

The Association of Uncompensated Care with Profitability
in Washington State Hospitals from 2000 to 2004

By

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the graduate thesis of JAE YOUNG CHOI find it satisfactory and recommend that it be accepted.

Chair

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Abstract

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Although the issue of uncompensated care has been affluently discussed and documented, there has been little discussion of the association of the types of hospital-based uncompensated care (charity care and bad debt) and profitability. The aim of this study is to examine the association of charity care and bad debt with hospitals' profitability.

This study posits that uncompensated care is not significantly associated with profitability. As sub hypotheses, this study posits that (1) bad debt is not significantly associated with profitability and (2) charity care is not significantly associated with profitability. This study tests the hypotheses with 2004 data on 85 of the Washington acute care hospitals using two measures of profitability. To test the hypotheses, this study uses an ordinary least square (OLS) regression.

Though the findings of this study revealed no evidence of a statistically significant association at the general level of uncompensated care with profitability for all hospital groups, this study revealed a statistically significant negative association of

uncompensated care with profitability for non-teaching public hospitals. Meanwhile, this study found a positive relationship between charity care and profitability and a negative relationship between bad debt and profitability for all Washington hospitals. In addition, this study also found that ownership types and teaching status seem to alter those associations. Detailed results about the how ownership types and teaching status alter the association of types of uncompensated care with profitability are discussed. Policy implications from these findings are also presented.

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CHAPTER I: INTRODUCTION/SIGNIFICANCE OF STUDY

This chapter is divided into two parts. Section one will launch discussion concerning the uncompensated care provided by hospitals. Section two will confer the need for conducting this study.

INTRODUCTION

In 2004, the costs of uncompensated care are estimated to be approximately \$41 billion (Kaiser Commission on Medicaid and the Uninsured, 2006). Uncompensated care is defined as the sum of charity care, which the hospital does not anticipate payment, and bad debt, which it attempts to collect payment (Weissman, 2005). Federal spending constitutes 58% of the total funds available to support uncompensated care received by uninsured people (Hadley and Holahan, 2004). Between 2001 and 2004, the federal safety net spending increased by 15.4%, while total federal health care spending increased by 23% (Hadley, Cravens, Coughlin, & Holahan, 2005). While the number of uninsured increased by approximately 5 million people during the same period, federal safety net spending per uninsured person actually decreased by 8.9% over the period (Hadley, Cravens, Coughlin, & Holahan, 2005).

The uninsured in the United States tend to rely on medical providers to supply free or reduced fee care, literally uncompensated care, to meet their medical needs. Though hospitals are not the only providers of health care to the indigent, they are generally considered as the crucial provider of care to the population (Hogeland, 1988; Lewin, Eckels, & Miller, 1988; Pincus, 1988; Zollinger, Saywell, Chu, & Zieger, 1991). Hadley and Holahan (2004) found that nationally, the majority of uncompensated care provided

to the uninsured (63%) occurs in hospitals, for both inpatient and outpatient care. The uninsured pay for approximately 35% of the cost of care provided to them, and the remaining 65% of the cost of care provided to the uninsured is considered partially or fully “uncompensated care” (Hadley and Holahan, 2003).

A substantial body of research has shown that compared with those with either private or governmental insurance, poor, uninsured persons are likely to receive fewer health services, to delay seeking needed care (Ayanian et al., 2000; Schroeder, 2001; Strunk & Cunningham, 2004), and to require avoidable hospitalizations and emergency room visits (Blewett, Davidson, Brown, & Maude-Griffin, 2003; Weissman, Dryfoos, & London, 1999). The federal Emergency Medical Treatment and Active Labor Act of 1986 (EMTALA) generally requires hospital emergency room to treat patients with emergency conditions and stabilize them prior to transferring, regardless of ability to pay (State of Washington Office of Financial Management, 2004).

SIGNIFICANCE OF STUDY

Assuring the health care of indigent patients continues to evoke concern, especially in the context of the viability of safety-net hospitals (Weissman et al, 2003). Historically, U.S. hospitals have engaged in internal cross-subsidization, using surpluses obtained from more wealthy patients, patronage, or government to cover the costs of services for which they were not paid (Vladeck, 2006). However, market competition has augmented over the past decade, and most of the privately insured patients in the 1980s are now members of managed care organizations that use their market power to negotiate considerable discounts from hospital charges (Rosko, 2004). Managed care organizations

are negotiating harsh deals with hospitals, which led to constrained payment growth and declining private sector payment-to-cost ratios (Bazzoli & Kang & Hasnain-Wynia & Lindrooth, 2005).

Becker and Potter (2002) found organizational efficiency and social responsibility seem to be inversely related. The ability of community hospitals to provide uncompensated care will become progressively more hampered (Mirvis, 2000). It brings out growing concern the weakened financial condition of hospitals that provide a huge amount of uncompensated care will lead to erosion of essential safety net providers (Blewett, Davidson, Brown, & Maude-Griffin, 2003). There is a considerable controversy over not only the overall health care sector but also the hospital sector that there are not large accompanying increases in the amount of uncompensated hospital care relative to the amount of care provided in hospitals (Cunningham & Tu, 1997; Mann, Melnick, Bamezai, & Zwanziger, 1997).

According to GAO (2005), the uncompensated care burden is not evenly distributed; rather it is concentrated in a small number of hospitals. One recent study, which examined hospitals' changing contribution in the safety net between 1996 and 2002, found that non-safety-net hospitals truncated certain services commonly used by the indigent patients (Bazzoli, Kang, Hasnain-Wynia & Lindrooth, 2005). When cost of uncompensated care reaches a level that makes it a substantial portion of a hospital's business, it may become a financial burden (Wissman, 1996).

The percentage of uninsured people in Washington escalated from 10.4% in 1991 to 15.5% in 2003 (U.S. Census Bureau, 2005). Uncompensated care provided by hospitals

in the State of Washington totaled \$159 million, and the bad debt component totaled \$257 million in 2002 (State of Washington Office of Financial Management, 2004).

As hospitals struggle to remain competitive and financially viable, their ability to continue to make decisions consistent with societal accountability may be fatally in jeopardy (Harrison and Sexton, 2004). Presumably, these hospitals eventually may be forced to close or reduce the amount of uncompensated care they have provided. Consequently, it is foreseeable that the hospitals' communities will be worse off.

The problem to be examined is whether the uncompensated hospital care consisting of charity care and bad debt has exacerbated acute care hospitals' profitability in the State of Washington from 2000 to 2004. The findings from the precise observation of the association between provision of uncompensated care and hospitals' profitability statewide should be of value for the community, hospital executives, payers, and researchers. Particularly, the result of this study will be valuable to state policy makers in their decision making for the optimum distribution of limited state health care resources to ensure that indigent patients have access to care.

CHAPTER II: LITERATURE REVIEW

The first section will describe methodology used in conducting the literature search. The second section will examine briefly uncompensated care and sources of financing for uncompensated care. The third section will explore the following determinants of uncompensated care: (1) patient characteristic, and (2) hospital specific characteristic. Hospital specific characteristic will include more specifically the following factors: (1) ownership, (2) payer mix, (3) hospital size, (4) staff efficiency, and (5) occupancy rate. The fourth section will examine the income effect. The final section will examine empirical studies concerning financial impact of uncompensated care. Each of these sections offers different perspectives on uncompensated care and as a result provides a wealth of valuable information to this study.

Methodology Used in Conducting Literature Search

The duration of the literature research spanned from October, 2005 to April, 2006 and the literature research encompassed professional and peer-reviewed literature obtained from the following sources:

- PubMed and Medline
- ProQuest
- online resources (The Kaiser Family Foundation, Health Affairs, The Urban Institute, and Center for Studying Health System Change)
- healthcare financial textbooks
- industry financial benchmark book

Of the approximately 227 total citations identified, 110 of them were determined to be relevant to this study, and 88 of them ultimately were included in this study.

The following inclusion criteria were used to determine relevancy: key constructs of this study: uncompensated care (charity care and bad debt), profitability; source reliability (professional and peer-reviewed literature); reliable online sources; publication date of material in terms of financial benchmarks (between year of 2000 and 2004); publications whose study topic is different but have relevant measures with this study; and United States population-based publications.

The following exclusion criteria were used to determine exclusion: unreliable source (non-professional literature), non-professional online sources; out-of-date publications in terms of financial benchmarks (prior to year of 2000); quarterly financial benchmark publications; publications that provided unmatched key words; publications that included dependent or independent variables that this study considered but finally did not employ (eg. those articles pertaining to financial solvency); explanatory and preliminary publications; international population-based publications.

Key search terms included uncompensated care, charity care, bad debt, safety net hospitals, uninsured, low income uninsured, profitability, operating margin, total margin, length of stay, occupancy rate, labor intensity, length of stay, outpatient services, Medicare, Medicaid, Disproportionate Share Hospital Payment (DSH payment), Medicaid DSH payment, Medicare DSH payment.

Uncompensated care

U.S. hospitals provide approximately \$30 billion annually in uncompensated care (Vladeck, 2006). Uncompensated care is defined as the sum of charity care and bad debt (Weissman, 2005). Charity care is the amount hospitals spend to provide services for which no payment is expected; bad debt is the amount hospitals spend to provide services for which they expect to be paid in full but collect only partial or no payment (Desai, Lukas, & Young, 2000). A study found a statistically significant positive relationship exists between the amount of charity care per bed and the percentage of bad debt expense to the total operating expense (Kwon, Stoeberl, Martin, & Bae, 1999). However, hospitals have improperly distinguished bad debt costs and charity care costs (Kwon, Stoeberl, Martin, & Bae; Magnus, Smith, Wheeler, 2004; PricewaterhouseCoopers' Health Research Institute, 2005; Weissmann, Dryfoos, & London, 1999). Health Financial Management Association (HFMA) (1997) noted the necessity to differentiate charity service from bad debts as follows:

“Charity service represents the consumption of valuable resources that must be managed wisely; charity service is one of the important indicators of the fulfillment of an organization’s charitable purposes and, therefore, should be clearly identified and disclosed; provider eligibility for certain financial assistance is dependent on identification of charity service; and bad debt expense is a measure of the effectiveness of the organization’s credit and collection process.” (chap. 1.)

Uncompensated care also contains the costs incurred by non-indigent patients who do not pay their bills (Weissmann, Dryfoos, & London, 1999). One study examining

Massachusetts hospitals through a descriptive study, reported 73% of the total bad debt case was covered by some form of insurance (Weissmann, Van De Lucas, & Epstein, 1992).

Meanwhile, Mirvis (2000) explained two mechanisms by which U.S. hospitals have been required to provide uncompensated care as follows: “hospitals which received federal funds for capital improvement under the Hill Burton Act are required to provide a defined amount of uncompensated care for 20 years from the opening date and maintaining tax exempt status requires hospitals to provide uncompensated care.”

The State of Washington’s charity care law ensures access to free hospital care for urgent medical needs for people with incomes up to 100% of the federal level (FPL, e.g., \$18,850 for a family of 4 in 2004); and a sliding scale discount for those with incomes up to 200% FPL (Revised Code of Washington Section 70.170.060., 1989).

Sources of Financing for Uncompensated Care

Hospitals may receive direct payments from several government sources to help cover their un-reimbursed costs (GAO, 2005). For instance, hospitals that serve a large number of poor Medicare and Medicaid patients receive supplementary Medicare and Medicaid payments as disproportionate share (DSH) funds (Mirvis, 2000).

(1) Medicaid DSH payment

The Medicaid DSH program was designed to provide financial aid to safety net hospitals in 1981 (Hadley, Cravens, Coughlin, and Holahan, 2005). The Social Security Act Statue 1923 requires state to designate as disproportionate share hospitals meeting

the following criteria: “(1) the hospital's Medicaid inpatient utilization rate is at least one standard deviation above the mean Medicaid inpatient utilization rate for hospitals receiving Medicaid payments in the State; or (2) the hospital's low-income utilization rate exceeds 25 percent”.

Each state generally determines whether hospitals are qualified for the DSH funds, and the amount of additional payments made to each facility is also established by each state (Rousseau and Schneider, 2004). It has become a controversial issue that some states have used DSH funds to finance other health-related or non-health related expenses, rather than using these federal funds as Congress intended (Coughlin, Bruen, and Brian, 2004). Medicaid made an estimated \$17 billion in DSH payment to hospitals in fiscal 2004 (Hadley, Cravens, Coughlin, & Holahan, 2005).

(2) Medicare DSH payment

The Medicare DSH payment is an adjustment to the DRG payment for inpatient hospital services furnished by acute care hospitals (Wynn, Coughlin, Bondarenko, & Bruen, 2002). Medicare DSH's contribution to safety net financing is not as significant as Medicaid DSH payment (Regenstein and Huang, 2005). The DSH adjustment depends on the hospital's disproportionate patient percentage (DPP), which is based on two ratios: 1) the proportion of Medicare inpatient days accounted for by beneficiaries who are eligible for Supplemental Security Income and 2) the proportion of all inpatient days accounted for by people covered by Medicaid (Hadley and Holahan, 2003). Hospitals received an estimated \$7.4 billion in DSH payments in fiscal 2004 (Hadley, Cravens, Coughlin, & Holahan, 2005).

The State of Washington Medical Assistance Administration ensures each hospital's total DSH payments do not exceed the individual hospital's DSH limit defined as:

- (a) The cost to the hospital of providing services to Medicaid clients, including clients served under Medicaid managed care programs;
- (b) Less the amount paid by the state under the non-DSH payment provision of the state plan;
- (c) Plus the cost to the hospital of providing services to uninsured patients;
- (d) Less any cash payments made by uninsured clients; and
- (e) Plus any adjustments required and/or authorized by federal regulation.

The Characteristics of Uncompensated Care Patients

There is vast literature examining the characteristics of hospital uncompensated care patients. One study indicated that over 50% of the uncompensated patients were single and most were female (Saywell et al., 1989), and the result has been confirmed by several studies (Rotarius et al., 2002; Weismann, Van De Lucas, & Epstein, 1992). The most common diagnosis for these uncompensated patients is pregnancy-related, which is followed by injury and poisoning and mental disorder (Saywell et al, 1989). Zollinger, Saywell, Chu, & Zieger (1991) revealed that pregnancy-related diagnoses constituted the largest proportion of unpaid bills (27.5%), and the results have been supported by other studies (Rosko, 2001; Weismann, Van De Lucas, & Epstein, 1992). Zollinger et al. (1991) summarized the patient factors that predict compensated care: being admitted to an urban hospital, being employed, being discharged to self-care, having insurance, and

being married. One study reported that having no obstetrics department seems to reduce a hospital's proportion of uninsured patients by roughly one-fifth (Norton & Staiger, 1994).

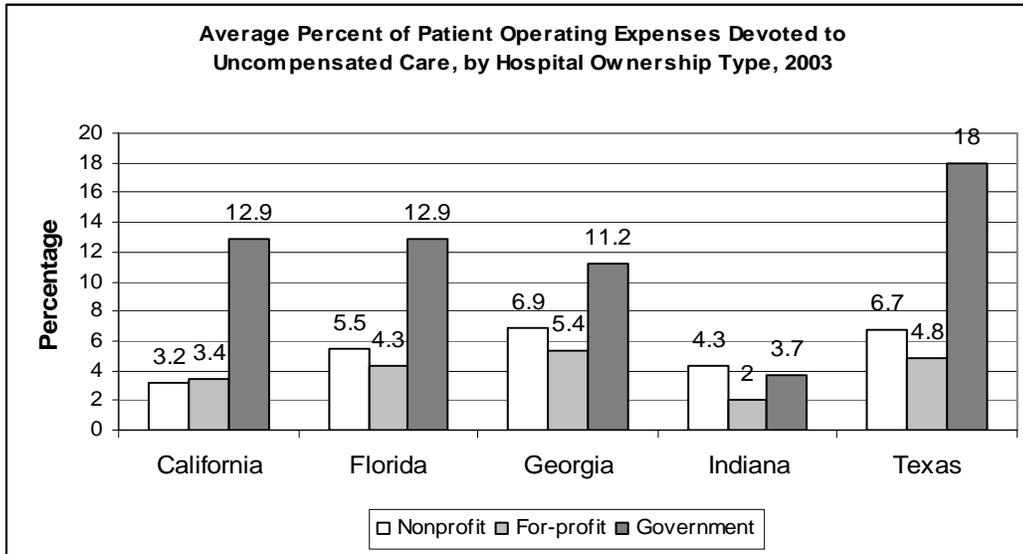
Emergency Departments (ED) are unique providers of critical health care services (Rotariou et al., 2002). Positive association of emergency admissions with uncompensated care has been documented by vast literature (Banks, Peterson, & Wendle, 1997; Duncan & Miller, 1989; Rosko, 2001; Rosko, 2004; Weissman, Van De Lukas, & Epstein, 1992). Buczko (1994) found that the percentage of patients who use the emergency room has a statistically significant positive association with the level of bad debt. Some researchers have argued that the fundamental problem with uncompensated care pools is that they fail to decrease uncompensated care burden because they do not promote efficient use of health care by the uninsured (Buczko, 1994; Duncan & Miller, 1989; Weissman & Van De Lukas & Epstein, 1992). For instance, in Florida counties, almost 85 percent of ED visits are for non-urgent medical conditions (Rotariou et al., 2002).

Hospital Specific Characteristics

A. Ownership

One recent report by Government Accountability Office (2005) examined whether non-profit hospitals provide levels of uncompensated care with 2003 uncompensated hospital care data from five states: California, Florida, Georgia, Indiana, and Texas. According to the report, government hospitals accounted for the largest share of patient operating expenses related to uncompensated care costs. The uncompensated care burden

was not evenly distributed within each hospital group but instead was concentrated in a small number of hospitals (GAO, 2005).



Source: GAO, 2005

Numerous studies have reported that hospital ownership is associated with the burden of uncompensated care cost. Much of the uncompensated care burden is concentrated within urban public hospitals and major public teaching hospitals (Mann, Melnick, Bamezai, & Zwanziger, 1997; Thorpe, Seiber, & Florence, 2001). Magnus and colleagues (2004) studied the association with not-for-profit hospitals' provision of uncompensated care with a multi-state data set of financial statements in 1997 (Magnus, Smith, & Wheeler, 2004). The study found that public hospitals provide more uncompensated care and incur more bad debt than do private hospitals; that medical-school-affiliated hospitals provide more charity care; and that system hospitals, strikingly, have higher bad debt than do non-system hospitals (Magnus, Smith, & Wheeler, 2004).

Meanwhile, Buczko (1994) reported membership in multi-hospital systems has a statistically significant inverse association with the bad debt expense. Meanwhile, a

recent study by Cuellar & Gertler (2005), which examines the effect of the hospital system on consumers, found no changes in the average volume of hospital charity care admission after joining a system.

B. Teaching Status

Teaching hospitals are more likely to provide uncompensated care than do non-teaching counterparts (Banks, Paterson, & Wendle, 1997; GAO 2005; Gaskin, 1997; Dunn & Chen, 1994; Norton & Staiger, 1994; Rundall, Sofaer, & Lambert, 1988). Particularly, uncompensated care is concentrated into publicly-funded teaching hospitals increasing the uncompensated care burden (Mann, Melnick, Bamezai, & Zwanziger, 1997; Thorpe, Seiber, & Florence, 2001). As Banks, Paterson, & Wendle (1997) indicated, teaching hospitals may provide more uncompensated care due to the educational value of patients with a wide variety of diagnosis.

C. Payer Mix

It is clear that one of the numerous factors affecting the safety-net hospitals is payer mix. Though Health Maintenance Organizations (HMOs) in the commercial sector have somewhat lost their legitimacy, they have grown in prominence in the Medicaid sector (Bazzoli, Kang, Hasnain-Wynia, & Lindrooth, 2005). A study by Capenter & Rosko (1999) found that operating margin was negatively associated with the volume of managed care patients. Another study conducted by Clement and colleagues (1997) found that increases in managed care penetration were associated with greater reductions in average revenue than average costs.

Davidoff et al (2000) found that not-for-profit and public hospitals' uncompensated care level respond positively to Medicaid payment generosity, even though the magnitude of the effect is small. Studies by Magnus, Smith, and Wheeler (2004) and Kwon et al. (1999) found that managed care and Medicare shares of revenues have statistically significant, inverse associations with bad debt expenses.

D. Hospital Size

Magnus, Smith, & Wheeler (2004) found that the number of beds has a significant, inverse relationship with bad debt expense. A study by Rosko (2001) found that uncompensated care as a percentage of operating expenses was less in the largest hospitals than in smaller or medium-sized hospitals even though larger Pennsylvania hospitals provide more amounts of uncompensated care. Another study by Rosko (2004) found a positive and statistically significant association between staffed beds and uncompensated care. One study indicated that larger hospitals are more adroit in collecting patient bills due to better administrative infrastructure (Magnus, Smith, and Wheeler, 2004). Becker & Potter (2002) confirmed that the expenses per bad debt declines as the hospitals increase in size.

E. Staff Efficiency

Higher wages are inversely related with net operating income needed to finance the provision of uncompensated care by not-for-profit hospitals (Gruber, 1994). Other studies support the result that average hospital wage is inversely associated with hospital provision of uncompensated care (Norton & Staiger, 1994; Paterson & Wendel, 1997). A

study by Gaskin (1997), which used the real wage variable as a proxy for variable cost, showed that the real wage for nurses is inversely associated with the provision of uncompensated care.

In the meantime, Magnus & Smith & Wheeler (2004) reported staff efficiency has a negative, statistically significant relationship with total uncompensated care and bad debt. This result may imply that hospitals with more FTE employees per occupied bed provide less uncompensated care than the counterpart hospitals.

F. Occupancy rate

Hospitals with high occupancy rates indicate a strong market demand for services and increase the likelihood of hospital profitability (Harrison & Sexton, 2004).

Several studies examined the association between occupancy rate and uncompensated care (Banks, Paterson, & Wendle, 1997; Buczko, 1994; Kwon, Safranski, Martin, & Walker, 1997). Two studies have found that occupancy rate has a positive, statistically significant association with the provision of uncompensated care (Buczko, 1994; Banks, Paterson, & Wendle, 1997).

Income effect

Economic theories of hospital behavior suggest that hospitals trade off margins or profit against the cost of providing social goods, including uncompensated care (Rosko, 2004). The logic behind the income effect is that as net non-operating income increases, uncompensated care should increase; if charity care is a normal good to hospital management (Gaskin, 1997). Several studies found a positive relationship between

operating surplus and the provision of uncompensated care (Frank & Salkever, 1991; Gaskin, 1997; Rosko, 2004). Gaskin (1997) found that the income effect was weak, positive, and statistically insignificant, while Rosko (2004) found a marginally significant positive association between non-operating income and the provision of uncompensated care ($p < .10$).

Meanwhile, a recent national study from the Center for Studying Health Change (HSC) (2005) seems to support the income effect. The study reported physicians at the high level of income are more likely to provide charity care, with 75.6 percent of physicians earning greater than \$250,000 providing charity care in 2004-2005, compared to with 66.4 percent of physicians earning less than \$120,000 (Center for Studying Health System Change, 2005).

Relationship between uncompensated care and hospital finance

The literature on uncompensated care has been dominated by a focus of the determinants of uncompensated care in individual hospitals. Numerous studies used operating margin as a hospital efficiency indicator (Cleverley & Harvey, 1992; Cleverley, 1994; Friedman & Shortell, 1988; Kwon, Safranski, Martin, & Walker, 1997; Vogel, Langland-Orban, & Gapenski, 1993). There is a paucity of research on examining the association of uncompensated care on profitability. This study identified several related studies whose main goals were examining the association of hospital-based uncompensated care and hospital finance (Magnus, Smith, & Wheeler, 2004; Magnus, Wheeler, and Smith, 2004; Rosko, 2001; Rosko, 2004; Vogel, Langland-Orban, & Gapenski, 1993; Duffy & Friedman, 1993).

One study, using cross-sectional design on Florida acute care hospitals, employed logistic regression analysis to examine the 22 hypothesized determinants of probability of high and low profitability (Vogel, Languard-Orban, & Gapenski, 1993). The study found that uncompensated care has a negative effect on the probability of high profitability. In the study, profitability measure—pre-tax operating margin and basic earning power—was divided into high profit and low profit categories. By examining a cohort of hospitals that had negative total margins, between 1980 and 1984, Duffy and Friedman (1993) also showed that total uncompensated care as a proportion of total revenue increased significantly more for the hospital cohort that had negative total margins than the cohort that had positive total margins ($p < .05$).

Rosko (2001), employing a cross-sectional design on 190 Pennsylvania hospitals in 1995, found that there was no statistically significant association between uncompensated care and operating margin. Another study by Rosko (2004), using panel design (1995-1998) on Pennsylvania private, not-for-profit hospitals found that the provision of uncompensated care was not associated with operating surplus. The operational definition of uncompensated care used in Rosko's study was net patient revenue less operating expenses. However, the study, using a different analytic approach that employed the partitioning model, showed that a high level of uncompensated care has an inverse relationship with operating surplus ($p < .05$) (Rosko, 2004).

Magnus and colleagues (2004) also found that uncompensated care has no association with hospital capital-investment efficiency measures: return on equity (ROE), return on assets (ROA), and return on net fixed assets (Magnus, Wheeler, and Smith, 2004).

Another study conducted by Magnus and colleagues, using a multi-state sample of hospitals' financial statements for 1997, employed three different dependent variables: uncompensated care, charity care, and bad debt (Magnus, Smith, and Wheeler, 2004). The study reveals no evidence of statistically significant association of uncompensated care, charity care, and bad debt with the previous year's operating margin. However, the study revealed that long-term debt to capitalization is statistically significant and positive in the bad debt and total uncompensated care. It should be noted another finding that long-term debt to capitalization had an inverse, but not a statistically significant, association between charity care and long-term debt to capitalization. Meanwhile, one study that examined the determinants of hospital bad debts revealed that hospitals that provide more charity care have a low level of bad debt expenses (Kwon, Stoeberl, Martin, and Bae, 1999). These findings from the two studies may imply that bad debt and charity care does not necessarily have a directionally identical influence on hospital finance.

Gaps in the literature

From the comprehensive literature review, this study identified several gaps in the literature. Though there has been a great deal of research on the determinants of uncompensated care in individual hospitals and research on the determinants of patients, little is known about whether hospital-based uncompensated care has an association with hospital profitability.

Although several studies examined the association between uncompensated care and hospital profitability, either they employed the uncompensated care as a dependent

variable, or they usually put bad debt and charity care into a single measure, albeit a fact that bad debt and charity care should be distinguished from an uncompensated care.

One study by Magnus, Smith, and Wheeler (2004) tried to examine the association of debt financing and lagging operating margin with uncompensated care, charity care, and bad debt, respectively. Though the study overcame the previous studies' limitation, which mingled bad debt and charity care, by splitting uncompensated care into bad debt and charity care, it also employed uncompensated care, charity care, and bad debt as dependent variables.

Since there is not universal coverage of healthcare in the U.S., then the financial health of U.S. hospitals that assure care for those patients without insurance coverage is critical. The next chapter will describe the methods used in this study on examining the association of uncompensated care and hospital profitability.

CHAPTER III: METHODS

This chapter will be divided into three sections. The first section will discuss data sources used for analysis. Section two will discuss the analytic strategies to be employed in this study. Section three presents hypotheses to be tested in this study. The final section of this chapter defines the variables.

Sources of Data and Methods

The Center for Health Statistics (CHS), Washington State Department of Health, collects and publishes hospital fiscal data, based on specific laws such as Revised Code of Washington RCW 70.58 that imposes the statutory authority for the collection of vital statistics data (State of Washington Office of Financial Management, 2004a). The primary data to be examined are hospital financial-year-end reports data from the Washington State Department of Health.

Before conducting analysis, this longitudinal panel study excluded four psychiatric hospitals, one rehabilitation hospital, one cancer care hospital, and four hospitals with incomplete or missing financial statements from the data. Financial data for 85 hospitals for the year 2004 were used in this study for the statistical analysis.

Analytical Approach

The following analytic procedures in this study:

1. Comparative trend analysis of dependent variables, using Washington hospital financial statements, from 2000 to 2004; and

2. A statistical analysis of relationship between the dependent variables and independent variables, using Washington hospital financial statements in 2004.

1. Comparative Trend Analysis Plan

This study will conduct trend and comparative analysis for all of the dependent variables to examine the change of the historical financial ratio's distribution of the dependent variables: operating margin and total margin. Specifically, each dependent variable will be partitioned into quartile each year, after combining the three latest hospital benchmark data in U.S. (Gapenski, 2002; HFMA, 2004; Solucient, 2005). This study will identify the percentage of Washington hospitals that fall into each quartile during the period of study, through 2000 to 2004. The trend and comparative analysis is expected to enable this study to provide a better understanding of financial situations of the sample hospitals during the study period.

2. Statistical Analysis Plan

In addition to the comparative trend analysis, this panel study uses an ordinary least square (OLS) regression of the complete body of independent variables and control variables on each measure of profitability to test the association between the uncompensated care provision and hospital profitability in 2004. In the first stage, this study will examine the association of uncompensated care, charity care, and bad debt with profitability for all Washington hospitals. This study then stratifies all Washington hospitals into two ownership types ([1] **private hospitals** including two sub categories of for-profit hospitals and not for-profit hospitals vs. [2] **public hospitals** including three

sub categories for the district hospitals, state teaching hospitals, and county teaching hospitals). In the second stage, this study will examine the association of bad debt and charity care with profitability by the two ownership types. In the third stage, the public hospital group will be stratified again by teaching status; this study will examine the association of types of uncompensated care with profitability for public hospitals when public, state-funded teaching hospitals are excluded.

The following regression models are estimated to predict the determinants of hospital profitability.

Regression Models	
First Model	$Y_{1-2} = f(X_1+X_4+X_5+X_6+X_7+X_8+X_9+X_{10}+X_{11})$
Second Model	$Y_{1-2} = f(X_2+X_3+X_4+X_5+X_6+X_7+X_8+X_9+X_{10}+X_{11})$
Dependent Variables	
Y ₁	Operating Margin (OM)
Y ₂	Total Margin (TM)
Independent Variables	
X ₁	Uncompensated Care Mix (UNC)
X ₂	Charity Care Mix (CHARITY)
X ₃	Bad Debt Mix (BADDEBT)
Control Variables	
X ₄	Occupancy Rate (OR)
X ₅	Labor Intensity (LABOR)
X ₆	Average Length of Stay (ALOS)
X ₇	Case Mix (CASEMIX)
X ₈	Size (SIZE)
X ₉	Medicaid Mix (MEDICAID)
X ₁₀	Medicare Mix (MEDICARE)
X ₁₁	Outpatient Mix (OUTPAT)

Statistical analyses will be conducted using the SAS software program (version 8). P-values less than 0.05 will be considered statistically significant.

Operational Definition of Variables

A. Dependent variables

The profitability for the study period is defined by the following two dependent variables (symbol):

1. Operating margin (OM)
2. Total margin (TM)

For the study, operating margin and total margin calculated from financial statements provided by Washington State Department of Health were used.

1. Operating Margin

As the first measure of hospital profitability, this study employs operating margin. This measure reflects the excess or shortage of revenues over expenses from the primary patient care operations of hospitals (Rosko, 2004). Zeller, Stanko, and Cleverley (1997), using audited financial data in a study of 2,189 not-for-profit hospitals, found operating margin ratios are meaningful for assessing a hospital's profitability. The formula for the operating margin is as follows:

$$\text{Operating Margin} = \frac{\text{Operating Income}}{\text{Operating Revenue}}$$

Of the total 85 hospitals, this study excludes hospital data (n=1) whose operating margin ratio is more than 2000% that can be considered as an outlier. Finally, a total of 84 hospitals' financial data are used in this study for the first regression model.

2. Total Margin (TM)

As the second measure of hospital profitability, this study employs total margin. The total margin gauges the ability of the organization to control expenses (Gapenski, 2003). The total margin has been a frequently employed measure of profitability by previous studies on healthcare finance (Kim, Glover, Stoskopf, & Boyd, 2002; Thrope, Seiber, & Florence, 2001; Younis & Forgione, 2005). One recent study on hospital profitability found total margin is a superior measure to return on equity (ROE) for assessing hospital profitability (Younis & Forgione, 2005). According to the Washington State Department of Health, the formula for the total margin is as follows:

$$\text{Total Margin} = \frac{\text{Net Income}}{\text{Net operating income} + \text{Non operating revenue}}$$

B. Independent variables

This study uses the following three independent variables (symbol):

1. Uncompensated Care Mix (UNC)
2. Bad Debt Mix (BADDEBT)
3. Charity Care Mix (CHARITY)

Data for all independent variables were obtained from Fiscal Year End Reports Washington State Department of Health.

1. Uncompensated Care Mix

It is clear that hospital size can distort the burden of unadjusted, uncompensated care expense. In several studies, the uncompensated care measure was calculated by dividing the volume by the number of beds (Banks, Peterson, & Wendle, 1997; Thorpe & Spencer, 1991). In studies by Gaskin (1997) and Rosko (2004), uncompensated care was defined as the total uncompensated charge divided by the hospital's average charge per adjusted admission. Meanwhile, in studies by Kwon, Stoeberl, Martin, & Bae (1999) and Rosko (2001), uncompensated care was scaled by operating expense. Several studies altered uncompensated care from charges to costs by using ratio of charges-to-costs (RCC) (Blewett, Davidson, Brown, & Maude-Griffin, 2003; Mann, Melnick, Bamezai, & Zwanziger, 1995; Rosko 2001). However, one study suspects the reliability of ratios of charge-to-cost (RCC) in determining relative hospital costs (Shwartz, Young, & Siegrist, 1995-1996).

In a study by Vogel, Langeland-Orban, and Gapenski (1993), uncompensated care was operationally defined by the percentage of total patient service revenue. Two studies defined uncompensated care as a percentage of total operating revenue (Magnus, Smith, & Wheeler, 2004; Magnus, Wheeler, and Smith, 2004). Meanwhile, other studies employed the operational definition of uncompensated care as a percentage of net patient service revenue (Sutton & Stensland, 2003; Weissman, Gaskin, & Reuter, 2003).

It is true that employing a cost-based measure of uncompensated care burden, such as operating expense, is meaningful. However, both charity care and bad debt expense are considered as foregone charges. Therefore, it may be more desirable, as Magnus and colleagues (2004) suggested, to employ charge-based data as both nominator and denominator. Guided by the studies conducted by Sutton and Stensland (2003) and

Weissman, Gaskin, and Reuter (2003), this study employs the percentage of net patient service revenue as a denominator for the precise examination of financial burden of uncompensated care as follows:

Uncompensated care (Charity care and bed debt deduction) divided by net patient service revenues

2. Bad Debt Mix

For the same logic with employing operational definition of uncompensated care, this study uses the operational definition of bad debt mix is as follow:

Bad debt deduction divided by net patient service revenues

3. Charity Care Mix

For the same logic with employing operational definition of uncompensated care, this study uses the operational definition of charity care mix index as follow:

Charity care deduction divided by net patient service revenues

C. Control variables

In order to draw valid inferences, this study uses the following control variables (symbol):

1. Occupancy Rate (OR)
2. Labor Intensity (LABOR)
3. Average Length of Stay (ALOS)
4. Case Mix Index (CASE)

5. Hospital Size (SIZE)
6. Medicaid Mix (MEDICAID)
7. Medicare Mix (MEDICARE)
8. Outpatient Mix (OUTPAT)

Data for all control variables were obtained from Fiscal Year End Reports Washington State Department of Health.

1. Occupancy Rate

Higher occupancy rate spreads fixed costs over more patients and hence increases per patient profitability (Gapenski, 2003). Hospitals with occupancy rates lower than the national average have an augmented probability of acquisition or closure (Burns, Bazozoli, Dyan, & Wholey, 2000). Based on the empirical research by Harrison and Sexton (2004), this study expects that occupancy rate is positively associated with profitability. Occupancy rate is calculated as follow:

$$\frac{\text{Patient Day}}{\text{Licensed Bed} \times 365}$$

2. Labor Intensity

Several studies employed staff efficiency or labor intensity as a key indicator of hospital efficiency (Magnus, Smith, & Wheeler, 2004; Magnus, Wheeler, & Smith, 2004; Langland-Orban, & Gapenski, 1993). In two studies, staff efficiency was defined as the number of full time equivalent (FTEs) employees per occupied bed (Magnus, Smith, &

Wheeler, 2004; Magnus, Wheeler, & Smith, 2004). Guided by Vogel, Languard-Orban, & Gapenski (1993), this study uses the same operational definition of labor intensity with the study as follows:

Total hospital full time equivalents (FTEs) divided by adjusted patient days

3. ALOS

Average length of stay is the number of days an average inpatient is hospitalized with each admission (Gapenski, 2003). Average length of stay may impact profitability by contributing to operating efficiency (Vogel, Languard-Orban, & Gapenski, 1993). Average length of stay is calculated by dividing the inpatient days by the total number of discharges (Gapenski, 2003). However, the two elements—discharge and inpatient days— are not available from Washington State Department of Health. Alternatively, this study uses the following formula:

$$\frac{\text{Patient Days}}{\text{Total admissions}}$$

4. Hospital Size

Greater size may improve hospital efficiency and market share (Wang, Ozcan, Wan, & Harrison, 1999). The measurement of total hospital beds provides a generally accepted measure of hospital size as a basis for comparison (Becker & Potter, 2002). Harvey (1992) found a statistically significant and inverse association between size and profitability among urban hospitals, but the relationship was significant and positively associated among rural hospitals (Cleverly & Harvey, 1992). A more recent study found

that the association between the number of beds and profitability is non-monotonic, piecewise linear with profitability (Younis, Rice, & Barkoulas, 2001)

This study employs the operational definition of size as follows:

Available bed

5. Case Mix Index

The case mix index is an indicator for intensity of service (Gapenski, 2003). Rosko and Carpenter (1994) found that hospital profits were inversely associated to the severity of illness index. A recent study by Magnus, Wheeler, & Smith (2004) found inverse associations between case mix and ROE, ROA, and Return on Net Fixed Assets, but the study revealed no evidence of statistically significant associations.

6. Medicaid Mix Index

One study examining factors influencing high and low profitability among hospitals found that Medicaid mix reduces the probability of high profitability (Vogel, Langeland-Orban, & Gapenski, 1993). Most Medicaid payments for most hospital services are substantially lower than Medicare payment (Becker & Potter, 2002). Two studies defined Medicaid mix as a percentage of net patient service revenue (Magnus, Smith, & Wheeler 2004; Magnus, Wheeler, & Smith, 2004). To apply the same logic as used with the operational definition of uncompensated care, the operational definition of Medicaid mix here is:

Medicaid revenue divided by net patient service revenue

7. Medicare Mix Index

To apply the same logic as used with the operational definition of uncompensated care, the operational definition of Medicare mix index here is:

Medicare revenue divided by net patient service revenue

8. Outpatient Mix

Reflecting the growing consequence of outpatient services in contemporary hospital industry, one recent study on variations in inefficiency in U.S. hospitals included outpatient visits in the cost function model (Rosko, 1999). Vogel, Langland-Orban, & Gapenski (1993) operationally defined outpatient mix as a percentage of net patient service revenue. To apply the same logic as used with the operational definition of uncompensated care, the operational definition of outpatient mix here is:

Total outpatient revenue divided by net patient care revenue

Hypotheses

The following include the hypothesis to be tested in this graduate thesis.

Central Hypothesis

Uncompensated care is not significantly associated with the profitability for Washington hospitals in 2004.

Sub Hypothesis 1

Bad debt is not significantly associated with the profitability for Washington hospitals in 2004.

Sub Hypothesis 2

Charity care is not significantly associated with the profitability for Washington hospitals in 2004.

CHAPTER IV: RESULT

This chapter is divided into four sections. The first section reports the results of the descriptive analysis. The second section reports the statistical results of the hypothesis.

A. Result of Descriptive analysis

Table 1 shows descriptive statistics for the dependent and independent variables to be included in the ordinary square regression model with the sample year 2004. The mean operating margin, mean total margin, mean long-term debt to equity, and mean cash flow to total debt is 0.019, 0.032, 4.05, 0.77, and 0.344, respectively. The sample hospitals in Washington spent an average 7.72 percent of net patient service revenue on uncompensated care. The 7.72 percent composed of charity care, 2.7 percent and bad debt, 5.02 percent. In other words, Washington acute care hospitals incurred approximately two times larger proportion of bad debt than charity care.

[Insert Table 1 about here]

Figure 1, 2, and 3 display the trends in provision of uncompensated care for the 85 Washington hospitals in 2004, for 89 hospitals in 2003 and 2002, for 86 hospitals in 2001, and for 85 hospitals, by ownership types. Figure 1 shows that both the provision of uncompensated care by private hospitals and public hospitals, which declined slightly in 2001, increased dramatically since 2003. The average annual increase rate of private hospital uncompensated care is 22.7 percent since 2001 and that of public hospital uncompensated care is 11.1 percent.

[Insert Figure 1 about here]

Figure 2 elaborates on the provision of uncompensated care by splitting it into bad debt and charity care. Since 2002, private hospitals' bad debt provision had rapidly increased and exceeded public hospitals' bad debt provision in 2003 and 2004. Meanwhile, hospital charity care, which had been stable until 2003 both for public hospitals and private hospitals, rapidly increased in 2004. An average increase rate of provision of bad debt for public hospitals was 23.6 percent from 2002 to 2004 and private hospitals' increasing rate was 52.4 percent from 2002 to 2004. Notably, between 2003 and 2004, private hospitals' provision of charity care increased by 83.2 percent.

[Insert Figure 2 about here]

Figure 3 shows the distribution of Washington hospitals that had the highest proportion of provision of uncompensated care to net patient service revenue, by ownership type through the study period. In other words, Figure 3 shows what hospital ownership had ponderous burden of uncompensated provision. In 2000, one for profit hospital, one state hospital, nine district hospitals and 10 not for-profit hospitals accounted for the highest 25 percentile providing uncompensated care in Washington. The number of district hospitals, which fell into this category, constantly decreased and only five hospitals were in the top 25 percent burden hospitals.

[Insert Figure 3 about here]

A closer examination of Washington hospital uncompensated care burden shows that private hospitals and public hospitals have somewhat different burdens that have changed over time; in 2000, private hospitals provided 0.21 percentage point greater uncompensated care of net patient service revenue than public hospitals (4.90% vs.

4.69%), whereas private entities provided 2.1 percentage point greater uncompensated care of net service revenue (8.74% vs. 6.67% in 2004). Since 2002, private hospitals' uncompensated care burden has increased more rapidly than public entities' burden. The annual average increase rate of private hospital uncompensated care is 24.2 percent since 2002 and that of public hospital uncompensated care is 16.1 percent. As shown in Figure 2, it is clear that private hospital charity care provision seems to drive the rapidly increasing uncompensated care; while public hospitals' charity care was 29 percent between 2003 and 2004, the increasing rate of charity care provision by private hospitals was 45 percent during the same period.

Figure 4-1 shows the proportion of Washington hospitals that fell into each quartile for national hospitals' operating margin. In 2000, 51 % of all Washington hospitals fell below the nation's lowest 25% operating margin category. In other words, 51% of Washington hospitals had operating margin at or below the nation's lowest 25% hospitals' operating margin. The proportion of hospitals that fall into the lowest 25 percentile category had dropped continuously until 2003, rising to 39% in 2004, again. The outperforming 25 percentile Washington hospitals had continuously increased since 2002 and 41 % of Washington hospitals were in the outperforming 25 percentile category in 2004.

[Insert Figure 4-1 about here]

Figure 4-3 compares the median (50%) value for Washington hospitals and that for all U.S. hospitals. Overall, median value for Washington hospitals had less operating margin than the national counterpart. However, Washington median had narrowed the gap with

national median and had higher values for operating margin than national value (2.5% vs. 2.37%).

[Insert Figure 4-2 about here]

Figure 5-1 shows the proportion of Washington hospitals that fall into each of the quartile values for national hospitals' total margin. Compared with the distribution of each operating margin quartile for Washington hospitals, the distribution of each total margin quartile for Washington hospitals had been compatible with nation's values.

[Insert Figure 5-1 about here]

However, 34% of Washington hospitals fell into the bottom quartile of the national hospital category in 2000 and this proportion increased to 40% in 2001. Although the bottom quartile had dropped to 25% in 2002 and 22% in 2003, the proportion increased to 29.4% in 2004, again. Figure 5-2 shows the gap between the Washington median and national median had constantly decreased until 2002 and the Washington median slightly outperformed national median in 2003 and 2004.

[Insert Figure 5-2 about here]

Unlike the comparative analysis of operating margin and total margin, analysis of the three dependent variables--*cash flow to total debt*, *cash flow coverage ratio*, and *long-term debt to equity*--does not fully provide the comparative study due to the limited sources of U.S. benchmark data.

Figure 6 shows the Washington median cash flow to total debt fell below the national median cash flow to total debt between 2000 and 2002, respectively. Median cash flow to total debt has a peak value in 2003 and dropped in 2004.

[Insert Figure 6 about here]

Figure 7 shows the Washington median cash flow coverage ratio, ranging from 2.44 in 2002 to 3.19 in 2004, had been down-warding until 2002 and the financial peak was in 2004, hitting the lowest point in 2002.

[Insert Figure 7 about here]

Figure 8 shows the Washington median cash flow coverage ratio and the national median value, 0.65, in 2002. Washington median cash flow coverage ratio, which underperformed its counterpart quartiles in 2002, hit the lowest point in 2002 and 2003.

[Insert Figure 8 about here]

B. Result of Statistical Analysis

Central Hypothesis 1

Uncompensated care is not significantly associated with the profitability for Washington hospitals in 2004.

This study revealed no evidence of statistically significant association between uncompensated care and profitability for Washington hospitals in 2004 (See Table 2). However, this study found a statistically significant negative association between uncompensated care and operating margin for all public hospitals ($P < .01$). This study also found a marginally significant positive association of uncompensated care with profitability ($P < .10$).

[Insert Table 2 about here]

Sub Hypothesis 1

Bad debt is not significantly associated with the profitability for Washington hospitals in 2004.

This study found that provision of bad debt is negatively associated with the operating margin for Washington hospitals in 2004 ($P < .01$) (See Table 3)

[Insert Table 3 about here].

Meanwhile, though the F -statistic was marginally significant at the ten percent level for total margin regression model, this study found a statistically significant association between provision of bad debt and total margin for Washington hospitals in 2004 ($p < .01$). This study reveals no evidence of a statistically significant association between bad debt and profitability for private hospitals in 2004 (See Table 4)

[Insert Table 4 about here].

However, this study found that a statistically significant negative association of bad debt with operating margin for the public hospitals ($P < .01$) (See Table 6). This study also found statistically significant negative association of bad debt and operating margin for the non-teaching public hospitals ($p < .01$) (See Table 7).

Sub Hypothesis 2

Charity care is not significantly associated with the profitability for Washington hospitals in 2004.

This study found that provision of charity care is positively associated with the operating margin and total margin for all hospitals in 2004 ($P < .01$ and $P < .01$, respectively) (See Table 2). Consistent with the result of all hospital category, charity care has a statistically significant positive association with operating margin and total margin for the private hospitals ($P < 0.01$ and $P < 0.01$, respectively) (See Table 4). However, this study revealed no evidence of a statistically significant positive association of profitability and charity care for the all public hospitals (See Table 6). Contrary to the results of the all hospital group and private hospital group, a statistically significant negative association of charity care and operating margin was found for non-teaching public hospital group, though the association is marginally significant ($P < .10$). Meanwhile, though F -statistic was marginally significant at $p < .10$, charity care has a negative association with total margin for the non-teaching public hospitals ($P < .05$) (See Table 7).

Regarding control variables employed in this study, *occupancy rate*, *average length of stay*, and *outpatient mix* are positively associated with the operating margin for Washington public hospitals in 2004 ($p < 0.01$, $p < 0.05$, and $p < 0.05$, respectively). *Available bed* is negatively associated with the operating margin for Washington public hospitals in 2004 ($p < 0.01$). Meanwhile, there are statistically significant, positive relationships between *average length of stay*, *available bad*, and *outpatient mix* and operating margin for Washington private hospitals in 2004 ($p < 0.05$, $p < 0.01$, and $p <$

0.05, respectively). *Case mix* is negatively associated with the total margin for Washington private hospitals in 2004 ($p < 0.05$) and outpatient mix is positively associated with the total margin for Washington private hospitals in 2004 ($p < 0.05$).

The summary of statistical findings from this study is presented below.

Summary of statistical findings

	Central Hypothesis	Sub-hypothesis 1	Sub-hypothesis 2
	Uncompensated care is not significantly associated with the profitability for Washington hospitals in 2004.	Bad debt is not significantly associated with the profitability for Washington hospitals in 2004.	Charity care is not significantly associated with the profitability for Washington hospitals in 2004.
All Hospitals	Statistically insignificant negative association	Statistically significant negative association	Statistically significant positive association
All Private Hospitals	Marginally significant positive association	Statistically insignificant negative association	Statistically significant positive association
Not-For-Profit Hospitals	Marginally significant positive association	Statistically insignificant negative association	Statistically significant positive association
All Public Hospitals	Statistically significant negative association	Statistically significant negative association	Statistically insignificant positive association
Non-Teaching Public Hospitals	Statistically significant negative association	Statistically significant negative association	Statistically significant negative association

CHAPTER V: CONCLUSION/LIMITATION OF STUDY

The first section will discuss the significant findings from this study. The second section will discuss the limitations of the study. The third section will propose future study needed. Finally, the fourth section will discuss policy implications based on the findings of this study.

Significant findings

This study examined the association of the types of uncompensated care with profitability among acute care hospitals in Washington through 2000 to 2004. Washington hospitals' uncompensated care burden has increased rapidly over the study period. This study found that 25 percent of Washington hospitals lost money from operations in 2004.

The most significant finding from this study is that the types of uncompensated care should be broken out. This study found that charity care is positively associated with the profitability, whereas bad debt is negatively associated with the profitability for Washington hospitals. Though several previous studies found the negative association of uncompensated care and profitability, this study is the first to reveal the two types of uncompensated care have a different relationship with profitability.

Another significant finding from this study is that ownership type and teaching status seem to alter the extent of the association of types of uncompensated care with the profitability. The ordinary least square regressions identified that a 1% increase in charity care mix (percentage of net patient service revenue) would increase operating margin by

0.007 for all Washington hospitals ($P < .01$). However, this study's regression model found that 1% increase in charity care mix would increase operating margin by 0.01 for the private hospitals ($P < .01$). Interestingly, for the public hospitals, a 1% increase in charity care mix increased operating margin by 0.0009, but this study reveals no evidence of statistically significant association. This study also found that a 1% increase in bad debt mix would decrease operating margin by 0.008 for all hospitals ($P < .01$). Like the charity care mix, the different associations of bad debt mix with the two types of ownership are found in this study. While a 1% increase in bad debt mix would decrease operating margin by 0.01 for the public hospitals ($p < .01$), a 1% increase in bad debt mix would decrease operating margin by 0.0002 for the private hospitals. However, this study reveals no evidence of a statistically significant association between bad debt mix and private hospitals' operating margin.

More importantly, this study found teaching status may alter the association of types of uncompensated care with profitability. This study found public teaching hospitals seem to have totally different charity care behavior compared to non-teaching public hospitals. Both teaching hospitals are categorized in the public hospital group. Contrary to the results of all public hospitals, this study found a negative association of profitability and charity care for the non-teaching public hospitals.

One possible explanation for the bad debt behavior is that private hospitals are likely to have a more clearly defined and stringent bad debt collection policies and patients' financial coverage of benefits checks upon admission than do the counterpart cohort, public hospitals. Kwon, Stoeberl, Martin, and Bae (1999) noted that size of bad debt may

be attributed to inefficient hospital management. On the other hand, public hospitals may have somewhat loose bad debt collection policies that allow relatively more bad debt proportion of net patient service revenue.

Another possible explanation is public hospitals may have more difficulty in determining whether a patient is eligible for charity care. One study, which examined uncompensated care in Massachusetts hospitals using FY 1988 patient records, found that 73% of the bad debt cases were covered by some types of insurance such as Medicaid (Weissman, Van De Lukas, & Epstein, 1992). Besides, the 2005 Pricewaterhouse Charity Care survey found about 92% of hospitals reported some of their bad debt expense could be considered as charity care (PricewaterhouseCoopers, 2005). Washington public hospitals spent 71.8% of their total uncompensated care on bad debt, and the remaining 28.2% on charity care, whereas private hospitals spent 59.9% of their total uncompensated care on bad debt and 40.1% on charity care in 2004. Washington State charity care law requires that hospitals provide free care for patients whose income is below 100 percent of federal poverty level and discounted care for patients whose income is between 100 and 200 percent of poverty level. However, hospitals can provide their own sliding scale for discounts.

To sum, public hospitals may have less efficient managerial policy in determining the eligibility. It may be also possible that public hospitals are likely to be located where more underinsured patients are. Consequently, it seems plausible that bad debt is not only incurred from those who are not willing to pay but also the underinsured and that bad debt behavior may be affected by not only internal managerial efficiency but also external factors.

Though it is relatively apparent to interpret the bad debt behavior by ownership type, it is challenging to interpret the results of different impact of charity care behavior between private and public hospitals. One possible explanation may be that the Disproportionate Share Hospital (DSH) funding provided to the Washington private hospitals may alleviate the financial burden of those hospitals. Roughly, Washington private hospitals were paid a \$24 million Non-Rural Hospital Indigent Adult Assistance Disproportionate Share (NRHIAADSH) payment and a \$13 million Low-Income Disproportionate Share Program payment in SFY 2004 (Washington State Department of Social & Health Services., 2006).

Unlike the results from the all public hospitals that revealed **positive** association of charity care, though the association is not statistically significant, with profitability, results from the non-teaching public hospitals reveals that charity care has a statistically significant **negative** association with profitability. Though DSH payments and other state funding may play an important role alleviating public hospitals' financial burden from uncompensated care provision, DSH payment provided to public hospitals might have less contribution to the profitability than private hospitals. In fact, in addition to the general DSH payment, the two teaching public hospitals received supplementary teaching hospital DSH funding, about \$93 million that is 5% of the two hospitals' net operating revenue. Arguably, the considerable funding influx to the two public teaching hospitals might lead to the positive association of charity care with their profitability, and thus the positive association led statistically insignificant positive association of charity care and profitability for the all public hospitals.

2002 National Association of Public Hospitals and Health Systems (NAPH) member survey seems to insinuate another possible explanation. In 2002, 57 percent of NAPH members lost money on care provided to Medicaid patients, even when DSH payments were taken into consideration (NAPH, 2004). Though the counterpart cohort's (private hospitals) comparative results are not available, the finding seems to pose a question concerning current distribution formula of DSH payments. This concern is to be discussed in later section.

However, one should not eliminate the possibility that whereas public hospitals, which are financially vulnerable, provided less charity care, private hospitals, which have relatively better financial condition, provide more charity care. This explanation may be supported by the previous study that found a positive association of uncompensated care with operating surplus (Frank & Salkever, 1991; Gaskin, 1997; Rosko, 2004).

Limitation of the Study

This study's findings should be interpreted cautiously with regards to several limitations. First, this study was limited to one state and thus it has limited generalizability. Second, though this study employed a longitudinal design for the purpose of descriptive and statistical analysis, statistical analysis of this study was cross-sectional rather longitudinal, using the FY 2004 data. Therefore, such a limitation did not allow this study to determine causal-relationship between uncompensated care and profitability. Finally, this study excluded environmental factors that can affect hospital financial performance, such as HMO penetration, market competition rate, unemployment rates, and community income level. Therefore, omitting such external

factors as control variables in the regression models used in this study might lead to distorted results.

Future Research

There are four areas that are deserving of further research: (1) a study on investigating reasons for reducing the increasing rate of uncompensated care for public hospitals, (2) a study on association of uncompensated care with profitability for for-profit hospitals, (3) a study on impact of DSH payment on the profitability, and (4) a study on the association of uncompensated care with financial solvency.

The trend analysis showed that the increasing rate of uncompensated care proportion of the total net patient revenue for private hospitals has been faster than that for public hospitals over time. Another result of descriptive analysis shows bad debt incursion has a statistically significant negative association with profitability for public hospitals. Further research is needed to determine whether reducing the increasing rate of uncompensated care for public hospitals may be attributable to the burden of bad debt expense.

The small number of for-profit hospitals (n=4 out of 84) does not allow to examine the association of the types of uncompensated care with profitability. If there are many for-profit hospitals in another state, such as California,, future studies are needed to examine the association of charity care and bad debt with profitability of the for-profit hospitals.

This study tried to interpret the hospital charity care behavior from the regression model used in this study. Though this study considered DSH payment as one of the explanatory factors of the finding, limited financial data does not allow this study to examine the association of the DSH payments, which are paid to the individual hospitals,

with profitability. If data are available, future study is needed to conduct sensitive analysis, deducting the amount of DSH payment from their revenue. The results of the further study would enable researchers to understand the association of DSH payment with profitability.

This study identified a last but crucial further study that examines the relationship between the types of uncompensated care and hospital financial solvency, using financial statements that provide all relevant financial information. More importantly, future study is needed to examine the association between financial solvency and the types of uncompensated care, using four to six year average values of solvency measure, such as cash flow coverage (CFC) ratio and long term debt to equity ratio.

Policy Implications

There are two areas that represent crucial policy implications, including (1) current DSH payment distribution and (2) systematic examination of bad debt.

As the current environment of competitive low cost health systems coupled with tougher and tighter Medicare and Medicaid fee schedules becomes more challenging, hospitals struggle to generate surpluses that are used to subsidize the indigent patient (Vladeck, 2006). In 2004, a quarter of Washington hospitals had negative operating margins. It is obvious that DSH payments have played a crucial role in helping financial viability of safety net hospitals in the U.S. (Rousseau and Schneider, 2004; Wynn, Coughlin, Bondarenko, & Bruen, 2002). However, there is an explicitly growing concern that distribution method still fails to target exactly the hospitals that serve the most indigent patients. Burt and Arispe (2004) found that fewer than half of high-burden EDs

serving high volumes of safety net patients received any recent DSH payment, yet almost one-third of low-burden EDs serving those patients also received such payment. In 1997, ProPAC (as cited in Wynn, Coughlin, Bondarenko, & Bruen, 2002) noted several problems with current methods for distributing Medicare DSH payments: “the hospitals’ disproportionate patient percentage (DPP) is a poor indicator of hospitals’ care for the poor, particularly because the omission of uncompensated care means that the leading source of financial pressure on safety net hospitals is not considered in the distribution of Medicare DSH payments.” There have been also concerns about Medicaid DSH payment. It is obvious that Medicaid DSH payment have alleviated hospitals’ uncompensated care burden. However, a portion of these funds were available to cover the costs of uncompensated care due to intergovernmental transfers and the amounts retained by the states hospital some states have structured their Medicaid DSH programs (Coughlin and Liska, 1997).

Policymakers should probe current DSH payment distribution mechanism as to whether they provide adequate compensation to safety net hospitals that deliver uncompensated care. Though this study found charity care has a statistically significant positive association with the profitability, this study reveals evidence of statistically significant negative association between public hospitals-based charity care and their profitability. While U.S. public hospitals provide only about 4.3 percent of admission nationwide, they are responsible for 24 percent uncompensated care in 2002 (National Association of Public Hospitals & Health Systems (NAPH) Annual Survey of Members, 2004, as cited in Regenstein and Huang, 2005). As of 2005, 47 percent of Washington

hospitals are public entities (45 out of 96). Considering substantial proportion of the public hospitals in Washington State, policymakers need to pay attention to a study conducted by Desai, Lukas, & Young (2000). The study found that public hospitals that converted to for-profit status showed a significant decline in the level of uncompensated care they provided (Desai, Lukas, & Young, 2000). Policymakers should examine whether the DSH payments are targeting the financially vulnerable safety net hospitals for the sustainability of U.S. hospitals that provide approximately \$30 billion in uncompensated care.

Second, policy makers should systematically examine the nature of bad debt incurred by either public hospitals or private hospitals. It is imperative to determine whether the bills are unpaid by patients who are unable to pay or who are not willing to pay. If the bills are unpaid due to the former, then some sort of additional subsidy is needed. If the unpaid bills are from the latter, other approaches will be needed. Bad debt incurred from those who are not low income uninsured or underinsured can be regarded as avoidable wastes of resources. This study recommends that policymakers scan the nature of bad debt expense and develop a state policy that can provide incentives for setting appropriate billing policies. Until there is universal health coverage for all U.S. citizens, the concern surrounding uncompensated care will continue to be a national policy issue deserving of further study.

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Table 1. Descriptive statistics for dependent and independent variables for 2004 study

Variable	Mean	S.D	Minimum	Maximum
<i>Operating Margin</i>	0.019	0.067	-0.2	0.21
<i>Total Margin</i>	0.032	0.062	0.18	0.17
Uncompensated Care (%)	7.715	5.104	0.04	29.52
Charity Care (%)	2.696	3.016	0	19.35
Bad Debt (%)	5.01	3.258	0	16.11
Occupancy rate	0.418	0.2541	0.01	1.06
Labor Intensity	0.019	0.01	0.011	0.094
Average Length of Stay (days)	3.793	1.7975	1.667	13.747
Case mix index	0.9228	0.4458	0	3.912
Medicaid mix (%)	17.683	9.407	3.242	42.43
Medicare mix (%)	37.33	10.717	63.294	0
Available Bed	124.91	130.52	8	688
Outpatient mix (%)	0.544	0.152	0.22	0.99

Table 2. Ordinary Least Square Regression for the 2004 study [uncompensated care, all hospitals]
(N: Operating Margin=84 and Total Margin=85)

Variable	Operating Margin	Total Margin
Uncompensated Care	-0.00143	-0.00080575
Occupancy rate	0.08262	0.09339
Labor Intensity	0.20933	0.84407
Average Length of Stay	0.00112	0.00000383
Case mix index	-0.00885	-0.01886
Medicaid mix	-0.00028605	-0.00048284
Medicare mix	-0.00066643	-0.00064246
Available Bed	-0.00003822	-0.00000591
Outpatient mix	0.03118	0.07243
Interscept	0.11677	0.002
R-squared	0.2185	0.079
F value	0.23	0.72
* statistically significant at the .1 level; ** .05 level; *** .01 level		

Table 3. Ordinary Least Square Regression for the 2004 study [charity care and bad debt, all hospitals]
(N: Operating Margin=84 and Total Margin=85)

Variable	Operating Margin	Total Margin
Charity care mix	0.00762 ***	0.00646 **
Bad debt mix	-0.00874 ***	-0.00659 ***
Occupancy rate	0.06437	0.07082
Labor Intensity	0.06179	0.71357
Average Length of Stay	0.00127	0.00029486
Case mix index	-0.01959	-0.02702
Medicaid mix	-0.00084064	-0.00099657
Medicare mix	-0.00106	-0.00103
Available Bed	-0.00007873	-0.0002828
Outpatient mix	0.07449	0.10675
Interscept	0.05105	0.0361
R-squared	0.2297	0.1937
F value	2.18 **	1.78 *
* statistically significant at the .1 level; ** .05 level; *** .01 level		

Table 4. Ordinary Least Square Regression for the 2004 study
 [Charity care and bad debt – all private hospitals] (N=43)

Variable	Operating Margin	Total Margin
Charity care mix	0.01055 ***	0.01103 ***
Bad debt mix	-0.000292	-0.0034
Occupancy rate	0.05682	0.10494
Labor Intensity	6.25809	5.69074
Average Length of Stay	0.0055 **	0.00536
Case mix index	-0.04218 *	-0.05249 **
Medicaid mix	0.00008766	-0.00018341
Medicare mix	-0.00108	-0.00062829
Available Bed	0.00002121 ***	0.00004025
Outpatient mix	0.24819 **	0.28535 **
Intercept	-0.18523	-0.20782
R-squared	0.4796	0.4259
F value	2.95 ***	2.37 **

* statistically significant at the .1 level; ** .05 level; *** .01 level

Table 5. Ordinary Least Square Regression for the 2004 study
 [Charity care and bad debt – not-for-profit hospitals] (N= 39)

Variable	Operating Margin	Total Margin
Charity care mix	0.00999 ***	0.01013 ***
Bad debt mix	-0.00295	-0.0035
Occupancy rate	0.08614	0.15657 *
Labor Intensity	6.46378 *	6.67811
Average Length of Stay	0.00612	0.00544
Case mix index	-0.04641 **	-0.06255 **
Medicaid mix	0.00003306	-0.00011929
Medicare mix	-0.00121	-0.00037358
Available Bed	0.00004976	0.00005973
Outpatient mix	0.33225 ***	0.38775 **
Intercept	-0.23832	-0.30001
R-squared	0.538	0.5036
F value	3.26 **	2.84 ***

* statistically significant at the .1 level; ** .05 level; *** .01 level

Table 6. Ordinary Least Square Regression for the 2004 study
 [charity care and bad debt – all public hospitals]
 (N: Operating Margin=41 and Total Margin=42)

Variable	Operating Margin	Total Margin
Charity care mix	0.00097507	-0.00007531
Bad debt mix	-0.0142 ***	-0.00814 **
Occupancy rate	0.19604 ***	0.14739
Labor Intensity	0.71261	1.01094
Average Length of Stay	0.0398 **	0.01641
Case mix index	-0.00376	-0.00901
Medicaid mix	0.00041155	-0.0007288
Medicare mix	-0.00161	-0.002
Available Bed	-0.00064188 ***	-0.00033765 *
Outpatient mix	0.23556 **	0.1543
Interscept	-0.17895	-0.02047
R-squared	0.489	0.2828
F value	2.87 **	1.22

* statistically significant at the .1 level; ** .05 level; *** .01 level

Table 7. Ordinary Least Square Regression for the 2004 study
 [charity care and bad debt – non teaching public hospitals]
 (N: Operating Margin=39 and Total Margin=40)

Variable	Operating Margin	Total Margin
Charity care mix	-0.02765 *	-0.03486 **
Bad debt mix	-0.01578 ***	-0.00958 **
Occupancy rate	0.25781 ***	0.20774 **
Labor Intensity	0.43341	0.65188
Average Length of Stay	0.03035 *	0.00705
Case mix index	-0.00754	-0.01138
Medicaid mix	0.00011513	-0.00095772
Medicare mix	-0.00214	-0.00244
Available Bed	-0.00069224 **	-0.00027922
Outpatient mix	0.28175 **	0.21509 *
Interscept	-0.10901	0.03486
R-squared	0.5621	0.3888
F value	3.59 ***	1.84 *

* statistically significant at the .1 level; ** .05 level; *** .01 level

Figure 1. Washington Hospitals Uncompensated Care Provision, by Ownership Type

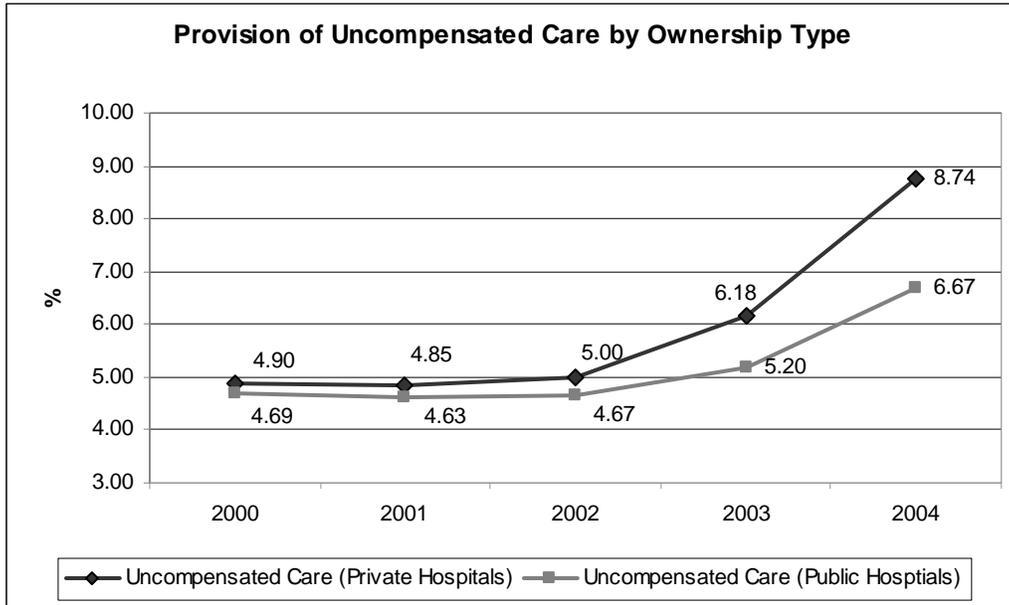


Figure 1. Uncompensated care as a percentage of net patient service revenue, by ownership type (Uncompensated care composed of charity care and bad debt. Private hospitals include not for-profit and for profit; private hospitals include district hospitals and state hospitals. Source: The Washington State Department of Health)

Figure 2. Washington Hospitals' Charity Care & Bad Debt Provision, by Ownership Type

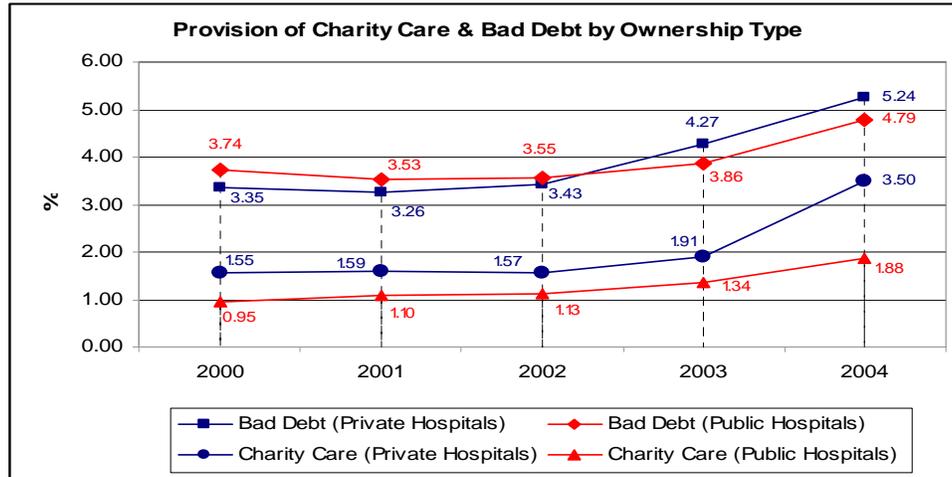


Figure 2. Charity care and bad debt as a percentage of net patient service revenue, by ownership type (Private hospitals include not for-profit and for profit; private hospitals include district hospitals and state hospitals. Source: The Washington State Department of Health)

Figure 3. The upper quartile hospitals having heavy burden of uncompensated care, by ownership type

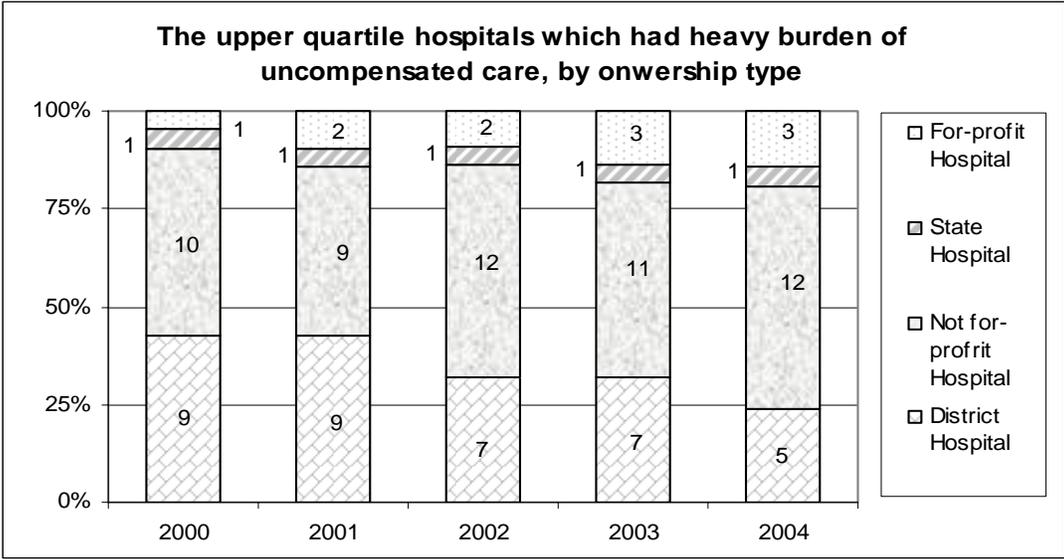


Figure 3. The number of hospitals composed of the top 25 percentile hospitals which provided high proportion of uncompensated care as a percentage of net patient service revenue, by ownership type

(Source: The Washington State Department of Health)

Figure 4-1. Operating Margin- Percent of WA hospitals falling into each national hospitals' quartile

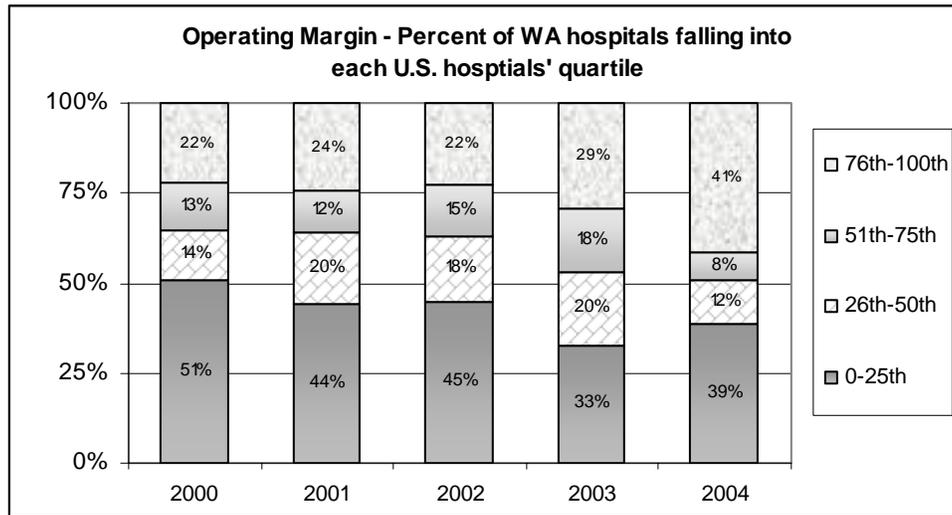


Figure 4-1. The percentage of hospitals the proportion of Washington hospitals that fall into the each quartile values for nation hospital's operating margin. (Source: The Washington State Department of Health, Solucient (2005), and HFMA (2004))

Figure 4-2. Operating Margin-Comparative and Trend Analysis

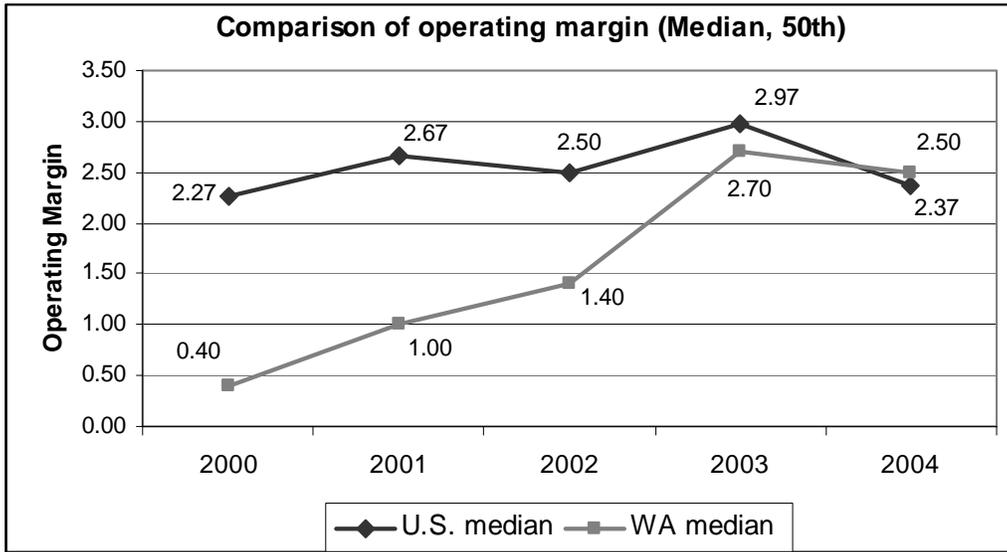


Figure 4-2. Operating margin comparison of the median (50%) value for Washington hospitals and those for nation hospitals (Source: The Washington State Department of Health, Solucient (2005), and HFMA (2004))

Figure 5-1. Total Margin – Percent of WA hospitals falling into each national hospital’s quartile

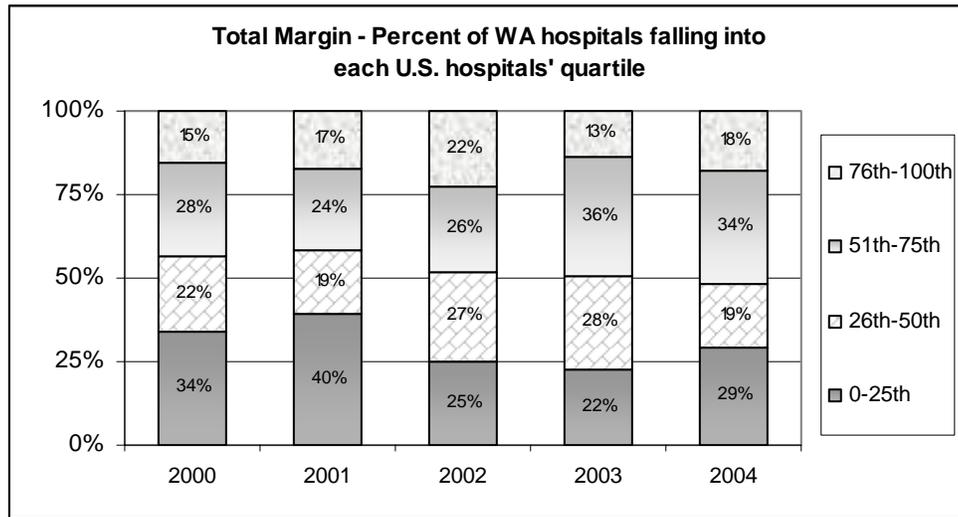


Figure 5-1. The percentage of hospitals the proportion of Washington hospitals that fall into the each quartile values for nation hospital’s total margin. (Source: The Washington State Department of Health, Solucient (2005), and HFMA (2004))

Figure 5-2. Comparative and trend analysis of total margin (Median)

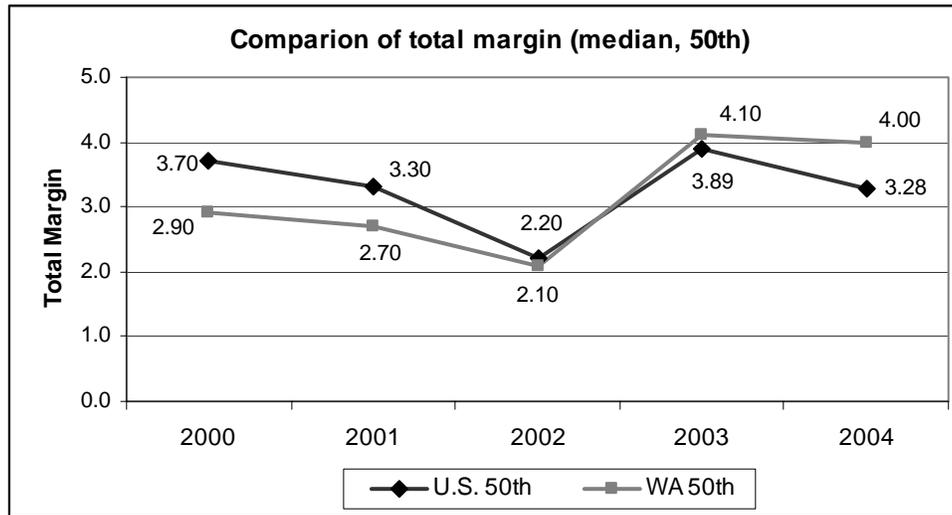


Figure 5-3. Total margin comparison of the median (50%) value for Washington hospitals and those for nation hospitals (Source: The Washington State Department of Health, Solucient (2005), and HFMA (2004))