the variables used to adjust the model the following were significant (see Table 5 for details). The mean age for radical prostatectomy ranged from 59 years old for category 1 hospitals to 62 years old for category 5 hospitals. There were significant differences among race, where

blacks and Hispanics compared to whites would stay on average 0.74 and 0.47 more days respectively for radical prostatectomy; both on average were charged more in the amounts of \$2,074 and \$4,912 respectively; the latter not being associated to a longer stay. Non-for-profit and public hospitals compared to investor hospitals would charge on average less per intervention, \$9,236 and \$11,820 respectively; the former would stay 0.17 more days, and the latter 0.35 less days on average. There were no significant differences among the types of health insurance for length of stay, but other payers compared to commercial health insurance charged on average \$2,675 more per procedure. These 127 patients of the other payer group were distributed as follows: 44 Champus, 2 Veterans Administration, 32 other (example county health program), 45 charity, and 4 other. If the radical prostatectomy was performed where there were residents, the length of stay was extended on average in 0.16 days and charges were on average \$2,168 less. As expected, there were significant increases on length of stay and charges for care associated with severity; for type of admission no significant differences were found.

Overall, 34% of the variance in length of stay and 32% of the variance in charges were explained by the fully controlled model.

Discussion

This study found that there were no in-hospital deaths in Florida for the year 2005 related to mastectomy, lumpectomy or radical prostatectomy interventions for hospitals with 100 or more treatment discharges per year or specialized cancer hospitals. Even though no statistical test was performed, a mortality pattern appeared when the three procedures were merged. One death occurred in a category 3 hospital, one in a category 4 hospital and three in a category 5 hospital. Deaths appeared inversely related to the volume of the procedures performed at the hospital. The age of the two patients who died consequent to a mastectomy at category 5 hospitals that resulted in death (83 and 90 years old) are also noteworthy. It invites the query of whether other options might have existed for these older patients. Also, the overall mortality for these procedures (0.03% for radical prostatectomy, 0.08% for mastectomy and 0.16% for lumpectomy) was inversely related to the complexity of the procedure.

The length of stay after radical prostatectomy for prostate cancer was on average likely to be lower if performed at higher volume hospitals, and substantially so if performed at a specialized cancer hospital. There were no statistically significant findings that specialized cancer centers had different lengths of stay for mastectomy and lumpectomy procedures. Specialized cancer hospitals charged less for mastectomies. These findings are consistent with the

literature that hospitals with higher volumes are generally associated with better outcomes compared to very low volume hospitals, and this study demonstrates that it is valid particularly if performed by specialized cancer hospitals.

Some have suggested that specialized cancer hospitals have higher mortality rates, higher length of stay, and higher charges for care because they might have a more severely ill patient population along with expensive equipment and treatments, and the cost of specialized staff. These data demonstrate that specialized cancer hospitals do not have excess deaths related to the procedures studied, and in fact have shorter lengths of stay for prostate cancer treatment after controlling some aspects of patient severity and other related characteristics, but not TNM. Furthermore, the specialized cancer hospitals category are not different in length of stay for lumpectomies and mastectomies when compared to the other hospitals, and, in fact, charges significantly less for mastectomies, while not different for lumpectomy or radical prostatectomy. And all these findings are without controlling the TNM staging. Why? One plausible explanation is that mortality rates are lower in specialized cancer hospitals because of high volume and specialization which impacts morbidity by fewer complications, along with the exclusive dedication of staff to cancer patients. This includes focused management to cancer without competing with other less deadly diagnosis, and staff not genuinely biased towards better survival diseases. Length of stay also is less, basically due to fewer complications thanks to dedicated staff and the concomitant specialization. And charges for care, also are less, even though the specialized cancer hospitals have higher technology

and updated equipment, perform the latest innovation in cancer treatments, and their staff is specialized with higher stipends associated, so, even though the fixed costs are in fact higher, with high volumes on one side, but essentially a better performance by the staff at the end by less length of stay and less complications, allow these costs to be prorated and the variable costs to be lower.

In regards to the control variables, even though there were no statistical differences for age, there was a pattern for the three procedures; all three had an increase on average age per category, with age lowest for category 1 hospitals and highest for category 5 hospitals. One question that arises from this observation is whether there were not other options to be offered to patients at the category 5 hospitals? Differences among race for length of stay and charges for care were not expected; these were found to be higher for Hispanics and blacks. Plausible explanations could be that these patients have more aggressive or advanced stages of cancer – which is not controlled in this study, or more likely because of socioeconomic and language barriers that require more time of hospitalization to deliver the appropriate care with the concomitant higher charges. As expected non-for-profit and public hospitals charged less on average compared to investor institutions. There were various findings for the variable type of payer or health insurance. One that was worth special attention was “other payers” that charged on average \$2,675 more for radical prostatectomy compared to commercial health insurance; the majority of other payers are from charity, county health programs, and Champus payers. One

possible explanation is that commercial health insurances reimbursed less on average than the other payer fee. As expected, Medicare and Medicaid for mastectomy procedures on average charged less. Other unexpected finding was that Medicaid lumpectomy patients stayed on average almost a day more than their commercial health insurance counterparts. One plausible explanation is the use of a different payment method, for example by arranging fixed pricing regardless of length of stay which is an incentive to not extend the days of hospitalization; or as for the race variable, is that this group delays medical attention with the concomitant major staging of their cancer, or also due to their economic situation, they are held at the hospital for more time because they would not be able to have the appropriate care at home. And finally, hospitals having residents within their staff were found to charge less on average for mastectomy and radical prostatectomy procedures when it was expected the contrary due to higher length of stay to learn from the patients. The plausible explanation is that perhaps the majority of the residents belong to non-for-profit and public hospitals.

The lack of further findings for lumpectomy could reside in the fact that the procedure was easy to perform, no special skills or equipment were required nor the existence of concomitant complications or necessary days of hospitalization, many being possible to be ambulatory; all this said would not relate then to the volume of the hospital. Very similar rationale could apply to mastectomies which has been a procedure performed for many years yielding the learning curve to many physicians independent of which hospital is chosen.

Other positive aspects of specialized cancer hospitals, along with having the same or better outcomes than general hospitals, whether high or very low volumes, is that generally they are associated with positive externalities, such as basic and clinical research, outreach and educational activities, playing a relevant role in prevention and early diagnosis with the ultimate goal of diminishing the mortality and morbidity of cancer as a whole.

There were some methodological limitations of the study. First, this study focused on surgical treatment procedures instead of the comprehensive treatment because radiotherapy and chemotherapy data are collected differently. Second, the TNM staging is not available which is a parameter related to survival and related to type of procedure done. Third, using mortality as an in-hospital outcome is a rare event for mastectomy, lumpectomy and radical prostatectomy. Data should be pooled from several years in order to provide an insight for this easy measure.

The intent of this study is to pursue this same analysis for other cancers such as colorectal, lung and gastric cancer in addition to measure the trends of the last five years. This is to further add evidence that high cancer discharge volume hospitals, preferably specialized cancer hospitals, are a cost efficient model and deliver better outcomes to patients.

References

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Appendices

Appendix A: Florida Hospitals

AHCA ID	Name Hospital	City	County	Beds
103000	A G HOLLEY STATE HOSPITAL	LANTANA	PALM BEACH	100
100250	ALL CHILDREN'S HOSPITAL	SAINT PETERSBURG	PINELLAS	216
100240	ANNE BATES LEACH EYE HOSPITAL	MIAMI	DADE	100
120001	ARNOLD PALMER HOSPITAL FOR CHILDREN & WOMEN	ORLANDO	ORANGE	443
110068	ATLANTIC SHORES HOSPITAL	FORT LAUDERDALE	BROWARD	72
100131	AVENTURA HOSPITAL AND MEDICAL CENTER	AVENTURA	DADE	407
100093	BAPTIST HOSPITAL	PENSACOLA	ESCAMBIA	492
100008	BAPTIST HOSPITAL OF MIAMI	MIAMI	DADE	577
100088	BAPTIST MEDICAL CENTER	JACKSONVILLE	DUVAL	579
100117	BAPTIST MEDICAL CENTER - BEACHES	JACKSONVILLE BEACH	DUVAL	122
100140	BAPTIST MEDICAL CENTER - NASSAU	FERNANDINA BEACH	NASSAU	54
23960052	BAPTIST MEDICAL CENTER SOUTH	JACKSONVILLE	DUVAL	96
100121	BARTOW REGIONAL MEDICAL CENTER	BARTOW	POLK	56
110034	BAY MEDICAL BEHAVIORAL HEALTH CENTER	PANAMA CITY	BAY	90
100026	BAY MEDICAL CENTER	PANAMA CITY	BAY	323
100032	BAYFRONT MEDICAL CENTER	SAINT PETERSBURG	PINELLAS	502
100014	BERT FISH MEDICAL CENTER	NEW SMYRNA BEACH	VOLUSIA	112
100002	BETHESDA MEMORIAL HOSPITAL	BOYNTON BEACH	PALM BEACH	390
100213	BLAKE MEDICAL CENTER	BRADENTON	MANATEE	383
100168	BOCA RATON COMMUNITY HOSPITAL	BOCA RATON	PALM BEACH	394
100243	BRANDON REGIONAL HOSPITAL	BRANDON	HILLSBOROU	327
100184	BROOKS REHABILITATION HOSPITAL	JACKSONVILLE	DUVAL	143
100071	BROOKSVILLE REGIONAL HOSPITAL	BROOKSVILLE	HERNANDO	120
100039	BROWARD GENERAL MEDICAL CENTER	FORT LAUDERDALE	BROWARD	716
100112	CALHOUN-LIBERTY HOSPITAL	BLOUNTSTOWN	CALHOUN	25
100138	CAMPBELLTON-GRACEVILLE HOSPITAL	GRACEVILLE	JACKSON	25
100177	CAPE CANAVERAL HOSPITAL	COCOA BEACH	BREVARD	150
100244	CAPE CORAL HOSPITAL	CAPE CORAL	LEE	281
100254	CAPITAL REGIONAL MEDICAL CENTER	TALLAHASSEE	LEON	198
100009	CEDARS MEDICAL CENTER	MIAMI	DADE	560
100161	CENTRAL FLORIDA REGIONAL HOSPITAL	SANFORD	SEMINOLE	226
100047	CHARLOTTE REGIONAL MEDICAL CENTER	PUNTA GORDA	CHARLOTTE	208
104024	CIRCLES OF CARE, INC.	MELBOURNE	BREVARD	52
100023	CITRUS MEMORIAL HOSPITAL	INVERNESS	CITRUS	198
100056	CLEVELAND CLINIC HOSPITAL	WESTON	BROWARD	150
100234	COLUMBIA HOSPITAL	WEST PALM BEACH	PALM BEACH	250
100191	COMMUNITY HOSPITAL	NEW PORT RICHEY	PASCO	389
100183	CORAL GABLES HOSPITAL	CORAL GABLES	DADE	256
110019	CORAL SPRINGS MEDICAL CENTER	CORAL SPRINGS	BROWARD	200
100258	DELRAY MEDICAL CENTER	DELRAY BEACH	PALM BEACH	403
100150	DEPOO HOSPITAL	KEY WEST	MONROE	49
100175	DESOTO MEMORIAL HOSPITAL	ARCADIA	DESOTO	49
110036	DEVEREUX HOSPITAL & CHILDREN'S CENTER OF FLORIDA	VIERA	BREVARD	100
100020	DOCTORS HOSPITAL INC	CORAL GABLES	DADE	281
100166	DOCTORS HOSPITAL OF SARASOTA	SARASOTA	SARASOTA	168
100078	DOCTORS MEMORIAL HOSPITAL	BONIFAY	HOLMES	25
100106	DOCTORS' MEMORIAL HOSPITAL, INC.	PERRY	TAYLOR	48
100197	DOUGLAS GARDENS HOSPITAL	MIAMI	DADE	32
110044	EASTSIDE PSYCHIATRIC HOSPITAL	TALLAHASSEE	LEON	24
100134	ED FRASER MEMORIAL HOSPITAL	MACCLENNY	BAKER	25
100239	EDWARD WHITE HOSPITAL	SAINT PETERSBURG	PINELLAS	167
110004	ENGLEWOOD COMMUNITY HOSPITAL	ENGLEWOOD	SARASOTA	100
110035	FAMILY, THE	SUNRISE	BROWARD	100
100236	FAWCETT MEMORIAL HOSPITAL	PORT CHARLOTTE	CHARLOTTE	238
100024	FISHERMEN'S HOSPITAL	MARATHON	MONROE	58
100219	FLAGLER HOSPITAL	SAINT AUGUSTINE	ST. JOHNS	316
100007	FLORIDA HOSPITAL	ORLANDO	ORANGE	892
100068	FLORIDA HOSPITAL - OCEANSIDE	ORMOND BEACH	VOLUSIA	119
100169	FLORIDA HOSPITAL - ORMOND MEMORIAL	ORMOND BEACH	VOLUSIA	205
120004	FLORIDA HOSPITAL ALTAMONTE	ALTAMONTE SPRINGS	SEMINOLE	258
120003	FLORIDA HOSPITAL APOPKA	APOPKA	ORANGE	50
23960017	FLORIDA HOSPITAL CELEBRATION HEALTH	CELEBRATION	OSCEOLA	112

Appendix A: (Continued)

AHCA ID	Name Hospital	City	County	Beds
100045	FLORIDA HOSPITAL DELAND	DELAND	VOLUSIA	156
100021	FLORIDA HOSPITAL EAST ORLANDO	ORLANDO	ORANGE	144
100072	FLORIDA HOSPITAL FISH MEMORIAL	ORANGE CITY	VOLUSIA	139
100118	FLORIDA HOSPITAL FLAGLER	PALM COAST	FLAGLER	81
100109	FLORIDA HOSPITAL HEARTLAND MEDICAL CENTER	SEBRING	HIGHLANDS	159
100089	FLORIDA HOSPITAL KISSIMMEE	KISSIMMEE	OSCEOLA	60
120013	FLORIDA HOSPITAL LAKE PLACID	LAKE PLACID	HIGHLANDS	50
100057	FLORIDA HOSPITAL WATERMAN	TAVARES	LAKE	204
100282	FLORIDA HOSPITAL WAUCHULA	WAUCHULA	HARDEE	25
100046	FLORIDA HOSPITAL ZEPHYRHILLS INC	ZEPHYRHILLS	PASCO	154
100210	FLORIDA MEDICAL CENTER	LAUDERDALE LAKES	BROWARD	459
104000	FLORIDA STATE HOSPITAL	CHATTAHOOCHEE	GADSDEN	2007
104026	FORT LAUDERDALE HOSPITAL	FORT LAUDERDALE	BROWARD	100
100223	FORT WALTON BEACH MEDICAL CENTER	FORT WALTON BEACH	OKALOOSA	247
100153	GEORGE E. WEEEMS MEMORIAL HOSPITAL	APALACHICOLA	FRANKLIN	25
100130	GLADES GENERAL HOSPITAL	BELLE GLADE	PALM BEACH	73
110403	GOOD SAMARITAN MEDICAL CENTER	WEST PALM BEACH	PALM BEACH	333
110003	GULF BREEZE HOSPITAL	GULF BREEZE	SANTA ROSA	65
111522	GULF COAST HOSPITAL	FORT MYERS	LEE	120
100242	GULF COAST MEDICAL CENTER	PANAMA CITY	BAY	176
111520	GULF COAST TREATMENT CENTER	FORT WALTON BEACH	OKALOOSA	24
110009	H LEE MOFFITT CANCER CTR & RESEARCH INSTITUTE HOSPITAL	TAMPA	HILLSBOROU	162
100017	HALIFAX MEDICAL CENTER	DAYTONA BEACH	VOLUSIA	734
110016	HALIFAX PSYCHIATRIC CENTER-NORTH	DAYTONA BEACH	VOLUSIA	30
100030	HEALTH CENTRAL	OCOOE	ORANGE	171
100081	HEALTHMARK REGIONAL MEDICAL CENTER	DEFUNIAK SPRINGS	WALTON	50
120005	HEALTHPARK MEDICAL CENTER	FORT MYERS	LEE	362
23960013	HEALTHSOUTH EMERALD COAST REHABILITATION HOSPITAL	PANAMA CITY	BAY	75
103038	HEALTHSOUTH REHAB HOSPITAL	MIAMI	DADE	60
110045	HEALTHSOUTH REHABILITATION HOSPITAL	LARGO	PINELLAS	70
110013	HEALTHSOUTH REHABILITATION HOSPITAL OF SARASOTA	SARASOTA	SARASOTA	76
23960042	HEALTHSOUTH REHABILITATION HOSPITAL OF SPRING HILL	BROOKSVILLE	HERNANDO	60
110021	HEALTHSOUTH REHABILITATION HOSPITAL OF TALLAHASSEE	TALLAHASSEE	LEON	76
23960049	HEALTHSOUTH RIDGELAKE HOSPITAL	SARASOTA	SARASOTA	40
110027	HEALTHSOUTH SEA PINES REHABILITATION HOSPITAL	MELBOURNE	BREVARD	90
103028	HEALTHSOUTH SUNRISE REHAB HOSPITAL	SUNRISE	BROWARD	126
110017	HEALTHSOUTH TREASURE COAST REHABILITATION HOSPITAL	VERO BEACH	INDIAN RIV	90
100137	HEART OF FLORIDA REGIONAL MEDICAL CENTER	DAVENPORT	POLK	142
100055	HELEN ELLIS MEMORIAL HOSPITAL	TARPON SPRINGS	PINELLAS	168
100098	HENDRY REGIONAL MEDICAL CENTER	CLEWISTON	HENDRY	25
100053	HIALEAH HOSPITAL	HIALEAH	DADE	378
100049	HIGHLANDS REGIONAL MEDICAL CENTER	SEBRING	HIGHLANDS	126
100225	HOLLYWOOD MEDICAL CENTER	HOLLYWOOD	BROWARD	324
104015	HOLLYWOOD PAVILION	HOLLYWOOD	BROWARD	46
100019	HOLMES REGIONAL MEDICAL CENTER	MELBOURNE	BREVARD	514
100073	HOLY CROSS HOSPITAL, INC.	FORT LAUDERDALE	BROWARD	571
100125	HOMESTEAD HOSPITAL	HOMESTEAD	DADE	120
100200	IMPERIAL POINT MEDICAL CENTER	FORT LAUDERDALE	BROWARD	204
100105	INDIAN RIVER MEMORIAL HOSPITAL	VERO BEACH	INDIAN RIV	335
100142	JACKSON HOSPITAL	MARIANNA	JACKSON	100
100022	JACKSON MEMORIAL HOSPITAL	MIAMI	DADE	1498
120008	JACKSON MEMORIAL HOSPITAL-NORTH	MIAMI	DADE	60
100208	JACKSON SOUTH COMMUNITY HOSPITAL	MIAMI	DADE	199
100048	JAY HOSPITAL	JAY	SANTA ROSA	55
100080	JFK MEDICAL CENTER	ATLANTIS	PALM BEACH	424
100253	JUPITER MEDICAL CENTER	JUPITER	PALM BEACH	156
100209	KENDALL REGIONAL MEDICAL CENTER	MIAMI	DADE	412
23960011	KINDRED HOSP-BAY AREA-ST PETERSBURG	SAINT PETERSBURG	PINELLAS	82
23960060	KINDRED HOSPITAL OCALA	OCALA	MARION	31
100152	KINDRED HOSPITAL SOUTH FLORIDA CORAL GABLES	CORAL GABLES	DADE	53

Appendix A: (Continued)

AHCA ID	Name Hospital	City	County	Beds
100115	KINDRED HOSPITAL-BAY AREA-TAMPA	TAMPA	HILLSBOROU	73
100143	KINDRED HOSPITAL-CENTRAL TAMPA	TAMPA	HILLSBOROU	102
100016	KINDRED HOSPITAL-NORTH FLORIDA	GREEN COVE SPRINGS	CLAY	60
100120	KINDRED HOSP-SO.FLA-FT LAUDERDALE	FORT LAUDERDALE	BROWARD	70
100042	KINDRED HOSP-SOUTH FLORIDA-HOLLYWOOD	HOLLYWOOD	BROWARD	124
110051	LA AMISTAD RESIDENTIAL TREATMENT CENTER	MAITLAND	ORANGE	40
100241	LAKE BUTLER HOSPITAL HAND SURGERY CENTER	LAKE BUTLER	UNION	25
100156	LAKE CITY MEDICAL CENTER	LAKE CITY	COLUMBIA	67
100099	LAKE WALES MEDICAL CENTER	LAKE WALES	POLK	154
100157	LAKELAND REGIONAL MEDICAL CENTER	LAKELAND	POLK	851
100129	LAKESIDE BEHAVIORAL HEALTHCARE, INC	ORLANDO	ORANGE	56
111526	LAKEVIEW CENTER IRTP (MERIDIAN)	PENSACOLA	ESCAMBIA	16
23960046	LAKEWOOD RANCH MEDICAL CENTER	BRADENTON	MANATEE	120
100248	LARGO MEDICAL CENTER	LARGO	PINELLAS	256
100181	LARKIN COMMUNITY HOSPITAL	SOUTH MIAMI	DADE	130
100246	LAWNWOOD REGIONAL MEDICAL CENTER & HEART INSTITUTE	FORT PIERCE	ST. LUCIE	341
100012	LEE MEMORIAL HOSPITAL	FORT MYERS	LEE	427
100084	LEESBURG REGIONAL MEDICAL CENTER	LEESBURG	LAKE	294
100214	LEESBURG REGIONAL MEDICAL CENTER-NORTH	LEESBURG	LAKE	15
100107	LEHIGH REGIONAL MEDICAL CENTER	LEHIGH ACRES	LEE	88
104018	LIFESTREAM BEHAVIORAL CENTER	LEESBURG	LAKE	40
100195	LOWER KEYS MEDICAL CENTER	KEY WEST	MONROE	118
100004	MADISON COUNTY MEMORIAL HOSPITAL	MADISON	MADISON	25
110028	MANATEE GLENS HOSPITAL	BRADENTON	MANATEE	27
100035	MANATEE MEMORIAL HOSPITAL	BRADENTON	MANATEE	319
110049	MANATEE PALMS YOUTH SERVICES	BRADENTON	MANATEE	60
100160	MARINERS HOSPITAL	TAVERNIER	MONROE	42
120009	MARTIN MEMORIAL HOSPITAL SOUTH	STUART	MARTIN	100
100044	MARTIN MEMORIAL MEDICAL CENTER	STUART	MARTIN	244
110001	MEASE COUNTRYSIDE HOSPITAL	SAFETY HARBOR	PINELLAS	300
100043	MEASE DUNEDIN HOSPITAL	DUNEDIN	PINELLAS	173
100179	MEMORIAL HOSPITAL JACKSONVILLE	JACKSONVILLE	DUVAL	353
23960050	MEMORIAL HOSPITAL MIRAMAR	MIRAMAR	BROWARD	128
100206	MEMORIAL HOSPITAL OF TAMPA	TAMPA	HILLSBOROU	180
100230	MEMORIAL HOSPITAL PEMBROKE	PEMBROKE PINES	BROWARD	301
111527	MEMORIAL HOSPITAL WEST	PEMBROKE PINES	BROWARD	299
100038	MEMORIAL REGIONAL HOSPITAL	HOLLYWOOD	BROWARD	690
100061	MERCY HOSPITAL INC.	MIAMI	DADE	483
110199	MIAMI CHILDREN'S HOSPITAL	MIAMI	DADE	275
100127	MORTON PLANT HOSPITAL	CLEARWATER	PINELLAS	687
100063	MORTON PLANT NORTH BAY HOSPITAL	NEW PORT RICHEY	PASCO	122
100034	MOUNT SINAI MEDICAL CENTER	MIAMI BEACH	DADE	955
100062	MUNROE REGIONAL MEDICAL CENTER	OCALA	MARION	421
100018	NAPLES COMMUNITY HOSPITAL	NAPLES	COLLIER	420
100139	NATURE COAST REGIONAL HOSPITAL	WILLISTON	LEVY	40
100086	NORTH BROWARD MEDICAL CENTER	POMPANNO BEACH	BROWARD	409
120006	NORTH COLLIER HOSPITAL	NAPLES	COLLIER	128
100204	NORTH FLORIDA REGIONAL MEDICAL CENTER	GAINESVILLE	ALACHUA	278
100122	NORTH OKALOOSA MEDICAL CENTER	CRESTVIEW	OKALOOSA	110
100237	NORTH RIDGE MEDICAL CENTER	FORT LAUDERDALE	BROWARD	332
100029	NORTH SHORE MEDICAL CENTER	MIAMI	DADE	357
104007	NORTHEAST FLORIDA STATE HOSPITAL	MACCLENNY	BAKER	1138
100238	NORTHSIDE HOSPITAL	SAINT PETERSBURG	PINELLAS	288
100147	NORTHWEST FLORIDA COMMUNITY HOSPITAL	CHIPLEY	WASHINGTON	59
100189	NORTHWEST MEDICAL CENTER	MARGATE	BROWARD	215
100264	OAK HILL HOSPITAL	BROOKSVILLE	HERNANDO	204
104008	OAKWOOD CENTER OF THE PALM BEACHES, INC.	WEST PALM BEACH	PALM BEACH	44
100212	OCALA REGIONAL MEDICAL CENTER	OCALA	MARION	200
100226	ORANGE PARK MEDICAL CENTER	ORANGE PARK	CLAY	230
100221	ORLANDO REGIONAL LUCERNE HOSPITAL	ORLANDO	ORANGE	209
100006	ORLANDO REGIONAL MEDICAL CENTER	ORLANDO	ORANGE	581
120002	ORLANDO REGIONAL SAND LAKE HOSPITAL	ORLANDO	ORANGE	153

Appendix A: (Continued)

AHCA ID	Name Hospital	City	County	Beds
100263	ORLANDO REGIONAL SOUTH SEMINOLE HOSPITAL	LONGWOOD	SEMINOLE	206
100110	OSCEOLA REGIONAL MEDICAL CENTER	KISSIMMEE	OSCEOLA	235
120007	PALM BAY COMMUNITY HOSPITAL	MELBOURNE	BREVARD	60
100176	PALM BEACH GARDENS MEDICAL CENTER	PALM BEACH GARDENS	PALM BEACH	199
100050	PALM SPRINGS GENERAL HOSPITAL	HIALEAH	DADE	247
100187	PALMETTO GENERAL HOSPITAL	HIALEAH	DADE	360
100126	PALMS OF PASADENA HOSPITAL	SAINT PETERSBURG	PINELLAS	307
110006	PALMS WEST HOSPITAL	LOXAHATCHEE	PALM BEACH	175
100076	PAN AMERICAN HOSPITAL	MIAMI	DADE	146
100114	PARKWAY REGIONAL MEDICAL CENTER	NORTH MIAMI BEACH	DADE	382
100028	PARRISH MEDICAL CENTER	TITUSVILLE	BREVARD	210
100211	PASCO REGIONAL MEDICAL CENTER	DADE CITY	PASCO	120
100077	PEACE RIVER REGIONAL MEDICAL CENTER	PORT CHARLOTTE	CHARLOTTE	212
23960025	PHYSICIANS REGIONAL MEDICAL CENTER	NAPLES	COLLIER	83
110014	PINECREST REHABILITATION HOSPITAL	DELRAY BEACH	PALM BEACH	90
100167	PLANTATION GENERAL HOSPITAL	PLANTATION	BROWARD	264
110022	PORT SAINT LUCIE HOSPITAL	PORT SAINT LUCIE	ST. LUCIE	75
100232	PUTNAM COMMUNITY MEDICAL CENTER	PALATKA	PUTNAM	141
100252	RAULERSON HOSPITAL	OKEECHOBEE	OKEECHOBEE	100
110183	RECEPTION AND MEDICAL CENTER HOSPITAL	LAKE BUTLER	UNION	153
120010	REGENCY MEDICAL CENTER	WINTER HAVEN	POLK	61
100256	REGIONAL MEDICAL CENTER BAYONET POINT	HUDSON	PASCO	290
100025	SACRED HEART HOSPITAL	PENSACOLA	ESCAMBIA	449
23960041	SACRED HEART HOSPITAL ON THE EMERALD COAST	DESTIN	WALTON	50
100067	SAINT ANTHONY'S HOSPITAL	SAINT PETERSBURG	PINELLAS	395
100260	SAINT LUCIE MEDICAL CENTER	PORT SAINT LUCIE	ST. LUCIE	194
100151	SAINT LUKE'S HOSPITAL	JACKSONVILLE	DUVAL	313
100010	SAINT MARY'S MEDICAL CENTER	WEST PALM BEACH	PALM BEACH	460
100040	SAINT VINCENT'S MEDICAL CENTER	JACKSONVILLE	DUVAL	528
110055	SANDYPINES	TEQUESTA	PALM BEACH	80
100124	SANTA ROSA MEDICAL CENTER	MILTON	SANTA ROSA	129
100087	SARASOTA MEMORIAL HOSPITAL	SARASOTA	SARASOTA	826
100217	SEBASTIAN RIVER MEDICAL CENTER	SEBASTIAN	INDIAN RIV	129
23960043	SELECT SPECIALTY HOSPITAL- ORLANDO INC	ORLANDO	ORANGE	35
23960045	SELECT SPECIALTY HOSPITAL- PANAMA CITY, INC.	PANAMA CITY	BAY	30
23960028	SELECT SPECIALTY HOSPITAL-MIAMI, INC	MIAMI	DADE	40
100249	SEVEN RIVERS REGIONAL MEDICAL CENTER	CRYSTAL RIVER	CITRUS	128
100082	SHANDS AT AGH	GAINESVILLE	ALACHUA	367
100102	SHANDS AT LAKE SHORE	LAKE CITY	COLUMBIA	99
100146	SHANDS AT LIVE OAK	LIVE OAK	SUWANNEE	15
100103	SHANDS AT STARKE	STARKE	BRADFORD	25
120011	SHANDS AT VISTA	GAINESVILLE	ALACHUA	81
100113	SHANDS HOSPITAL AT THE UNIV. OF FLORIDA	GAINESVILLE	ALACHUA	632
100001	SHANDS JACKSONVILLE MEDICAL CENTER	JACKSONVILLE	DUVAL	696
110025	SHANDS REHAB HOSPITAL	GAINESVILLE	ALACHUA	40
110012	SHRINERS HOSPITAL FOR CHILDREN-TAMPA UNIT	TAMPA	HILLSBOROU	60
23960044	SISTER EMMANUEL HOSPITAL FOR CONTINUING CARE	MIAMI	DADE	29
100259	SOUTH BAY HOSPITAL	SUN CITY CENTER	HILLSBOROU	112
100172	SOUTH BEACH COMMUNITY HOSPITAL	MIAMI BEACH	DADE	196
100132	SOUTH FLORIDA BAPTIST HOSPITAL	PLANT CITY	HILLSBOROU	147
120014	SOUTH FLORIDA EVALUATION AND TREATMENT CENTER	MIAMI	DADE	200
104001	SOUTH FLORIDA STATE HOSPITAL	PEMBROKE PINES	BROWARD	350
100051	SOUTH LAKE HOSPITAL	CLERMONT	LAKE	104
100154	SOUTH MIAMI HOSPITAL	SOUTH MIAMI	DADE	445
110040	SOUTHERN WINDS HOSPITAL	HIALEAH	DADE	72
100220	SOUTHWEST FLORIDA REGIONAL MEDICAL CENTER	FORT MYERS	LEE	400
100196	SPECIALTY HOSPITAL JACKSONVILLE	JACKSONVILLE	DUVAL	107
111525	SPRING HILL REGIONAL HOSPITAL	SPRING HILL	HERNANDO	124
110054	SPRINGBROOK HOSPITAL	BROOKSVILLE	HERNANDO	60
103027	ST ANTHONY'S REHABILITATION HOSPITAL	FORT LAUDERDALE	BROWARD	26

Appendix A: (Continued)

AHCA ID	Name Hospital	City	County	Beds
103004	ST CATHERINE'S REHABILITATION HOSPITAL	NORTH MIAMI	DADE	60
100074	ST CLOUD REGIONAL MEDICAL CENTER	SAINT CLOUD	OSCEOLA	84
100075	ST JOSEPH'S HOSPITAL, INC.	TAMPA	HILLSBOROU	883
100180	ST PETERSBURG GENERAL HOSPITAL	SAINT PETERSBURG	PINELLAS	219
100015	SUN COAST HOSPITAL	LARGO	PINELLAS	200
100135	TALLAHASSEE MEMORIAL HOSPITAL	TALLAHASSEE	LEON	770
100128	TAMPA GENERAL HOSPITAL	TAMPA	HILLSBOROU	877
104016	TEN BROECK HOSPITAL	JACKSONVILLE	DUVAL	99
23960047	THE CENTERS INC	OCALA	MARION	15
100255	TOWN & COUNTRY HOSPITAL	TAMPA	HILLSBOROU	201
100108	TRINITY COMMUNITY HOSPITAL	JASPER	HAMILTON	42
100054	TWIN CITIES HOSPITAL	NICEVILLE	OKALOOSA	65
110047	UNIVERSITY BEHAVIORAL CENTER	ORLANDO	ORANGE	104
100173	UNIVERSITY COMMUNITY HOSPITAL	TAMPA	HILLSBOROU	465
100069	UNIVERSITY COMMUNITY HOSPITAL AT CARROLLWOOD	TAMPA	HILLSBOROU	120
100224	UNIVERSITY HOSPITAL AND MEDICAL CENTER	TAMARAC	BROWARD	317
100079	UNIVERSITY OF MIAMI HOSPITAL AND CLINICS	MIAMI	DADE	40
100070	VENICE REGIONAL MEDICAL CENTER	VENICE	SARASOTA	312
23960032	VILLAGES REGIONAL HOSPITAL, THE	THE VILLAGES	SUMTER	60
23960061	WEKIVA SPRINGS CENTER FOR WOMEN	JACKSONVILLE	DUVAL	20
110010	WELLINGTON REGIONAL MEDICAL CENTER	WEST PALM BEACH	PALM BEACH	143
110008	WEST BOCA MEDICAL CENTER	BOCA RATON	PALM BEACH	185
104027	WEST FLORIDA COMMUNITY CARE CENTER	MILTON	SANTA ROSA	100
100231	WEST FLORIDA HOSPITAL	PENSACOLA	ESCAMBIA	531
110041	WEST GABLES REHABILITATION HOSPITAL	MIAMI	DADE	60
23960039	WEST MARION COMMUNITY HOSPITAL	OCALA	MARION	70
100165	WESTCHESTER GENERAL HOSPITAL	MIAMI	DADE	125
100228	WESTSIDE REGIONAL MEDICAL CENTER	PLANTATION	BROWARD	224
110043	WILLOUGH AT NAPLES, THE	NAPLES	COLLIER	42
104017	WINDMOOR HEALTHCARE OF CLEARWATER	CLEARWATER	PINELLAS	100
100052	WINTER HAVEN HOSPITAL	WINTER HAVEN	POLK	466
100162	WINTER PARK MEMORIAL HOSPITAL	WINTER PARK	ORANGE	297
23960034	WUESTHOFF MEDICAL CENTER - MELBOURNE	MELBOURNE	BREVARD	115
100092	WUESTHOFF MEDICAL CENTER-ROCKLEDGE	ROCKLEDGE	BREVARD	267