

COST SHIFTING AND THE IMPACT OF NEW HOSPITALS ON EXISTING MARKETS

September 1, 2014



Wyoming Department of Health

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Commit to your health.

**Thomas O. Forslund
Director**

Wyoming Department of Health

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Executive Summary

In the 2014 Budget Session, a footnote added to Section 048 of the Budget Bill (House Enrolled Act 41) directed the Wyoming Department of Health (WDH) to study:

- 1) The extent of cost-shifting from Medicare, Medicaid, and uncompensated care to private payers, and
- 2) The impact of new hospitals on existing markets, if these new hospitals do not accept Medicare or Medicaid, or bear the burden of uncompensated care.

This report examines both academic literature and available data on Wyoming hospitals in an attempt to answer these questions. The report is structured in three parts:

- 1) The first part provides a background ‘primer’ on the Wyoming hospital market.
- 2) The second part analyzes the degree of cost-shifting in Wyoming.
- 3) The third part analyzes the impact of new physician-owned hospitals on existing markets.

FINDINGS: Cost Shifting in Wyoming

In its analysis of cost-shifting, the Department reached two main conclusions:

1. Cost shifting is only one of three potential strategies that hospitals can pursue in the face of revenue shortfalls.

The idea that hospitals may charge private payers higher prices (i.e. cost-shifting) in response to low reimbursement from public payers (or uncompensated care) is commonly discussed in debates over rising health care costs. However, economic theory predicts that cost-shifting is only one of three strategies that hospitals can pursue in the face of revenue shortfalls. Two other strategies, including cost-cutting and “volume shifting” (lowering private prices to attract more private volume) may also be used. Evidence suggests that, in Wyoming, some hospitals have to resort to these other strategies.

2. Hospitals’ ability to cost-shift depends on market power.

Market power, in this case, refers to a hospital’s position or standing in a local or regional hospital market in relation to private payers (e.g., insurers). A region or community with only one hospital would have a relatively concentrated hospital market; that sole hospital would likely not have to compete for customers based on the price of services, and would be said to have high market power.

A Department of Health analysis of available Wyoming data supports the conclusion that hospital market concentration is one of the more significant factors driving the prices that are paid by the private sector. Market power is more strongly associated with private prices than is uncompensated or unreimbursed care.¹

¹ The analysis drew on Wyoming Medicaid claims data on hospital patient flows to measure market concentration. It also used hospital claims data from the State’s Employee’s Group Insurance (administered by Cigna) to evaluate how hospital prices differ from the State’s average, after controlling for patient demographics, length of stay and diagnosis.

The results of this analysis are shown in Figure 1 (below). Here, the horizontal axis (“uncompensated average cost”) represents a calculated measure of uncompensated care that factors in (1) the average cost of care (e.g. per patient per day/visit), (2) the percent of those costs that are uncompensated, and (3) the amount of local government support received by the hospital. When the local support funds exceed the cost of uncompensated care reported, the value may be negative.

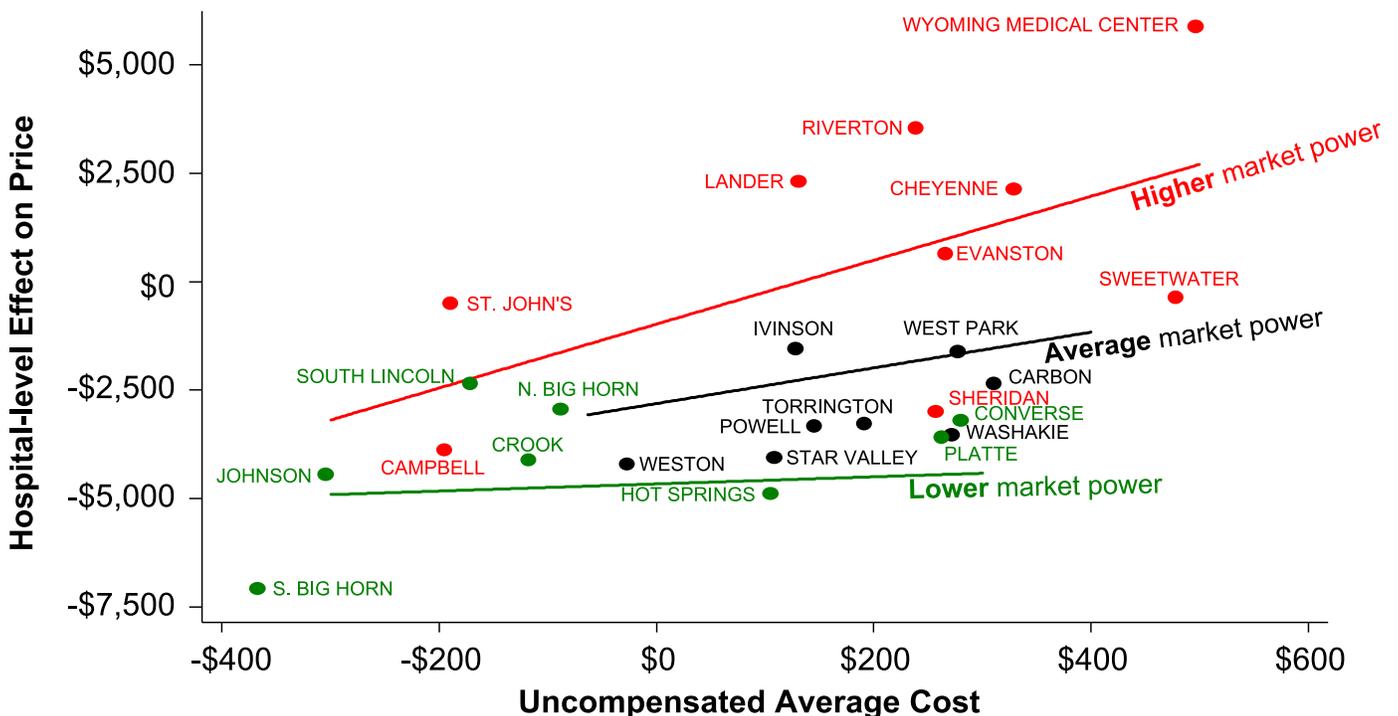
The vertical axis (“hospital level effect”) shows the difference between the average price paid for an episode of care at each hospital and Wyoming’s statewide average, controlling for length of stay, patient demographics, and diagnosis.

On the figure, the hospitals in green (e.g., South Big Horn, Platte, Converse County Memorial, etc.) have lower measured market power. The relatively flat slope for these hospitals (green line) indicates that hospitals in this category cannot or do not tend to increase prices in response to additional uncompensated care.

The hospitals in black are in the middle third in terms of market power, meaning they have more market power than those in green, but less than those in red. The hospitals in red have the most market power in the State, which means that these hospitals appear to be able to increase prices for private payers in response to uncompensated care.

The figure boils down to one takeaway: while uncompensated care is associated with higher prices, the degree to which hospitals increase prices to cope with uncompensated care (the increasing slopes of the three lines) depends on the relative market power of the hospital.

Figure 1: Relationship between average hospital-level price differences and uncompensated average cost, for hospitals with higher, average, and lower market power



FINDINGS: Impact of New Physician-Owned Hospitals

The second analysis presented in this report evaluated the impact of new hospitals on existing markets if these new hospitals do not accept Medicare or Medicaid, or bear the burden of uncompensated care. As a starting point for this analysis, the Department of Health examined commonly-listed objections to new physician-owned hospitals in the light of available data and economic theory. These objections include:

- 1) New hospitals will take away existing hospitals' Sole Community Hospital (SCH) status, endangering existing hospitals' ability to provide care in their communities.
- 2) New hospitals "skim the cream" by taking only private patients, leaving the burden of uncompensated care and public payers (Medicare/Medicaid) to the community hospitals.
- 3) Additional competition in hospital markets will add excess capacity that drives increased utilization, raising health care costs.

In regard to the common objections listed above, the analysis in this report supports the following conclusions:

1. New physician-owned hospitals will not generally affect existing hospitals' Sole Community Hospital (SCH) designation.

While it is true that Wyoming Medical Center in Casper lost SCH status in 2010 with the introduction of Mountain View Regional hospital, Section 6001 of the Patient Protection and Affordable Care Act ("the ACA") now effectively prohibits new physician-owned hospitals from participating in Medicare/Medicaid. Because they cannot participate in Medicare/Medicaid, any new physician-owned hospital will also not be considered a "like" hospital in counting against an existing community hospital's SCH status.

2. Being prohibited from taking Medicare and Medicaid patients is not an advantage.

The idea that hospitals might "skim the cream" by only accepting private-pay patients and not "having to" take Medicare/Medicaid patients is also commonly cited in this debate. While on the surface, it might seem beneficial for a hospital to serve better-paying customers, in reality, being forced to miss out on a large revenue stream (e.g Medicare and Medicaid patients) is a disadvantage. This is because even though Medicare pays less than *average* cost, a rational revenue-maximizing hospital will take public payer patients until the *marginal* cost -- not average cost -- of those patients exceeds the revenue received.

3. Additional competition is not an imminent threat to existing hospitals.

Measured on indicators of liquidity, profitability, and capital structure, Wyoming hospitals are generally more financially secure than the national average.²

² See Table 6 in Part I, calculated from CMS Hospital Cost reports from FY2011.

4. Competition generally benefits consumers.

While the hospital market is far from being a free market, any private insurer with a responsibility to its policyholders *will* negotiate with providers over price. Available evidence suggests that the entry of Mountain View Regional to Casper in 2008 increased the competitiveness of the local hospital market and reduced growth in privately-paid prices.

5. The net effect of additional hospitals on health care costs is unclear

The objection that additional hospitals create capacity that may encourage excessive utilization should be taken seriously. If patients can access care more readily, it is always possible that more care will be utilized. However, with the data that is currently available, it is impossible to determine whether or not the effects of increased quantity will overshadow any price effects from competition when it comes to total health care costs. Ultimately, insurance companies may be better able to address concerns about increased utilization through requirements for higher beneficiary cost-sharing.

Recommendations

The Department's analysis leads to two primary recommendations:

1. The balance of evidence points away from an increased regulatory role for the State of Wyoming in preventing the establishment of new hospitals.

The findings from this study indicate that increased competition among hospitals will generally benefit consumers. If lower prices and increased supply do encourage increased utilization, the growth in health care costs is best controlled by insurers through increased cost-sharing (versus the State attempting to control supply or protect existing industry). Government regulation may be necessary when there are large negative costs outside of the market, but when these costs are contained within the market (e.g. in market prices), regulation is typically an inefficient way of achieving desired outcomes.³

2. A better role for the State may be increasing price transparency through the establishment of an All-Payer Claims Database

While this study accomplished the tasks set out in the legislation, its process was significantly limited by lack of available data, specifically on the prices paid to hospitals by most insurers. The Department of Health sought claims data from both Blue Cross Blue Shield and the Wyoming Hospital Association, only to be told that actual prices paid were proprietary. Prices negotiated in secret not only make analysis difficult; they also reduce informed consumer choice in health care. An All-Payer Claims Database⁴ (APCD) may therefore be in the best interests of Wyoming businesses and consumers. As is the case with almost all APCDs, the State would serve an important role as a neutral third-party capable of (a) storing data securely, (b) processing and analyzing claims information to answer public policy questions, and (c) having the authority to enforce timely reporting of data by payers.

³ A discussion on microeconomic theory of free markets, prices and market failures can be found here: <http://www.econlib.org/library/Topics/College/marketfailures.html> - relevant authors include Pigou and Coase.

⁴ More information on All-Payer Claims Databases can be found here: <http://apcdcouncil.org/>

Background: Legislative Mandate

In the 2014 Budget Session, a footnote was added to Section 048 of the Budget Bill (House Enrolled Act 41) directing the Department of Health to conduct a study to define the impact of new hospitals on existing hospital markets. Specifically, footnote 3 to Director's Office line item reads:

3. With the resources provided by this line item⁵ the department shall conduct a study to define the impact of independent hospitals. The study shall determine the cost shift from Medicare, Medicaid and indigent care and define the impact that new independent hospitals will have on existing hospitals if the new hospitals do not treat Medicare, Medicaid or indigent patients. The study shall be submitted to the joint labor, health and social services interim committee not later than September 1, 2014.

Study Purpose and Scope

The language of the footnote specifies two distinct (and related) purposes for this study:

- (1) To determine extent of hospital cost-shifting from public-payer and uncompensated care to private payers.
- (2) To define the impact on existing hospitals if new independent hospitals do not take public-payer patients or bear the cost of uncompensated care.

Determining the extent of hospital cost shifting (1) is prerequisite to evaluating the impact a new hospital may have on any given hospital market in Wyoming (2). The Department therefore structured this report in three main parts:

Part I - Wyoming Hospital Market Primer. This is a background section describing the Wyoming hospital markets in terms of size, type, ownership, geography, average cost, uncompensated care and overall financial health. This section is intended to provide context to the study and establish a base of information that is used in Parts II and III.

Part II - The Extent of Cost Shifting. This section defines the phenomenon of cost-shifting, explores existing academic literature, and uses available data in Wyoming to attempt to determine the extent of cost-shifting and potential underlying factors.

Part III - The Impact of New Hospitals on Existing Markets. This section presents a case study of Wyoming Medical Center's balance sheet after the introduction of Mountain View Regional Hospital and draws on evidence from the previous two sections in attempting to frame the impact of new physician-owned hospitals on existing markets.

⁵ No appropriation was provided to the WDH for the study.

Part I: Wyoming Hospital Market Primer

Overview

This section provides background information on the Wyoming hospital market. It is intended to illustrate general context, but two specific conclusions regarding average cost and uncompensated care are carried forward and used in subsequent analysis.

The primer begins by exploring basic characteristics of hospitals: size (number of beds vs. average census), ownership type, and category -- the special Medicare distinctions of Critical Access Hospital and Sole Community Hospital, which become relevant in Part III of this report. The role of geography in defining local markets will also be discussed.

Next, the report examines a measure of average cost. The analysis attempts to standardize average cost as much as possible and break down the types of services, by hospital, that go into this cost. Uncompensated care is then considered in the context of average cost, as well as local government support to hospitals, in order to attempt to develop a good indicator of the average dollar burden of uncompensated care for each hospital.

The analysis concludes with a discussion of basic indicators of financial health, to include liquidity, profitability and capital structure, and demonstrates that Wyoming hospitals are generally more financially secure than the national average.

Available data

All hospital information is drawn from fiscal year (FY) 2011 hospital cost report data from the Centers for Medicare and Medicaid Services (CMS)⁶. This is the only publicly-available and comprehensive dataset on hospital statistical data, costs and operational indicators. Some caveats include:

- As of June 2014, FY 2011 was the latest dataset available with all Wyoming hospitals reporting.⁷
- Cost reports are focused on calculating Medicare reimbursement, not providing data on private sector care. All figures regarding private payers had to be calculated by subtracting Medicare, Medicaid, S-CHIP, Title V, and uncompensated care from totals.
- Cost report data are self-reported by hospitals or the contractors they hire. Reports are rarely audited, and quality is therefore uneven. Worksheets that determine Medicare reimbursement (A-E) are likely to be more accurate than the purely statistical worksheets (S-series, G-series). This study therefore makes a practice of reporting national benchmarks using medians instead of means, to prevent outliers from skewing averages.

⁶ Details on acquiring and using CMS Hospital Cost Reports are in Appendix E.

⁷ Hospitals do not necessarily report on the same fiscal year schedule.

Basic facts

30 hospitals in Wyoming are registered as providers with CMS. Two of these 30 specialize in psychiatric care (the Wyoming State Hospital and Wyoming Behavioral Institute) and one, Elkhorn Valley, specializes in rehabilitative care. The remaining 27 general acute-care hospitals⁸ are the focus of the study.

These hospitals are listed in Table 1 (located on page 14) along with some basic characteristics, including: location, ownership, number of licensed beds and average daily census (ADC). National benchmarks (medians, to prevent undue influence from outliers) are provided for the relevant size categories.

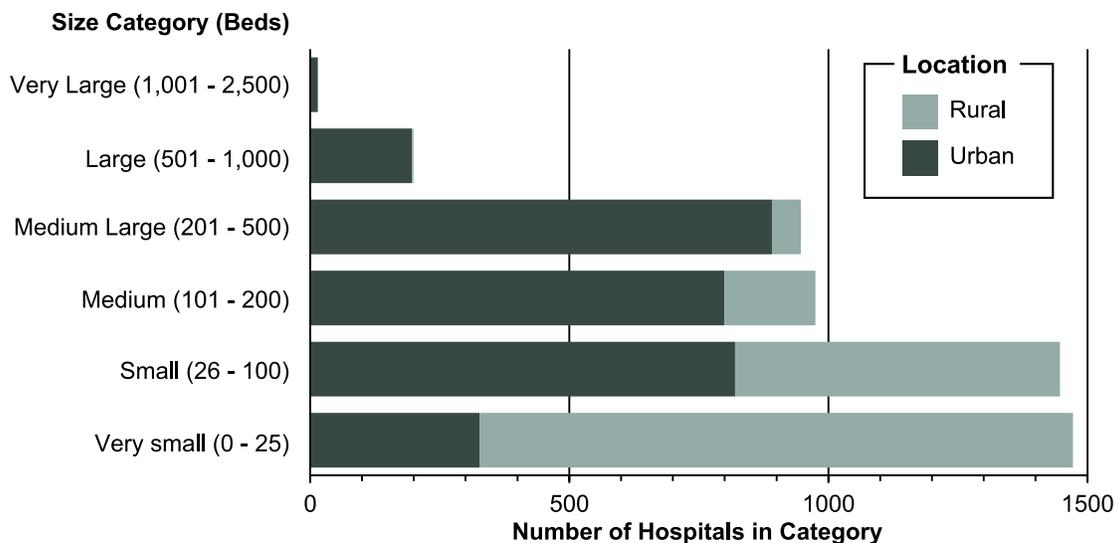
Size

This study categorizes hospitals by size according to the number of licensed beds:

“Very small”	1 to 25 beds
“Small”	26 to 100 beds
“Medium”	101 to 200 beds
“Medium Large”	201 - 500 beds
“Large”	501 - 1,000 beds
“Very Large”	1,001 to 2,500 beds

Figure 2, below, shows the number of CMS-registered hospitals in the United States by size category and by rural or urban location.

Figure 2: Rural hospitals in the United States, by size category. CMS, FY11, Worksheet S-2.



⁸ Mountain View Regional is a specialty hospital, but licensed with CMS for general acute care. It will be noted as an outlier, along with Niobrara, in subsequent analysis.

While many of the smaller hospitals are licensed for 25 beds, it is important to note that they are typically staffed and run in proportion to their average daily census, not their bed capacity. For smaller Critical Access Hospitals, this ranges between 2 - 10 patients per day.

Teaching status

Teaching hospitals incur additional expenses in educating residents and interns. These costs can be direct (stipends) or indirect (additional tests, slower procedures done for educational purposes). Most hospitals with more than 200 beds are teaching hospitals; about 30% of Medium-sized hospitals indicate a teaching function.

In Wyoming, both Wyoming Medical Center and Cheyenne Regional Medical Center are listed as teaching hospitals. Both have 8 residents and interns counted in the cost reports, out of 1,066 and 1,546 total paid employees, respectively.

Critical Access and Sole Community Hospitals

The majority of acute care hospitals in Wyoming (16 of 27) are Critical Access Hospitals (CAHs). CAH is a special designation from CMS that exempts the hospital from the usual Medicare prospective payment system (i.e., receiving a set payment based on required diagnosis-related care, putting the hospital at risk for cost), allowing them to receive cost plus 1% reimbursement for the Medicare patients they see.⁹

Critical Access Hospital (CAH)

Among other administrative requirements, a Critical Access Hospital must:

- Provide 24/7 emergency services in a rural area;
- Be located outside 35 miles from the nearest hospital, or more than 15 miles away in areas with mountainous terrain or only secondary roads;
- Maintain no more than 25 inpatient beds;
- Maintain an annual average length of stay of 96 hours or less for acute inpatient care (excluding swing beds).

Nationally, 83% of “Very small” hospitals nationally are designated as Critical Access Hospitals.

In addition to Critical Access Hospitals, many other hospitals in rural areas are registered with CMS as having Sole Community Hospital (SCH) status.¹⁰ Sole Community Hospitals, while reimbursed under the standard Inpatient Prospective Payment System (IPPS), receive additional payments from CMS.

⁹ CMS Rural Health Fact Sheet: Critical Access Hospital. ICN 006400, Dec. 2013. <http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/CritAccessHospfctsht.pdf>

¹⁰ CMS Rural Health Fact Sheet: Sole Community Hospital. ICN 006399, Jan. 2014. <https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/SoleCommHospfctsht508-09.pdf>

The distribution of SCH designation by size category in the United States can be seen in Figure 3, below. Note that SCH hospitals tend to be smaller facilities (<100 beds), but larger than Critical Access Hospitals (25 beds or less).

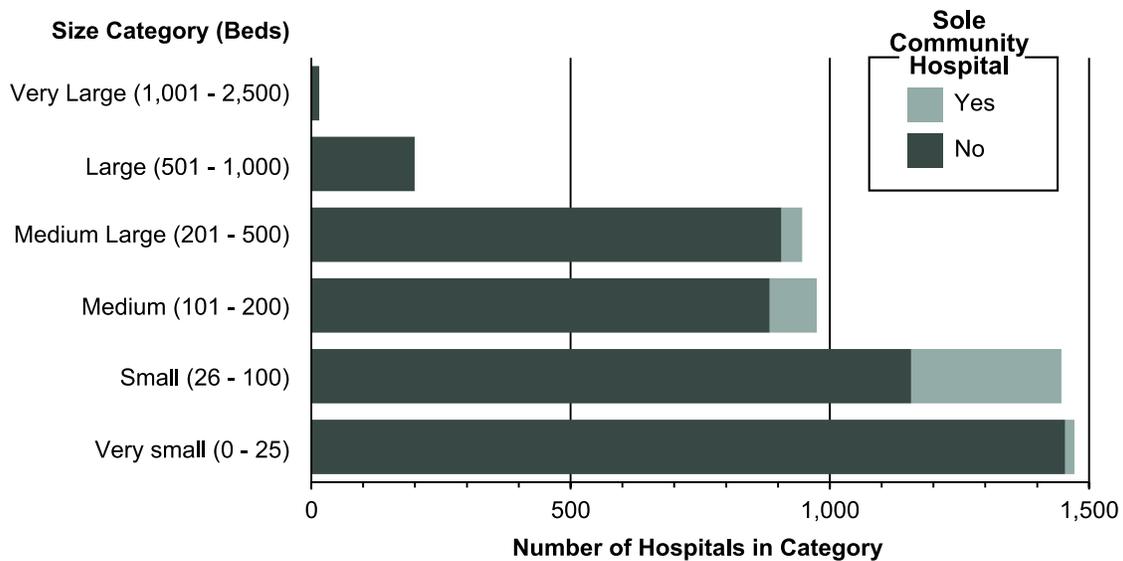
Sole Community Hospital (SCH)

Among other administrative requirements, an SCH must be located:

- At least 35 miles from other “like” hospitals, or
- In a rural area between 25 - 35 miles from other like hospitals and:
 - No more than 25% of inpatients in the hospital service area are admitted to other like hospitals within 35-mile radius or
 - The hospital has less than 50 beds and would meet the 25% criteria if it offered specialized care available at other hospitals.
- In a rural area between 15 - 25 miles from other like hospitals, but due to local terrain, other hospitals are inaccessible for at least 30 days in each 2 of every 3 years, or
- In a rural area and travel time to the nearest like hospital is over 45 minutes.

A “like” hospital provides acute care under Medicare IPPS, is not a CAH, and services more than 8 percent of inpatient days within the hospital service area.

Figure 3: SCH designation in the United States, by size category. CMS Hospital Cost Reports, FY 11



As seen in Table 1 (page 14), almost all non-CAH general acute hospitals in Wyoming had SCH designation in 2011. Wyoming Medical Center (WMC) and the physician-owned competitor, Mountain View, are the two exceptions. WMC lost SCH designation, retroactive to 2010, when Mountain View Regional gained a certain share of inpatient admissions in Casper.

Both CAH and SCH designation are key considerations in determining the potential effects of an additional hospital opening in a given market.

Ownership

Most Wyoming hospitals are run by a non-profit (14) or local/county/hospital district government (7). Six are for-profit. One of these -- Mountain View Regional -- is physician owned.

Geography

Hospital markets are fundamentally local; with the exception of needing specialized care, people generally want to stay close to family and friends.¹¹

Exhibit 1 (page 15) shows the location of Wyoming hospitals in the context of the geography that affects travel time and access to care -- population centers, roads and topography. Exhibit 2 (page 16) shows Wyoming hospitals in the context of surrounding states.

These graphics are intended largely for situational awareness -- giving the reader an idea exactly where South Lincoln Hospital, for example, is located. Note, however, that hospitals and hospital sizes both tend to mirror population concentrations, represented by small dots on Exhibit 1 and county shading on Exhibit 2.

Additionally, note that topography and roads help shape these markets. Exhibit 3 (page 17) uses network analysis¹² of Medicaid inpatient city-hospital flow data to show how hospitals cluster into 'markets.' These markets include main out-of-state competitors like Poudre Valley (Ft. Collins, CO), Rapid City (South Dakota), and Billings Clinic (Montana).

These markets correspond well to geographic features. The Lander/Riverton market, for example, is sharply separated from Thermopolis by the Wind River Canyon. The Basin is similarly divided from Sheridan/Buffalo by the Big Horn Mountains.

¹¹ The relationship between consumer demand for hospital services and travel time is demonstrated in Appendix C (page 56)

¹² Modularity class statistics calculated using Gephi software after excluding > 120 minute trips. Theory behind modularity can be found in Newman, M.E.J. "Modularity and community structure in networks," Proceedings of the National Academy of Sciences. June 6, 2006. Vol. 103, No. 23. <http://www.pnas.org/content/103/23/8577.full.pdf+html>

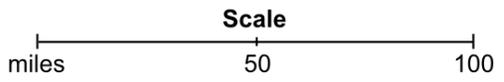
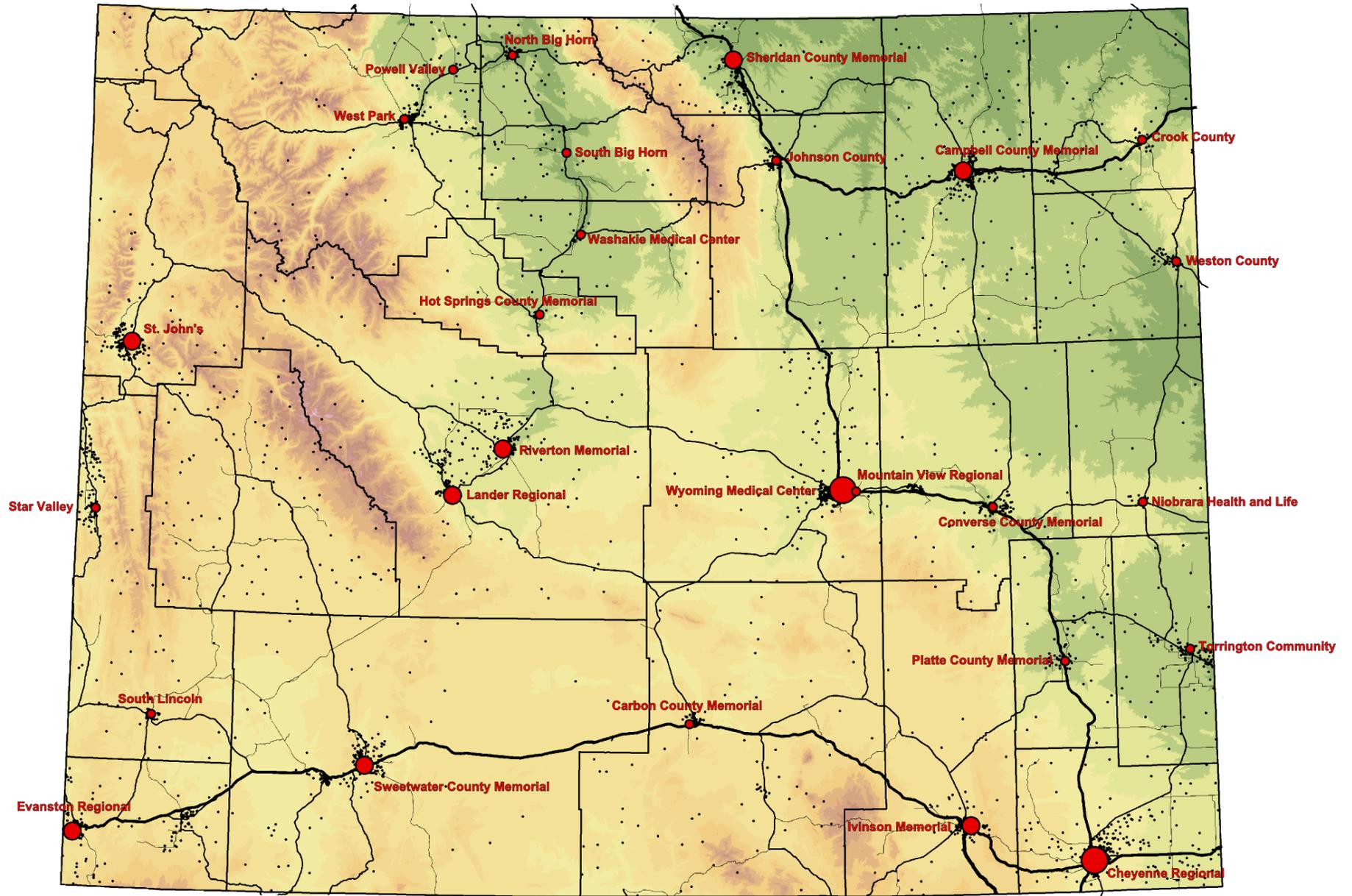
Table 1: Wyoming Hospitals, by Type, Ownership, Licensed Beds, and Average Daily Census (CMS, FY11, Worksheet S-2)

Hospital	City	CAH	SCH	Ownership	System	Size Category	Beds	ADC
South Big Horn	Basin			Non-profit		Very Small	6	2.3
North Big Horn	Lovell			For-profit	Billings Clinic	Very Small	13	5.2
South Lincoln	Kemmerer			Government		Very Small	14	2.5
Johnson County	Buffalo			Non-profit		Very Small	15	5.7
Crook County	Sundance			For-profit	Regional Health	Very Small	16	2.1
Star Valley	Afton			Non-profit		Very Small	20	6.4
Weston County	Newcastle			Government	Regional Health	Very Small	21	6.0
Mountain View Regional	Casper			For-profit - Physician		Very Small	23	8.2
Niobrara Health and Life	Lusk			Non-profit	Wyoming Medical Center	Very Small	24	20.4
Carbon County Memorial	Rawlins			Non-profit	QHR	Very Small	25	7.3
Community Hospital	Torrington			Non-profit	Banner Health	Very Small	25	8.9
Converse County Memorial	Douglas			Non-profit		Very Small	25	9.5
Hot Springs County Memorial	Thermopolis			Non-profit	HealthTech	Very Small	25	5.7
Platte County Memorial	Wheatland			Non-profit	Banner Health	Very Small	25	5.7
Powell Valley	Powell			Non-profit	HealthTech	Very Small	25	9.8
Washakie Medical Center	Worland			Non-profit	Banner Health	Very Small	25	9.2
West Park	Cody			Non-profit	QHR	Very Small	25	16.8
Evanston Regional	Evanston			For-profit	CHS	Small	32	7.2
St. John's	Jackson			Government		Small	40	19.7
Riverton Memorial	Riverton			For-profit	LifePoint	Small	59	15.7
Lander Regional	Lander			For-profit	LifePoint	Small	65	18.7
Sheridan County Memorial	Sheridan			Government		Small	65	26.8
Iverson Memorial	Laramie			Government	University of Colorado	Small	66	22.9
Campbell County Memorial	Gillette			Non-profit		Small	78	36.8
Sweetwater County Memorial	Rock Springs			Government		Small	99	18.6
Cheyenne Regional	Cheyenne			Government		Med - Teaching	170	108.7
Wyoming Medical Center	Casper			Non-profit		Med - Teaching	172	105.1
National Benchmarks (medians, 5048 hospitals reporting)						Very Small	25	7.3
						Small	52	24.9
						Med - Teaching	157	96.89

Wyoming Hospital Geography

CMS Hospital Cost Reports, FY2011 / 2010 US Census / Open Street Maps / National Elevation Dataset

Exhibit 1



Note: Hospitals (red dots) are sized by licensed beds. Each black dot represents 100 persons.

Hospitals in Wyoming and Surrounding States, by Beds

CMS Hospital Cost Reports, FY2011 / US Census

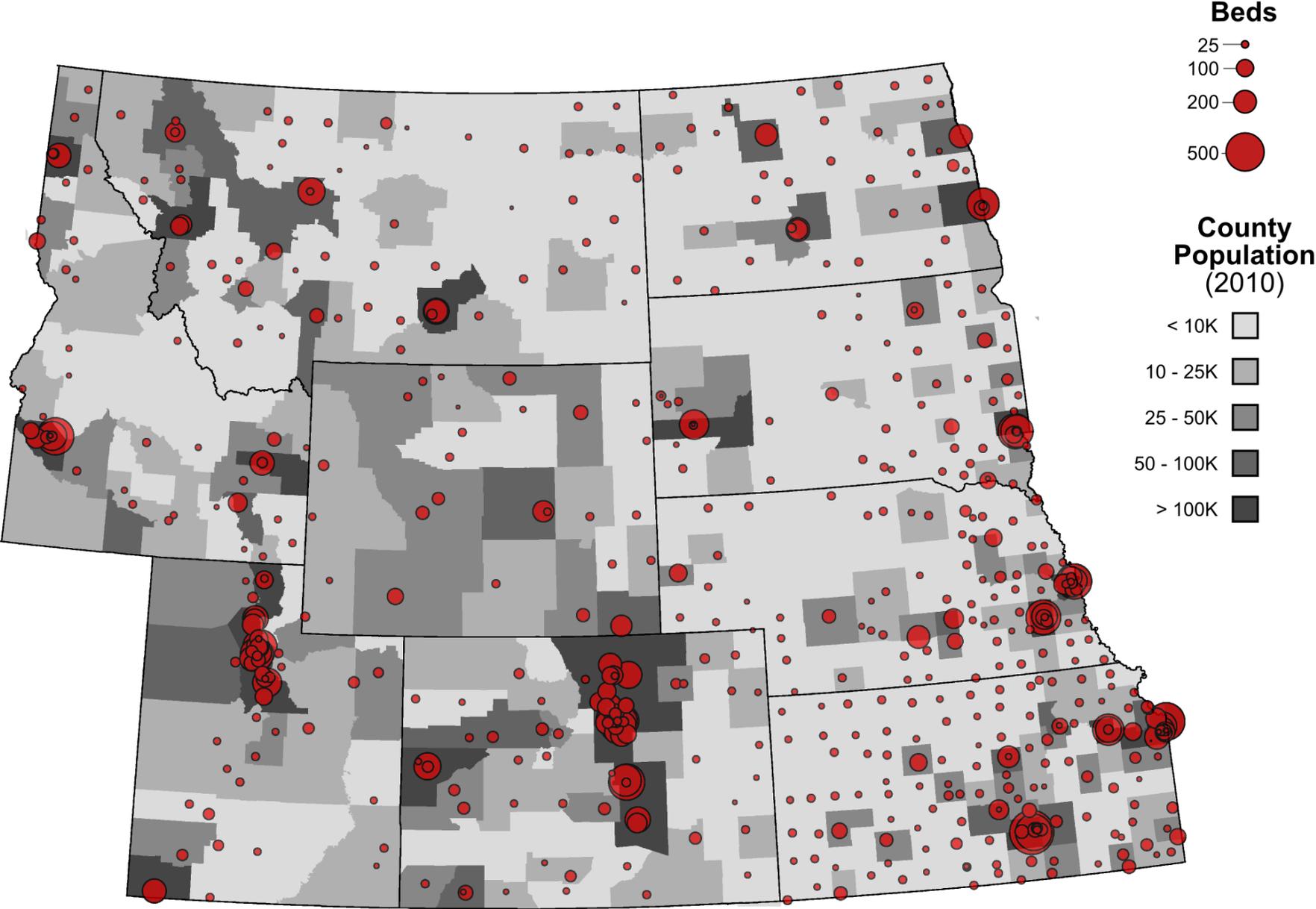
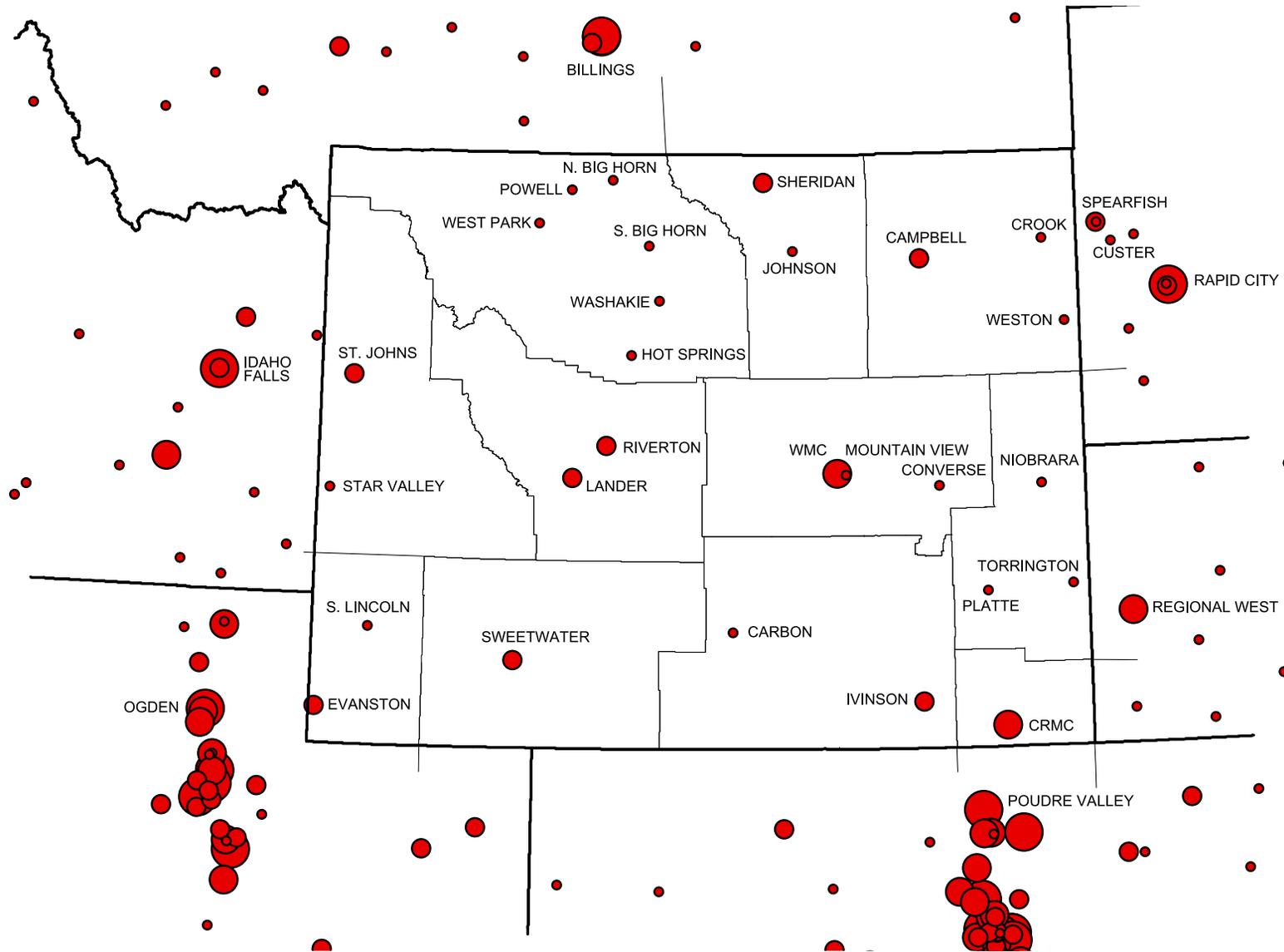


Exhibit 3: Wyoming hospital ‘markets,’ as determined from Medicaid inpatient data; county lines have been altered to reflect these ‘markets’ (WY Medicaid claims data, FY09 - FY13)

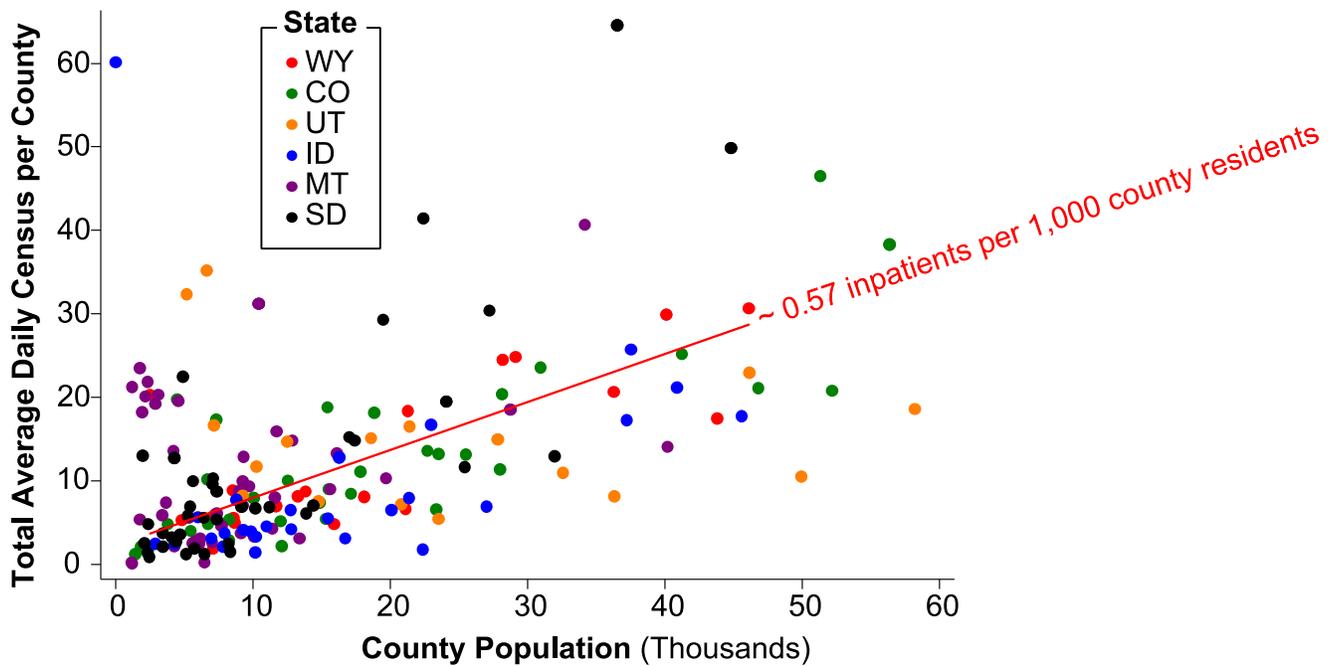


Wyoming's beds and average census per 1,000 county residents are in line with regional averages

As mentioned previously, Exhibit 2 (page 16) raises the question of whether or not there is a relationship between licensed beds and county population. There is. The regional average for the nine states shown on the map is 2.1 beds per 1,000 county residents.¹³ Wyoming's average is 2.2 beds per 1,000 residents, which is in line with this average.

The beds-to-population relationship breaks down in the smaller counties, however. Note from Table 1 (page 14) that Critical Access Hospitals are often licensed for 25 beds, but almost never serve that many people. To account for this, Figure 4, below, shows the total Average Daily Census (ADC) for smaller (<60,000 people) counties in Wyoming and surrounding states.

Figure 4: Average Daily Census (total, by county) vs. county residents in Wyoming and surrounding states. Each dot represents a county. (CMS FY11 Worksheet S-2 and 2010 US Census)



While noting the relationship between county population and average daily census, this study does not attempt to determine whether or not the level of beds per county residents is “efficient,” or whether or not those beds should be concentrated in one hospital or spread through several hospitals.

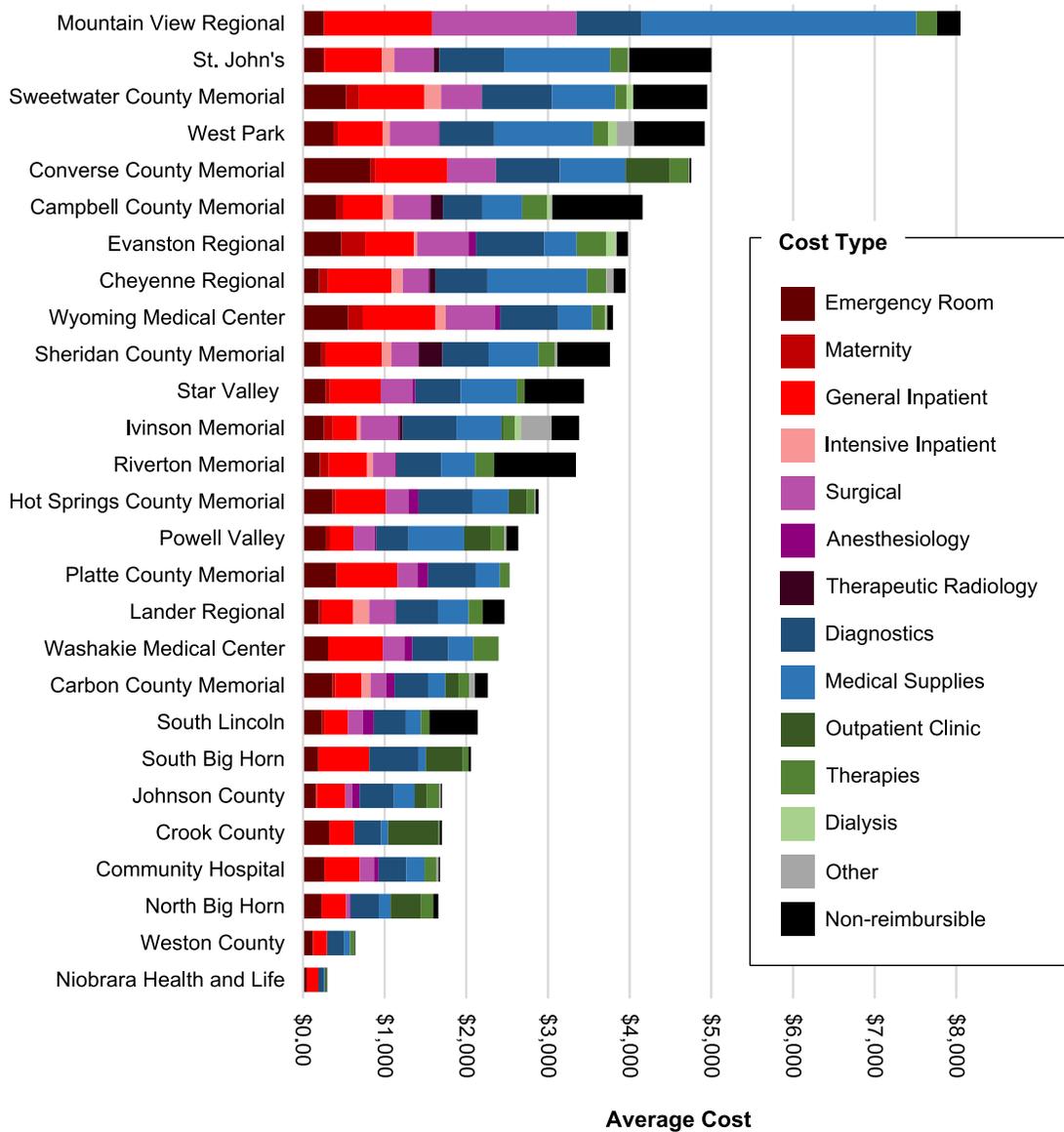
¹³ Using 2010 Census data against FY 2011 CMS Cost Report data.

Estimating the average cost of care

Determining the “average cost of care” across hospitals is complex; even beyond the inpatient vs. outpatient distinction, hospitals’ “products” vary significantly based on capabilities and patient/diagnosis mix. Only a best estimate can be presented here.¹⁴

Figure 5 breaks down average cost into specific cost centers, arranged in logical groupings, from the ER to outpatient therapies and non-reimbursable¹⁵ costs.

Figure 5: Average costs for Wyoming hospitals, allocated across core cost centers (CMS, FY11)



¹⁴ Details on how these costs were calculated can be found in Appendix A (beginning on page 44)

¹⁵ The bulk of non-reimbursable costs go to physician’s private offices whose services do not go to hospital patients. Other non-reimbursable costs include gift/flower/coffee shops, research expenses, and costs associated with non-paid workers.

Uncompensated and unreimbursed care

CMS and the American Hospital Association (AHA)¹⁶ break uncompensated care into two categories: charity care, which is provided without expectation of payment, and bad debt, where payment is anticipated but not received. In order to standardize the data, both CMS and the Hospital Association report uncompensated care in terms of the *cost* it took to provide that care, not in terms of billed *charges*. This is for two reasons:

- Charge-setting practices vary widely among hospitals. In most cases, charges do not reflect underlying cost; they are often set to maximize revenue in certain areas in order to pay for less profitable cost centers.¹⁷
- Charges rarely reflect the prices paid by most payers. Insurers typically either negotiate percentage discounts from charges (as is the case in Wyoming), or pay negotiated bundled or capitated rates that ignore charges altogether. It is not reasonable to assume that uninsured patients who fail to pay their bills *would have* paid more than the fully-insured.

Unreimbursed care is provided to patients whose payer reimburses the hospital at less than the cost of care. This payer could be Medicare, Medicaid or even a private insurer with strong bargaining power. In order to align with the CMS cost reporting data, however, only the degree to which the cost of serving *Medicaid* clients exceed *Medicaid* revenue will be considered unreimbursed care in this study.

In FY2011, Wyoming hospitals absorbed just over \$106 million in uncompensated and unreimbursed care costs. This cost estimate is approximately half of the uncompensated care figure reported by the Wyoming Hospital Association, which relies on billed charges.¹⁸ Table 2, on the next page, shows the degree of uncompensated and unreimbursed care for each hospital. In addition to the total dollar figure reported for each category, uncompensated and unreimbursed care is shown as a percent of total costs in order to facilitate cross-hospital comparisons.

Local governments offset some uncompensated care

The issue of uncompensated care is complicated by subsidies and non-operating revenue payments from local hospital districts and county governments. CMS cost report data indicates that Wyoming hospitals received a total of \$41 million in local government support in 2011. Table 3, on page 22, attempts to capture the degree of local government support to each hospital¹⁹ as an offset to the cost of uncompensated care. This table does not capture implicit subsidies received by hospitals such as Wyoming Medical Center, whose fixed capital requirements are leased from the county in exchange for uncompensated and inmate care.²⁰

¹⁶ American Hospital Association. "Uncompensated hospital care cost fact sheet." Jan 2013.

<http://www.aha.org/content/13/1-2013-uncompensated-care-fs.pdf>

¹⁷ Lewin Group. "A Study of Hospital Charge Setting Practices." Dec. 2005. No. 05-4.

http://www.medpac.gov/documents/dec05_charge_setting.pdf

¹⁸ <http://www.wyohospitals.com/pdf/archive/2012/Newsbriefs%206-22-12.pdf>

¹⁹ Line 23 and, in some cases, line 24 from Other Income (Worksheet G-3)

²⁰ http://trib.com/news/local/casper/wyoming-medical-center-meets-its-lease-obligations-with-natrona-county/article_50447cab-4416-5d11-8967-8ecab76613c7.html

Table 2: Wyoming Hospitals, Uncompensated Care Costs (CMS, FY11)

Hospital	City	Category	Unreimbursed	Bad Debt	Charity	Total	% of Cost
South Big Horn	Basin	Very Small	\$203,389	\$101,740	\$73,790	\$378,919	6.4%
North Big Horn	Lovell	Very Small	\$560,522	\$368,020	\$454,568	\$1,383,110	9.6%
South Lincoln	Kemmerer	Very Small	\$226,101	\$759,197	\$295,579	\$1,280,877	10.0%
Johnson County	Buffalo	Very Small		\$725,045	\$89,051	\$814,096	4.5%
Crook County	Sundance	Very Small	\$402,656	\$62,729		\$465,385	6.8%
Star Valley	Afton	Very Small	\$220,953	\$862,878	\$294,878	\$1,378,709	6.0%
Weston County	Newcastle	Very Small		\$392,284	\$125,525	\$517,809	4.9%
Mountain View Regional	Casper	Very Small	\$877,902	\$903,157		\$1,781,059	5.1%
Niobrara Health and Life	Lusk	Very Small	\$654,752	\$305,741	\$68,919	\$1,029,412	17.0%
Carbon County Memorial	Rawlins	Very Small	\$269,604	\$2,172,433	\$773,636	\$3,215,673	15.0%
Community Hospital	Torrington	Very Small	\$804,463	\$466,363	\$773,763	\$2,044,589	11.4%
Converse County Memorial	Douglas	Very Small	\$1,265,309	\$2,200,265		\$3,465,574	9.8%
Hot Springs County Memorial	Thermopolis	Very Small		\$708,743	\$102,676	\$811,419	5.8%
Platte County Memorial	Wheatland	Very Small	\$179,182	\$641,883	\$611,517	\$1,432,582	10.4%
Powell Valley	Powell	Very Small	\$836,252	\$1,587,383		\$2,423,635	5.5%
Washakie Medical Center	Worland	Very Small	\$267,253	\$679,600	\$947,717	\$1,894,570	11.4%
West Park	Cody	Very Small	\$574,550	\$2,388,346	\$495,966	\$3,458,862	5.6%
Evanston Regional	Evanston	Small	\$603,676	\$793,817	\$41,414	\$1,438,907	6.7%
St. John's	Jackson	Small	\$1,289,334	\$2,345,710	\$540,647	\$4,175,691	5.8%
Riverton Memorial	Riverton	Small	\$76,723	\$2,177,758	\$91,919	\$2,346,400	7.1%
Lander Regional	Lander	Small	\$292,207	\$1,448,054	\$57,463	\$1,797,724	5.3%
Sheridan County Memorial	Sheridan	Small	\$676,775	\$3,004,780	\$654,496	\$4,336,051	7.2%
Ivinson Memorial	Laramie	Small	\$429,221	\$2,679,402	\$482,136	\$3,590,759	6.0%
Campbell County Memorial	Gillette	Small		\$7,554,290	\$3,673,192	\$11,227,482	9.1%
Sweetwater County Memorial	Rock Springs	Small	\$224,685	\$3,978,659	\$960,205	\$5,163,549	9.7%
Cheyenne Regional	Cheyenne	Med- Teaching	\$1,655,506	\$12,539,013	\$5,070,478	\$19,264,997	8.3%
Wyoming Medical Center	Casper	Med - Teaching	\$4,685,308	\$10,535,433	\$9,788,942	\$25,009,683	13.1%
National Benchmarks (medians, 5055 hospitals reporting)		Very Small	\$344,478	\$488,988	\$163,956	\$997,422	6.3%
		Small	\$1,071,957	\$977,935	\$586,362	\$2,636,254	6.0%
		Med - Teaching	\$3,339,939	\$2,768,842	\$2,888,892	\$8,997,673	6.6%

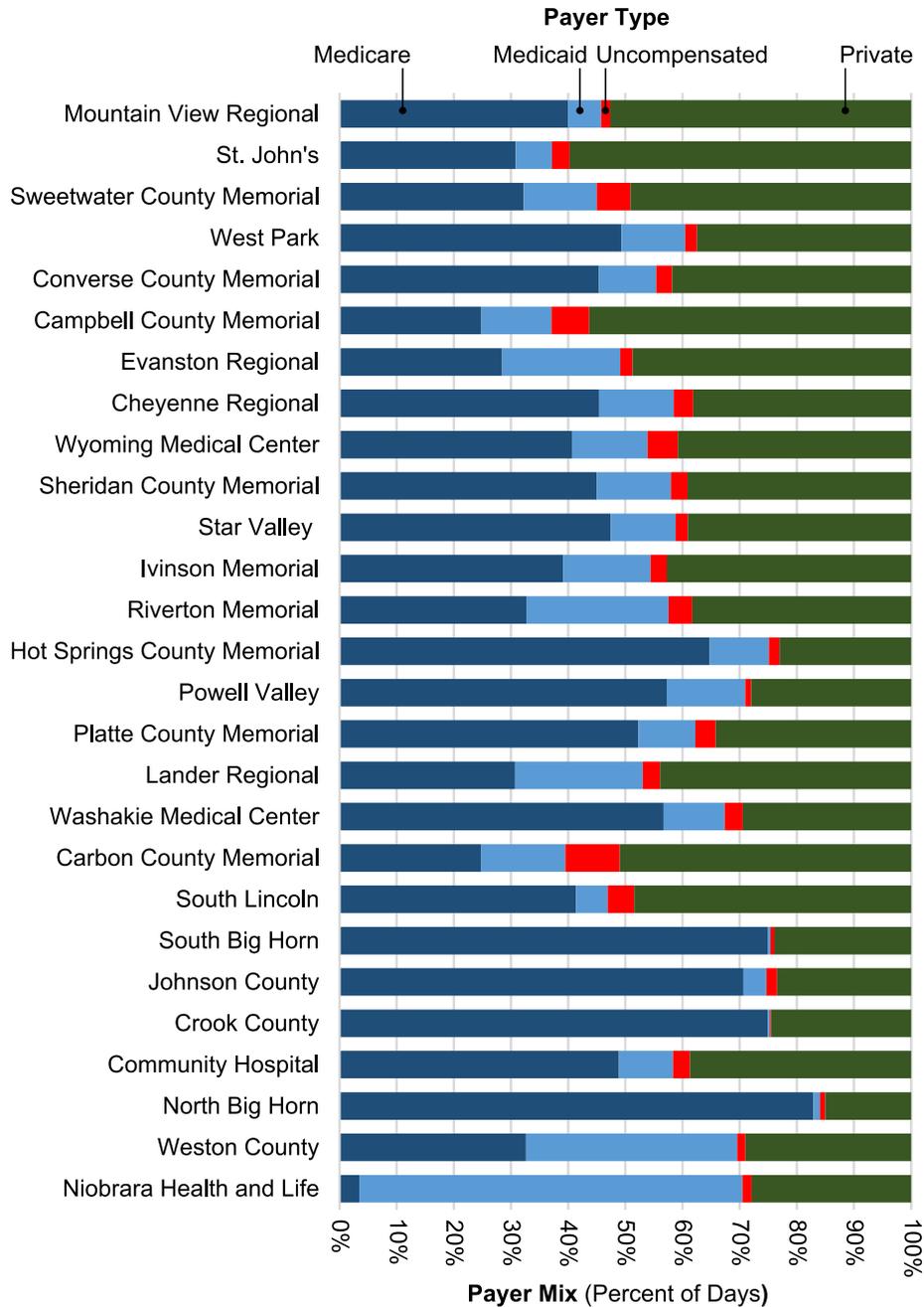
Table 3: Total Uncompensated Care, Including Local Government Offsets (CMS, FY11)

Hospital	City	Category	Total	% of Cost	Offsets	Net	% of Cost
Campbell County Memorial	Gillette	Small	\$11,227,482	9.1%	\$16,999,569	-\$5,772,087	-4.7%
Sheridan County Memorial	Sheridan	Small	\$4,336,051	7.2%	\$231,250	\$4,104,801	6.8%
Riverton Memorial	Riverton	Small	\$2,346,400	7.1%		\$2,346,400	7.1%
Lander Regional	Lander	Small	\$1,797,724	5.3%		\$1,797,724	5.3%
Sweetwater County Memorial	Rock Springs	Small	\$5,163,549	9.7%		\$5,163,549	9.7%
Wyoming Medical Center	Casper	Med- Teaching	\$25,009,683	13.1%		\$25,009,683	13.1%
Cheyenne Regional	Cheyenne	Med- Teaching	\$19,264,997	8.3%		\$19,264,997	8.3%
St. John's	Jackson	Small	\$4,175,691	5.8%	\$6,924,404	-\$2,748,713	-3.8%
Iverson Memorial	Laramie	Small	\$3,590,759	6.0%	\$1,313,565	\$2,277,194	3.8%
Evanston Regional	Evanston	Small	\$1,438,907	6.7%		\$1,438,907	6.7%
Mountain View Regional	Casper	Very Small	\$1,781,059	5.1%	\$14,698	\$1,766,361	5.1%
South Big Horn	Basin	Very Small	\$378,919	6.4%	\$1,442,876	-\$1,063,957	-17.9%
Converse County Memorial	Douglas	Very Small	\$3,465,574	9.8%	\$1,376,796	\$2,088,778	5.9%
Weston County	Newcastle	Very Small	\$517,809	4.9%	\$954,552	-\$436,743	-4.2%
Hot Springs County Memorial	Thermopolis	Very Small	\$811,419	5.8%	\$308,092	\$503,327	3.6%
Platte County Memorial	Wheatland	Very Small	\$1,432,582	10.4%		\$1,432,582	10.4%
Washakie Medical Center	Worland	Very Small	\$1,894,570	11.4%		\$1,894,570	11.4%
Community Hospital	Torrington	Very Small	\$2,044,589	11.4%		\$2,044,589	11.4%
Johnson County	Buffalo	Very Small	\$814,096	4.5%	\$4,036,764	-\$3,222,668	-17.9%
North Big Horn	Lovell	Very Small	\$1,383,110	9.6%	\$2,150,309	-\$767,199	-5.3%
Powell Valley	Powell	Very Small	\$2,423,635	5.5%		\$2,423,635	5.5%
Crook County	Sundance	Very Small	\$465,385	6.8%	\$939,484	-\$474,099	-6.9%
West Park	Cody	Very Small	\$3,458,862	5.6%		\$3,458,862	5.6%
Star Valley	Afton	Very Small	\$1,378,709	6.0%	\$648,776	\$729,933	3.2%
Niobrara Health and Life	Lusk	Very Small	\$1,029,412	17.0%	\$1,037,526	-\$8,114	-0.1%
South Lincoln	Kemmerer	Very Small	\$1,280,877	10.0%	\$2,310,303	-\$1,029,426	-8.0%
Carbon County Memorial	Rawlins	Very Small	\$3,215,673	15.0%	\$274,191	\$2,941,482	13.7%

Payer mixes are dominated by Medicare and the private sector

Figure 6, below, illustrates the payer mix for each Wyoming hospital in terms of patient days. As previously noted, private days are calculated -- the CMS cost report data only includes Medicare, Medicaid and total patient days and discharges, so this study made assumptions on the percent of private days based on the degree of uncompensated care.

Figure 6: Payer mix (percent of patient days), by Wyoming hospital (CMS, FY11)



Wyoming hospitals have generally healthy finances

Table 4, on the next page, is a snapshot of the financial health of Wyoming hospitals that measures three basic dimensions from six commonly-used indicators.²¹ On the table, green means that the indicator compares favorably with the national benchmark, tan indicates approximately average performance, and red shading indicates below-average performance.

When compared with these benchmarks, Wyoming hospitals appear financially secure. Exceptions include Crook County Memorial in Sundance -- the only hospital with a negative total margin and the one with the oldest facility -- and Carbon County Memorial in Rawlins, which has risk factors in numerous areas.

The three basic dimensions include *liquidity*, which measures the ability of a hospital to pay short-term obligations, *profitability*, which measures the sustainability of the hospitals' business, and *capital structure*, which measures the degree the hospital is leveraged and the amount it has invested in equipment.

The six indicators in each category are:

Liquidity

$$(1) \text{ Days of Cash on Hand} = \frac{365 \times (\text{Cash} + \text{Temporary Investments})}{\text{Total Expenses} - \text{Depreciation Expense}}$$

$$(2) \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Profitability

$$(3) \text{ Operating Margin} = \frac{(\text{Net Patient Revenue}^{22} - \text{Operating Expenses})}{(\text{Net Patient Revenue})}$$

$$(4) \text{ Total Margin} = \frac{\text{Total Income}^{23} - \text{Total Expenses}}{\text{Total Income}}$$

Capital

$$(5) \text{ Long - term Debt to Capitalization Ratio} = \frac{\text{Debt}}{\text{Debt} + \text{Fund Balance}}$$

$$(6) \text{ Average Age of Plant} = \frac{\text{Accumulated Depreciation}}{\text{Annual Depreciation Expense}}$$

²¹ University of Minnesota, University of North Carolina Chapel Hill, and University of Southern Maine. "Financial Indicators for Critical Access Hospitals" May 2005, page 15. <http://www.flexmonitoring.org/wp-content/uploads/2005/05/bp7.pdf>

²² Net Patient Revenue represents total patient revenue (billed charges) less negotiated discounts with payers, less bad debt and charity care charges. Some hospitals list bad debt charges as an operating expense instead of revenue deduction.

²³ In addition to net patient revenue, total income includes investment income, gifts/donations, local government support, and non-operating revenue streams (e.g. parking lot, gift shop)

Table 6: Financial health indicators for Wyoming hospitals compared against national benchmarks (CMS, FY11 Worksheet G)

Hospital	Category	Days Cash	Current Ratio	Op. Margin	Total Margin	Debt:Capital	Age of Plant
South Big Horn	Very Small	170	8.4	-26.92%	4.18%	0.00	10.1
North Big Horn	Very Small	66	4.2	-11.84%	5.48%	0.00	13.9
South Lincoln	Very Small	173	7.7	-20.17%	7.04%	0.02	17.7
Johnson County	Very Small	141	7.9	-4.75%	16.39%	0.00	6.2
Crook County	Very Small	5	2.3	-23.19%	-0.45%	0.00	21.8
Star Valley	Very Small	173	7.7	-0.05%	4.98%	0.18	8.5
Weston County	Very Small	36	2.4	-4.79%	7.06%	0.00	14.5
Mountain View Regional	Very Small	17	1.6	15.42%	17.84%	0.22	2.8
Niobrara Health and Life	Very Small	98	5.6	-4.81%	4.08%	0.02	2.9
Converse County Memorial	Very Small	253	8.8	0.43%	8.63%	0.16	7.3
Hot Springs County Memorial	Very Small	46	1.8	-1.10%	2.99%	0.17	13.0
Platte County Memorial	Very Small	0	1.5	1.82%	9.15%	0.08	10.2
Washakie Medical Center	Very Small	1	2.5	10.23%	10.97%	0.00	8.3
Community Hospital	Very Small	1	3.0	6.03%	10.08%	0.59	8.9
Powell Valley	Very Small	25	2.6	-1.79%	0.96%	0.11	4.0
West Park	Very Small	140	4.8	2.12%	11.39%	0.28	9.1
Carbon County Memorial	Very Small	10	1.2	-6.24%	3.44%	0.46	18.2
Evanston Regional	Small	N/A		37.29%	38.34%	0.00	5.1
St. John's	Small	134	5.6	-1.76%	13.31%	0.23	12.1
Riverton Memorial	Small	1	4.5	4.42%	7.02%	0.00	10.0
Sheridan County Memorial	Small	69	2.6	-3.05%	8.49%	0.00	11.8
Lander Regional	Small	1	5.8	9.87%	10.24%	0.00	10.3
Iverson Memorial	Small	157	4.5	10.88%	19.67%	0.02	12.2
Campbell County Memorial	Small	5	1.9	-5.09%	11.82%	0.18	10.3
Sweetwater County Memorial	Small	114	4.0	3.55%	5.82%	0.25	6.7
Cheyenne Regional	Med- Teaching	31	2.2	9.11%	1.92%	0.26	10.4
Wyoming Medical Center	Med- Teaching	70	2.9	0.84%	0.43%	0.24	13.1
National Benchmarks (medians, ~5000 hospitals reporting)	Very Small	29	2.29	-3.60%	2.55%	0.30	9.83
	Small	10	1.94	-1.20%	2.90%	0.30	9.06
	Med- Teaching	9	1.65	-0.79%	2.14%	0.42	11.7

Conclusions

In addition to providing background information on the Wyoming hospital market generally, this section illustrated several general points:

- (1) The importance of Critical Access Hospital (CAH) and Sole Community Hospital (SCH) designation to Wyoming hospitals.
- (2) Hospital markets are significantly affected by travel time and geography.
- (3) The ratio of hospital capacity (beds/census) to county population in Wyoming is in line with regional averages.
- (4) Average costs vary widely, are difficult to calculate from available data, and are driven by case mix, hospital capabilities and size.
- (5) Uncompensated and unreimbursed care is best measured by cost; some of these costs are offset by local government support.
- (6) Wyoming hospitals are generally financially secure compared with national benchmarks.

The next section builds on the measure of uncompensated care (average cost times adjusted uncompensated percent) to explore the extent of cost shifting in Wyoming.

Part II: The Extent of Cost-Shifting

A requirement of Footnote 3 is to “determine the cost shift from Medicare, Medicaid and indigent care.” This section attempts to determine the extent of cost-shifting in Wyoming hospitals, as well as illustrate how it relates to uncompensated/unreimbursed care -- and, more importantly, the degree of market concentration and natural negotiating leverage hospitals might have over private insurers.

What is “cost shifting”?

The idea of cost-shifting is closely related to the economic concept of price discrimination: when they can, suppliers will charge different consumers different unit prices in order to maximize revenue.²⁴

In the context of health care, consumers can be grouped by payer source. For the same service, public payers like Medicare and Medicaid will pay the lowest rates, various private insurers pay based on proprietary negotiated discounts, and self-pay clients typically pay nearly full charges.

Cost shifting implies, however, that this price discrimination is *causal* -- that is, hospitals charge private payers more *because* they receive less from public payers.²⁵ Proving price discrimination exists is therefore an important first step before we can prove that cost-shifting takes place.

The “Cost Shift Payment Hydraulic”

Hospital price discrimination is evident in CMS data when looking at aggregate hospital revenue vs. costs. These data indicate that, in Wyoming, where private payers reimburse hospitals approximately \$1.36 for every dollar of cost they incur, Medicare pays approximately 94 cents on the dollar, Medicaid pays approximately 84 cents, and uncompensated care is compensated by local governments at 46 cents for every dollar of cost.²⁶ This last figure is in aggregate, however; there is a wide range of uncompensated care across Wyoming hospitals evident in Table 5 of the previous section.

Consultants studying the phenomenon have termed this revenue-to-cost ratio “the Cost Shift Payment Hydraulic.”²⁷ The “hydraulic” is shown in Figure 7 on the next page, where the vertical axis displays the revenue-to-cost ratio discussed above and the horizontal axis indicates the percent of total cost incurred by that payer source.

As an aside, aggregate billed charges are included on the diagram, representing approximately \$2.26 for every dollar of cost. This reinforces the reason why charges are an unreliable measure of hospital resources and why obtaining data *on prices actually paid* by private insurers is so important.

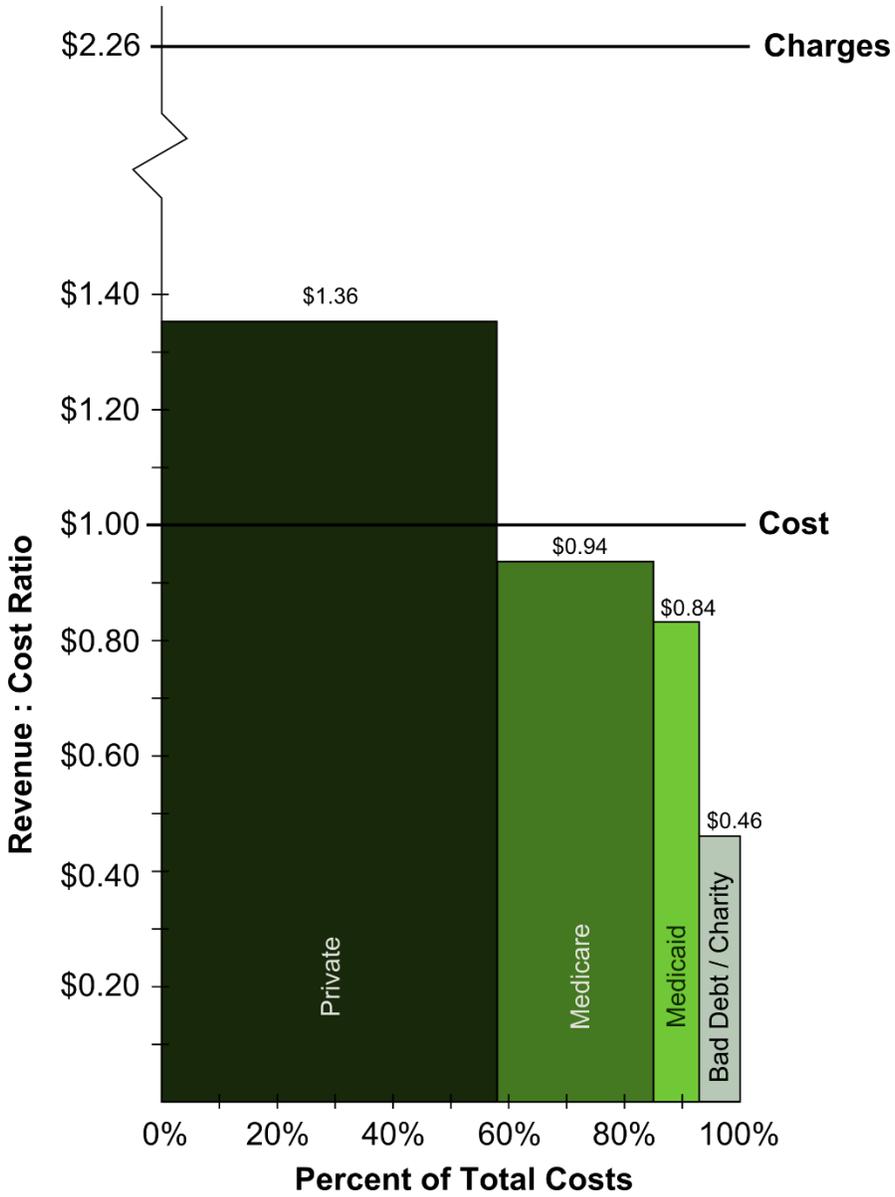
²⁴ Crude price discrimination relies on segmenting the market based on identifiable characteristics. Movie theaters offering student, military and senior discounts are good examples; they can attract higher volume from people who might not go to the movies at full price, while still being able to charge that full price to everyone else. In the theoretical extreme of price discrimination, a company would know each consumer’s actual price point and make them an individualized offer instead of charging a single price for everyone.

²⁵ Frakt, Austin B. “How Much Do Hospitals Cost Shift? A Review of the Evidence” *Milbank Quarterly*. Vol. 89, No. 1, 2011 (pp. 90–130) citing Morrisey and Ginsburg.

²⁶ The methodology is illustrated in Appendix A.

²⁷ Dobson, DaVanzo and Sen (members of the Lewin Group) “The Cost-Shift Payment ‘Hydraulic’: Foundation, History and Implications.” *Health Affairs*. Vol. 25, No. 1. Jan/Feb 2006.

Figure 7: Wyoming’s “Cost Shift Payment Hydraulic”. (CMS, FY11)



The main problem with the “hydraulic” approach, however, is that it takes costs at face value; there is no exploration of whether or not these costs are the lowest they might be in a more competitive market. Even the word “hydraulic” implies that costs are an incompressible fluid.

Costs can be contained

In most markets, competition on consumer prices drives down input costs. Large retailers like Walmart, for example, use their volume purchasing power to aggressively negotiate discounts with suppliers, allowing them to further cut prices to maintain or increase their consumer volume. In these competitive market situations, costs can be assumed to be as low as possible.

The best example of the effect of competition and transparency has on cost containment may be the air travel industry, where the real (inflation-adjusted) cost of flying has been cut by over 50% since the market was deregulated in 1978.²⁸ Much of this cost decrease has been the result of dramatic fuel-efficiency gains in airplanes,²⁹ an increase in the ratio of passengers to available seats,³⁰ and lower labor costs.³¹ This cost containment was the likely result of intense price pressure brought about by increased competition on websites like Expedia.com, which foster transparency in ticket prices.

Health care markets, by contrast, remain comparatively uncompetitive and opaque.³² While price negotiations between insurers and hospitals do occur, these negotiations are confidential and the price data is proprietary. Additionally, there is what economists call “information asymmetry”: end customers lack full understanding of the medical services they receive, relying instead on the recommendations of the people providing that service. Moreover, patients rarely bear the full cost of care. Costs are instead spread across society via the insurance sector in the form of higher premiums, most of which are paid by employers. While this might reduce an individual’s take-home salary in the long-term, there is no direct linkage at the consumer level between the consumption of medical services and the price of those services.

Given these numerous market complications and the lack of price pressure from consumers, it therefore unlikely that hospital costs are as low as they might be in a more transparent or competitive world.

Evidence shows, in fact, that hospitals who can extract more revenue from private payers tend to have fewer cost controls and higher unit prices.³³ In the case of non-profits, what might otherwise be profit margin distributed to shareholders often gets reinvested back into “cost” -- building a new cancer

²⁸ Thompson, Derek. “How Airline Ticket Prices Fell 50% in the Last 30 Years (and Why Nobody Noticed).” *The Atlantic*. February 28th, 2013. <http://www.theatlantic.com/business/archive/2013/02/how-airline-ticket-prices-fell-50-in-30-years-and-why-nobody-noticed/273506/>

²⁹ BTUs per person-mile have dropped from 10,185 in 1970 to 2,691 in 2010. Sivak, Michael. “Making driving less energy intensive than flying.” University of Michigan Transportation Research Institute. UMTRI-2014-2. January 2014.

³⁰ Passenger load factors have increased from 70.4% to 83.4% between 2002 - 2014. http://www.transtats.bts.gov/Data_Elements.aspx?Data=5

³¹ Pilot salaries have moderated since the 70s and 80s. <http://blogs.wsj.com/middleseat/2009/06/16/pilot-pay-want-to-know-how-much-your-captain-earns/>

³² A good primer on hospital-insurer negotiation and health care markets generally is in Gaynor and Town, “Competition in Health Care Markets” Chapter 9. *Handbook of Health Economics*, Vol. 2. Elsevier, 2012.

³³ Stensland, Gaumer and Miller. “Private-payer profits can induce negative Medicare margins.” *Health Affairs*. Vol. 29, No. 5. May 2010. <http://content.healthaffairs.org/content/29/5/1045.full.pdf+html>

wing³⁴, investing in a new surgical robot³⁵ or buying out local physician practices. And when costs for medical services increase, the cost coverage from payers like Medicare on the “cost shift hydraulic” appears to decrease.

For these reasons, this study does not recommend using the “hydraulic” as an indicator of cost-shifting.

Cost-shifting is strongly related to hospital market power

Both theory and empirical research show that cost-shifting from public payers and uncompensated care to the private sector is limited -- much less than a dollar for dollar shift, and more on the order of 10-20 cents. Crucially, when cost-shifting does occur, it requires that hospitals have a strong market position relative to private payers.³⁶

When hospitals aren't in a position to demand higher rates from private insurers, according to economic theory they can pursue two other strategies:

- “Volume-shifting.” In response to declining public payments, hospitals reduce the number of public patients served and attempt make up volume with private payers by reducing private rates.³⁷
- Cost-cutting. This could involve reducing staff or wages, negotiating input prices, eliminating [underutilized] capacity, reducing quality or services provided, and limiting technology acquisition.

Study methodology

For this project, the Department of Health analyzed hospital claims data from the State of Wyoming's Employees' Group Insurance (EGI). EGI is a self-funded health insurance plan covering the Wyoming State Executive Branch, the University of Wyoming, seven Wyoming Community Colleges and the Natrona County School District. In 2011, EGI had an average of 35,915 members and total medical spending of \$157.7 million, 86.4% of which was paid by the plan. While self-funded, most plan administration, to include rate negotiation with hospitals, is done by Cigna. This means that EGI prices are likely similar to the prices negotiated by other commercial insurers.

The objective of the analysis is to determine the price paid by EGI to various Wyoming hospitals for a similar bundle of services, and then use this ‘standardized’ price to explore which hospital-level factors (specifically uncompensated care and market concentration) were significant in explaining price differences across hospitals.

³⁴ <http://cheyenneregional.org/sites/cheyenne-regional-foundation/where-the-money-goes/cc/>

³⁵ Lee, Jaimy. “Surgical-robot costs put small hospitals in a bind.” *Modern Healthcare*. April 19, 2014. <http://www.modernhealthcare.com/article/20140419/magazine/304199985> and Barbash and Glied. “New Technology and Health Care Costs — The Case of Robot-Assisted Surgery.” *New England Journal of Medicine*. August 19th, 2010. <http://www.nejm.org/doi/pdf/10.1056/NEJMp1006602>

³⁶ Meta-analysis of literature: Frakt, Austin B. "How Much Do Hospitals Cost Shift? A Review of the Evidence." *The Milbank Quarterly* 89.1: 93 - 123 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3160596/>

³⁷ Frakt, drawing on profit-maximization models articulated by McGuire, T. and Pauly, M. “Physician Response to Fee Changes with Multiple Payers.” *Journal of Health Economics* 10(2): 385-410. 1991.

The analysis only includes 25 Wyoming hospitals. Mountain View Regional and Niobrara Health and Life are excluded; both appear to be outliers from the general acute hospital model. Mountain View is a small physician-owned hospital specializing in neurosurgery³⁸ and Niobrara appears to be more of a long-term care facility -- only 4 of its 24 beds are acute-care.³⁹ Average costs shown in Figure 5 of Part I (page 19) reflect these qualitative distinctions.

A good analogy to describe the overall approach of this analysis would be building a statistical model to explain the price paid for houses (an episode of care) in various neighborhoods (hospitals).

The price paid for any given house is likely based on both individual and neighborhood factors. On the individual house-level, overall square footage, type of construction, age, number of bedrooms and bathrooms, presence of a garage, etc. are all likely significant. There are also neighborhood-level factors -- quality of the schools, walkability, median income, surrounding property values, and so on.

If the objective were to determine what drives differences in price across neighborhoods, you would need to control for the house-level factors first. This could be done by predicting the price paid for a “standard” home, say, a 2000 ft², 25-year old brick construction house with 2 bedrooms, 2 bathrooms and 1 garage in each neighborhood, and seeing how the price of this home varies across neighborhoods.

It is important to note that this “standard” house may not actually exist in each neighborhood. Some neighborhoods may be exclusively composed of mansions and not have any 2000 ft² homes. The value of the model lies in its ability to measure the neighborhood-level factors by controlling for the individual factors.

Table 8, below, shows how episode- and hospital-level factors correspond to the real estate analogy. Note that there are significant factors out there that cannot readily be measured (e.g. perceived hospital quality) and will remain “unexplained” in the model.

Table 8: Analytical framework for thinking about hospital prices and real estate analogy

Hospital Services Price		Real Estate Price	
Episode-level	Patient Age	Home-Level	Bedrooms
	Patient Sex		Bathrooms
	Diagnosis		Age
	Length of Stay		Square footage
Hospital-level	Uncompensated care	Neighborhood-level	Crime rate
	Market power		School quality
	Perceived quality (?)		Prestige (?)

To evaluate how the hospital-level effects varied with uncompensated care and market power, the Department used a statistical tool called regression analysis. Details on this analysis can be found in Appendix D (page 63). The Department used similar statistical techniques to calculate the inputs for this

³⁸ <http://mountainviewregionalhospital.com/aboutmvrh/why-mvrh>

³⁹ <http://www.niobrarahospital.com/>

model. Details on the methodology for predicting hospital-level effects from claims data are in Appendix B (page 48). Details on the methodology for measuring hospital market concentration are in Appendix C (page 56). The burden of uncompensated care by hospital was calculated by multiplying the adjusted uncompensated care percent from Table 3 (page 22) by the average cost per adjusted patient day in Table 2 of Appendix A (page 46).

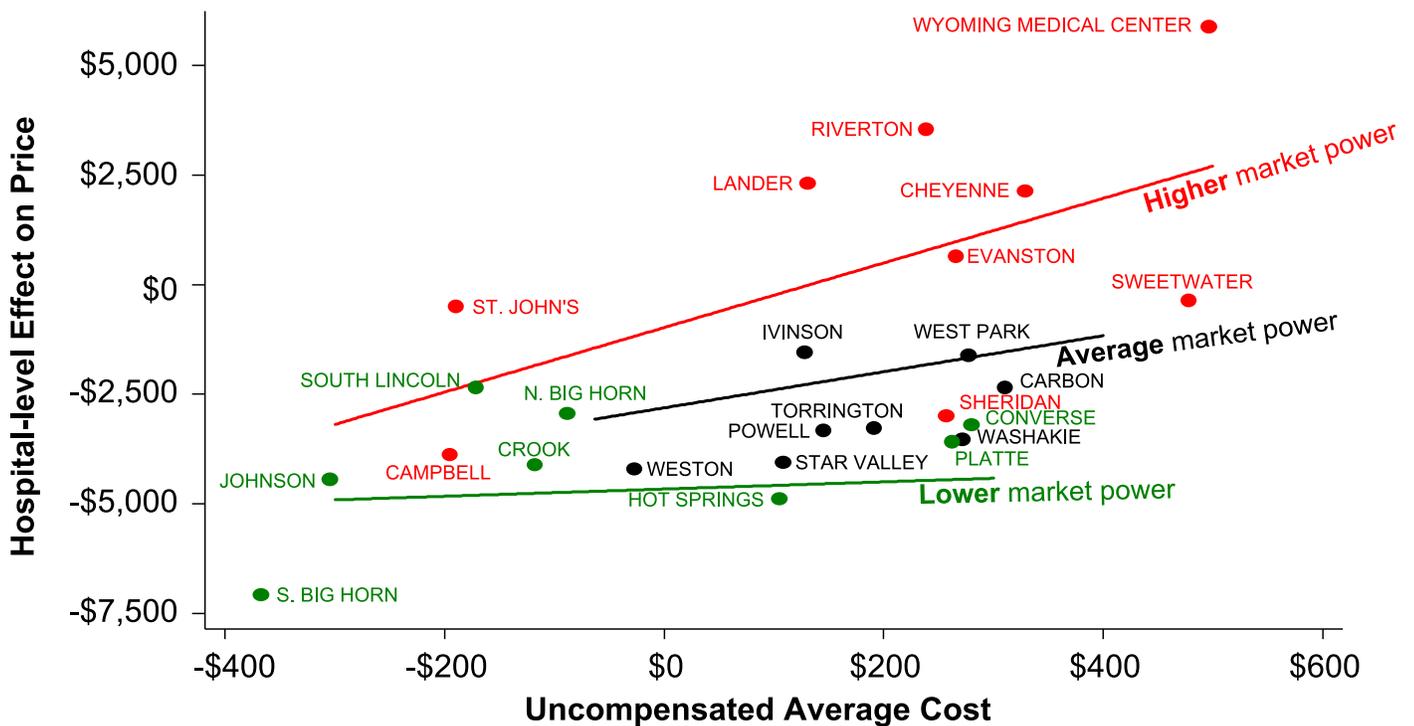
Analysis supports the connection between hospital cost-shifting and market power

Using this approach, the Department found that the overall hospital-level effect on prices paid by EGI is indeed correlated with the amount of uncompensated care at each hospital.⁴⁰

The degree of market concentration for each hospital, however, was even more influential on price paid; this is intuitive, since it reflects the potential negotiating leverage a hospital might have over EGI and other private insurers.

The complicated relationship between uncompensated care, market power, and private prices -- which fits with the theoretical and empirical literature described previously -- is illustrated in Figure 8, below.

Figure 8: Relationship between hospital-level price differences and uncompensated average cost, for hospitals with higher, average and lower market power.



⁴⁰ The fit of this statistical model was good (adjusted R² above 0.70). See Appendix D on page 63 for technical details on this regression model.

On the figure, the horizontal axis represents a measure of uncompensated care that factors in (1) the average cost of care (e.g. per patient per day/visit), (2) the percent of those costs that are uncompensated, and (3) the amount of local government support received by the hospital. When this local support exceeds the cost of uncompensated care provided, the value may be negative.

The vertical axis -- the “hospital level effect” -- shows how the average price paid for an episode of care at each hospital, controlling for length of stay, patient demographics and diagnosis, differs from the Statewide average.

On the figure, the hospitals in green -- ranging from South Big Horn to Platte and Converse County Memorial -- have lower measured market power. The relatively flat slope for these hospitals (green line) indicates that hospitals in this category cannot or do not dramatically increase prices in response to additional uncompensated care.

The hospitals in black are in the middle third in terms of market power; the hospitals in red have the most market power in the State. These hospitals appear to be able to increase prices for private payers in response to uncompensated care.

The figure boils down to one takeaway: while uncompensated care is associated with higher prices, the degree to which this happens (the increasing slopes of the three lines) depends on the relative market power of the hospital.

Limitations of the analysis

As evident in the methodology described in the appendices, this analysis is essentially a first-order approximation on the issues behind cost-shifting. Some specific limitations include:

1. Primary data sources are limited in scope and applicability.

- The sample size is small (25 hospitals) and should not be used to draw sweeping conclusions.
- EGI is only one insurer in a State, and the State is made up largely of self-insured entities. The prices Cigna negotiates might be very different from Blue Cross Blue Shield or other commercial insurers.
- As noted in Part I, CMS hospital cost reports are self-reported and not audited. Data quality is variable overall.

2. There are unknowns that the analysis cannot control for.

- Because average cost calculations and uncompensated care rely on CMS cost report data, it is unlikely that the data captures the full range of implicit subsidies (e.g. leased buildings by WMC) that might affect a hospital’s need to shift costs.
- While the model built to predict prices fits the data fairly well, the methodology only uses available data. Even if more data were available, however, it would be difficult to ‘standardize’

prices that are not paid prospectively -- i.e., if prices for services were not directly tied to diagnosis severity, as is the case with Medicare's Diagnosis-Related Groups (DRGs).

- Medicaid patient flows may not serve as a good proxy for private-pay patients in the estimation of market concentration per Appendix C (page 56). Medicaid patients may, for example, have higher or lower tolerance for travel time than private-pay patients.

Conclusion: market power matters

Although this analysis has some limitations, its conclusions fit within the established theory and empirical literature.⁴¹ There are therefore sufficient grounds to suspect that the issue of uncompensated care and cost shifting in Wyoming is closely tied to hospital market power. Ultimately, hospitals with less leverage over private insurers are not able to cost-shift and must resort to other strategies.

The importance of market concentration is also applicable to Part III of this report -- the impact of new physician-owned hospitals. As will be demonstrated, increased competition (i.e., lower market concentration) has effects on price that need to be factored into any consideration of the State's role in protecting existing industry.

⁴¹ Additional meta-analysis from the Robert Wood Johnson Foundation on hospital prices and consolidation - Gaynor and town. "The impact of hospital consolidation - update." RWJF Synthesis Project. June 2012. No. 9. ISSN 2155-3718.

Part III: The Impact of New Hospitals on Existing Markets

This section addresses the second part of the footnote, to “define the impact that new independent hospitals will have on existing hospitals if the new hospitals do not treat Medicare, Medicaid or indigent patients.”

The analysis first examines the history of regulating physician-owned hospitals, describes the current status of new hospitals (with respect to CMS, following the passage of the Affordable Care Act (ACA)), and then draws on the previous two parts to examine arguments concerning the regulation of new physician-owned hospitals.

The analysis concludes with a recommendation that the State not attempt to further regulate the Wyoming hospital market. A more productive role for the State may be encouraging price transparency through the establishment of an All-Payer Claims Database (APCD).

The severity of CMS restrictions on physician-owned hospitals has fluctuated over the last decade

Opposition to physician-owned specialty hospitals began growing in the late 1980s as part of a broader concern that the financial incentives inherent in facility ownership were distorting physician referral behavior.

The first broad federal restrictions on physician self-referral were enacted in 1992. The “Ethics in Patient Referrals Act” (also known as “Stark I”, as it was sponsored by Rep. Pete Stark from California) established Section 1877 of the Social Security Act,⁴² which generally prohibited physicians from referring Medicare patients for “designated health services” (DHS) to an entity in which the physician or immediate family member had a financial relationship. Those entities were also prohibited from submitting claims to CMS from those referrals. Initially, DHS included only clinical laboratory services. In 1993 and 1994, the list was expanded (via “Stark II”) to hospital services.⁴³

Prior to the 2003 passage of the Medicare Modernization Act (MMA), the “whole hospital” exception (i.e., where physicians had financial interest in the “whole hospital,” instead of one department) allowed physician-owned hospitals to bill for services rendered to Medicare and Medicaid patients.

In response to both self-referral concerns, as well as a growing perception that physician-owned hospitals were “cherry-picking” the healthiest and wealthiest clients without bearing the burden of uncompensated or unreimbursed care, Section 507 of the MMA imposed an 18-month moratorium on the expansion of participating physician-owned hospitals while CMS studied the issue. Section 5006 of the Deficit Reduction Act further extended the moratorium until August 2006 until CMS could report to Congress on these potential issues. Reports required by Congress -- one from the Medicare Payment Advisory Commission (MedPAC) and one from the Department of Health and Human Services (HHS) -- found mixed results.

⁴² http://www.ssa.gov/OP_Home/ssact/title18/1877.htm

⁴³ <http://www.cms.gov/Medicare/Fraud-and-Abuse/PhysicianSelfReferral/index.html>

(1) The MedPAC report, which used 2002 CMS cost report data, found that:

- Specialty hospitals captured market share from community hospitals, but this did not appear to have a significant effect on the financial performance of those community hospitals.
- Specialty hospitals tended to treat more profitable Medicare patients (e.g. the low-end of acuity within each diagnosis-related group) and tended to treat fewer Medicaid patients.⁴⁴

(2) The Research Triangle Institute, under contract with the Department of Health and Human Services (HHS), also issued a report⁴⁵ using 2003 Medicare claims data and Agency for Healthcare Research and Quality (AHRQ) quality indicators. This report found that:

- Cardiac specialty hospitals resembled full-service community hospitals in terms of their emergency department volume, size, and community integration. Surgical and orthopedic specialty hospitals more closely resembled Ambulatory Surgical Centers in their focus on outpatient volume.
- Specialty hospitals did not tend to avoid uninsured or underinsured patients, but actually ended up paying more in uncompensated care *and taxes* as a share of net revenues than community hospitals lost to uncompensated care.

The moratorium effectively expired in late 2006, but the “whole hospital” exception was sharply and potentially permanently curtailed in 2010 via Section 6001 of the Patient Protection and Affordable Care Act (PPACA).⁴⁶

ACA Barriers

The Affordable Care Act imposes significant barriers on new physician-owned hospitals from being registered with CMS or reimbursed for Medicare or Medicaid patients

Subject to approval from the HHS Secretary, there are some exceptions which allow the expansion of existing physician-owned hospitals.⁴⁷ However, because these exceptions are rare, this study makes the assumption that newly-constructed physician-owned hospitals will not be allowed to accept Medicare or Medicaid reimbursement.

⁴⁴ Guterman, Stuart. “Specialty hospitals: a problem or a symptom?” *Health Affairs*, 25, No. 1. 2006. <http://content.healthaffairs.org/content/25/1/95.full.pdf+html>

⁴⁵ Greenwald, et. al. “Specialty versus community hospitals: referrals, quality and community benefits.” *Health Affairs*. 25, No. 1 2006. <http://content.healthaffairs.org/content/25/1/106.full.pdf+html>

⁴⁶ http://www.cms.gov/Medicare/Fraud-and-Abuse/PhysicianSelfReferral/Downloads/Section_6001_of_the_ACA.pdf

⁴⁷ An example of an application for expansion can be found here: <http://www.cms.gov/Medicare/Fraud-and-Abuse/PhysicianSelfReferral/Downloads/LakePointe.pdf>

Frequently-cited effects

Opponents of new physician-owned hospitals have cited three main damaging effects of new physician-owned hospitals:

(1) Loss of Sole Community Hospital (SCH) designation. For a hospital, losing SCH designation means it would also lose additional Medicare reimbursement.

(2) “Cream skimming.” This refers to the concept that new physician-owned hospitals will benefit at the expense of existing hospitals by taking only private patients and not having to treat Medicaid, Medicare or indigent patients.

(3) Higher costs through additional utilization. It has been argued that communities do not need additional capacity, and that duplicative resources will increase health care costs by inducing additional utilization; that is, if more hospital services are available, demand for hospital services will increase.

This study examines each of these arguments in turn, weighing the empirical and theoretical evidence.

Loss of Sole Community Hospital (SCH) status is unlikely

In the case of new hospitals potentially emerging in Casper, Rock Springs and Gillette, loss of SCH status would be a consideration for Sweetwater Memorial and Campbell County Memorial. Wyoming Medical Center lost its SCH designation retroactive to January 1st, 2010, resulting in an estimated \$15.7 million in retroactive payments due to CMS, as well as future revenue loss of \$8 million per year.⁴⁸ The \$15.7 million payment represents approximately 7.2% of FY2011 operating expenses; the \$8 million in foregone revenue represents approximately 3.6% of FY2011 revenue.

According to CMS rules, however, a hospital that does not participate in Medicare/Medicaid would not be considered a “like” hospital for the purposes of evaluating SCH status in surrounding community hospitals.⁴⁹ It is therefore unlikely that any existing hospital would face the threat of lower Medicare reimbursement with the opening of a new physician-owned hospital that does not participate in the Medicare/Medicaid program.

“Cream skimming” ultimately refers to increased competition

First, a specialty hospital can only capture market share from existing hospitals (i.e. “skim the cream”) if it effectively competes on either price or quality. If private patients (or their insurers) did not benefit from increased choice, they would stay with the community hospital.

⁴⁸ http://billingsgazette.com/news/state-and-regional/wyoming/wyoming-medical-center-loses-millions-in-medicare-funding/article_a634db6c-6aec-53df-9929-3be7fe06aa8a.html

⁴⁹ Federal Register, Vol 67, No. 148. Rules and Regulations, 2002, page 50053. <http://www.cms.gov/Regulations-and-Guidance/Regulations-and-Policies/QuarterlyProviderUpdates/downloads/cms1203f.pdf>

Second, the supposed advantage of “not having to take” Medicare and Medicaid patients is in fact a detriment. The ACA forces these hospitals to forgo potential revenue. Even if care is compensated at lower levels than by the private sector (i.e., the “cream”), the need to pay for fixed costs in a capital-intensive business means that treating Medicare and Medicaid patients for *some* reimbursement (“milk”) is often better than treating no additional patients for no reimbursement (“nothing”). In economic terms, for any given hospital, there is an efficient, revenue-maximizing⁵⁰ volume of Medicare and Medicaid patients. The fact that virtually all hospitals in the US welcome Medicare (and Medicaid, as part of the package deal) implies that this volume is not zero.⁵¹

Third, while for-profit physician-owned specialty hospitals may not take as much uncompensated care, they also do not receive the implicit or explicit government subsidies provided to many community hospitals. A new hospital, for example, will not be able to supplement its revenue with mill levies, special-purpose excise taxes, or land and buildings leased below market rates. Nor will it be able to benefit from non-profit status; and as the previously-cited RTI/HHS study indicated, the increased tax burden of specialty hospitals often outweighs the burden of less uncompensated care.⁵²

Utilization induced by additional supply may increase health care costs through higher volume.

There is evidence substantiating the third concern. The Dartmouth University Institute for Health Policy and Clinical Practice has demonstrated a correlation between available hospital resources and utilization for Medicare patients.⁵³ This is likely true for privately-insured patients as well, though insurers may impose cost-sharing requirements above Medicare thresholds that may limit demand even in the face of greater supply.

Price and quantity effects from increased hospital competition are therefore the most likely outcomes of an additional physician-owned hospital in various markets, however neither effect is certain.

While competition is often associated with price, it should be noted that there is evidence indicating that competition induced by the emergence of specialty hospitals has not necessarily resulted in lower overall unit prices. The Center for Studying Health System Change conducted a qualitative study of three markets in 2006 that indicated private payers have some difficulty in negotiating between hospitals over limited specialty services; the payers studied believed the only result of new specialty hospitals would be a medical “arms race” that would only increase costs, and therefore prices, across the board.⁵⁴

⁵⁰ The efficient volume, from a hospital perspective, is determined by the marginal cost of each Medicare patient, not the average cost. If the hospital already owns the MRI machine, for example, the marginal cost is the (essentially variable) cost of doing one additional scan that day; by contrast, the average cost is the total cost of the MRI machine (capital and labor) divided by all the scans performed.

⁵¹ In Wyoming, virtually all medical providers accept Medicaid. While hospital rates are below Medicare, other providers receive Medicaid reimbursement of an average 116% of Medicare. <http://kff.org/medicaid/state-indicator/medicaid-to-medicare-fee-index/>

⁵² Greenwald, et. al. “Specialty versus community hospitals: referrals, quality and community benefits.” *Health Affairs*. 25, No. 1 2006. <http://content.healthaffairs.org/content/25/1/106.full.pdf+html>

⁵³ http://www.dartmouthatlas.org/downloads/reports/supply_sensitive.pdf

⁵⁴ Berenson, et. al. “Do specialty hospitals promote price competition?” *Center for Studying Health System Change Issue Brief*, No. 103. Jan 2006. <http://www.hschange.com/CONTENT/816/816.pdf>

A case study of Wyoming Medical Center from FY2007 to FY2011 indicates that the introduction of Mountain View Regional Hospital did moderate prices in the Casper market.

Table 10, below, shows the change in revenue and expenses for Wyoming Medical Center between 2007 and 2011. Note on this table that WMC has remained profitable. Although WMC estimates it has lost nearly \$60 million related to the opening of Mountain View Regional since 2008, both operating and total margins remain positive.⁵⁵

Note as well that the magnitude of discounts received by payers has increased from 38% to 55%, indicating that prices *actually paid* increased more slowly than the prices charged. When standardized for inpatient volume, in fact, the average price paid leveled off between 2009 and 2011 despite higher charges.

Table 10: Wyoming Medical Center income and expenditures (CMS)

	FY2007	FY2009	FY2011
Gross patient revenue (Charged)	\$303,565,977	\$392,297,594	\$486,759,392
Negotiated discounts	\$115,904,186	\$167,186,299	\$268,130,020
Discount percent	38%	43%	55%
Total patient revenue (Paid)	\$187,661,791	\$225,111,295	\$218,629,372
Inpatient volume (days)	41,243	36,734	38,374
Charged / Inpatient volume	\$7,360	\$10,679	\$12,685
Paid / Inpatient volume	\$4,550	\$6,128	\$5,697
Operating expenses	\$186,776,098	\$216,229,753	\$216,786,920
Operating Margin	0.47%	3.95%	0.84%
Other revenue	\$10,309,183	-\$5,700,757	\$5,788,492
Other expenses	\$10,592,209	\$0	\$6,667,785
Net income (loss)	\$602,667	\$3,180,785	\$963,159
Total margin	0.30%	1.45%	0.43%

Figure 9, on the next page, shows how prices paid by EGI -- standardized for length, diagnosis and patient age -- varied across 2006 - 2013 between Wyoming Medical Center and Cheyenne Regional Medical Center. Details on the model can be found in Appendix B (page 48).

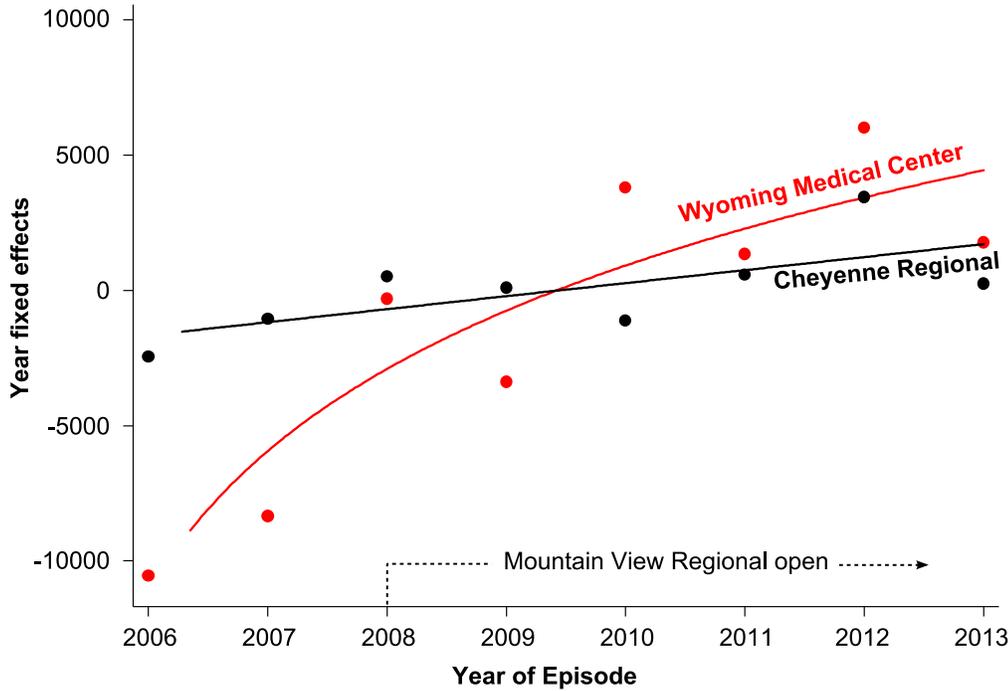
On the figure, the vertical axis shows the “year fixed effect” which represents how the average price paid for an episode of care at *one hospital in one year* (controlling for length of stay, patient demographics and diagnosis) differs from the same hospital’s average episode price over the entire time period (2006 - 2013).

In this figure, where CRMC (black dots / line) shows steady year-on-year growth in prices, price increases at WMC (red dots / line) seems to have slowed since the introduction of Mountain View Regional in 2008. While the EGI data only represent one insurer, and the model built to predict its prices

⁵⁵ <https://wyomingmedicalcenter.org/index.php/news/more/third-hospital-faqs>

has the same limitations as the other EGI models, its corroboration of the CMS cost report data indicates that insurers likely gained some leverage on prices following the introduction of Mountain View into the market.

Figure 9: EGI price data, year effects for WMC and CRMC controlling for episode length, diagnosis weight and patient age (Appendix B)

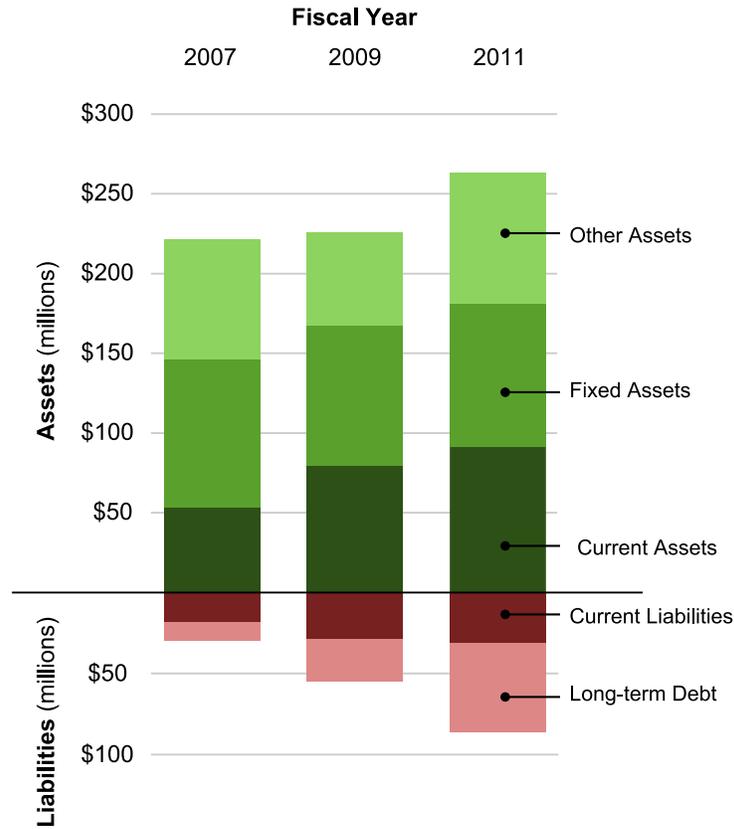


There is, however, some evidence of a “medical arms race” as well. Table 11, below, shows the balance sheet for WMC, as reported by Worksheet G of the CMS hospital cost reports. Figure 10 compares assets and liabilities graphically.

Table 11: Wyoming Medical Center balance sheet and indicators (CMS)

	FY2007	FY2009	FY2011
Current assets	\$53,547,175	\$79,717,697	\$91,309,408
Fixed assets	\$92,958,211	\$87,660,383	\$90,228,360
Accumulated depreciation	\$121,562,664	\$143,908,363	\$165,259,360
Other assets	\$74,749,249	\$58,314,725	\$81,824,592
Total assets	\$221,254,635	\$225,692,805	\$263,362,360
Current liabilities	\$18,141,450	\$28,897,372	\$31,141,600
Total liabilities	\$29,176,106	\$54,804,736	\$86,102,568
Long-term debt	\$11,034,656	\$25,907,364	\$54,960,968
Fund balance	\$192,078,529	\$170,888,069	\$177,259,792
Current ratio	2.95	2.76	2.93
Debt-to-capitalization	0.05	0.13	0.24

Figure 10: Wyoming Medical Center assets and liabilities (CMS)



Note that while financial indicators (e.g. liquidity as measured by the current ratio) for WMC remain healthy, the major change from 2007 to 2011 has been the increase in long-term debt. While the debt-to-capitalization ratio is still under normal levels (0.3) in 2011, it is clear that WMC has leveraged itself since 2008 to invest in its capabilities. Whether or not this increased investment is a result of trying to out-compete Mountain View in certain capabilities is unknown.⁵⁶

Determining whether induced utilization overcomes the effect of lower prices to ultimately increase health care costs is beyond the scope of this study. It should be noted, however, that increased utilization is more efficiently mitigated by insurers through higher cost-sharing instead of the State increasing barriers to entry for providers on the supply side.

⁵⁶ The newly-completed \$42.5 million West Tower Addition at WMC, for example, has a large neurosurgical component. <https://wyomingmedicalcenter.org/index.php/about/category/west-tower-addition>

Conclusions

The analysis of cost shifting and the effect of physician-owned hospitals entering existing markets leads the Department to two broad conclusions:

1. There is insufficient evidence that the State needs to protect existing hospital markets.
2. Lack of transparency in prices is a problem not only for the purpose of analysis, but for Wyoming consumers.

1. The balance of evidence argues against a State role in regulating hospital markets

As shown in Part I, Wyoming hospitals were more financially secure than the average hospital nationally in 2011. Hospitals like Wyoming Medical Center and Sweetwater Memorial are likely able to adapt to any additional competition without significant damage to their bottom lines.

Part II demonstrates the limited scope of cost-shifting and how closely tied it is to market concentration. Part III shows -- via a case study of the Casper market from 2007 to 2011 -- that increased competition with the introduction of Mountain View likely slowed price growth for private insurers.

Competition generally benefits consumers. While hospital markets are much less competitive and less transparent than other markets, price and quality are still affected by competition through provider-insurer negotiation. That prices are driven by market concentration is the finding of both this study and recent academic consensus.⁵⁷

2. Improving data quality and accessibility through an All-Payer Claims Database may be a more productive role for the State

The shortcomings of this study are largely driven by a lack of data. The Department requested private pay claims data from both Blue Cross Blue Shield (based on the KidCARE contract) as well as from the Wyoming Hospital Association; in both cases, the Department was told this data was proprietary. What limited data the Department was able to obtain required significant analyses (per Appendices A - D) in order to draw any conclusions.

The complete absence of price and quality information, however, is even more of a problem for Wyoming consumers.

One way to increase price transparency would be to construct a Wyoming All-Payer Claims Database (APCD). An APCD is a large, secure database that collects, aggregates, standardizes and processes claims data from health insurers and other payers.

Typical claim information collected includes patient demographics, insurance type, provider type, clinical diagnoses and procedure codes billed, prices paid by the plan and by the member, and units of service.

⁵⁷ Gaynor and town. "The impact of hospital consolidation - update." RWJF Synthesis Project. June 2012. No. 9. ISSN 2155-3718.

Once analyzed, APCD⁵⁸ data could feed a consumer-oriented website that would show the estimated prices for medical services at various provider types, given their payer coverage. The Wyoming Hospital Association “Price Point” website -- wyopricepoint.com -- is an example of such a consumer website, but it only displays *billed charges* for identified procedures, not prices actually paid. Given the large discrepancy between charges, paid prices and actual costs, the WHA information is less helpful than it might appear on its face. APCD information could also be used to generate objective quality metrics based on bills for hospital-acquired conditions.

⁵⁸ More information on All Payer Claims Databases can be found here:

- The All Payer Claims Database Council: <http://www.apcdouncil.org/>
- Robert Wood Johnson Foundation Issue Brief: http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2014/rwjf409988

State-specific APCD websites include:

- Utah: <http://health.utah.gov/hda/apd/>
- Colorado: <https://www.comedprice.org/#/home>
- Kansas: http://www.kdheks.gov/hcf/data_consortium/default.htm
- New Hampshire: <https://nhchis.com/NH/>
- Maine: <https://mhdo.maine.gov/>

Appendix A: Evaluating Cost and Revenue at Hospitals

Evaluating average cost

Most hospitals do not only operate inpatient and outpatient lines of businesses. Cheyenne Regional Medical Center, for example, has a significant (~\$11 million) home health care operation. Many of the smaller hospitals also have Skilled Nursing Facility (SNF) beds.

In order to better standardize costs for cross-hospital comparisons, this study adjusted reported total costs and inpatient days to account for only “core” costs -- inpatient and outpatient functions. Table 1 shows how each hospital’s total costs⁵⁹ are adjusted towards these “core” cost measures by making required CMS adjustments⁶⁰ and then excluding “non-core” costs such as Inpatient Psychiatric Facility (IPF) and Rehabilitative (IRF) sub-providers, nursing and SNF beds, hospice and home health agency costs.⁶¹

Similarly, inpatient days for each hospital were standardized to exclude “non-core” days, while including observation bed days and labor/delivery days.⁶² Because outpatient visits are not reported on the S-3, the ratio of Medicare Part B (outpatient) costs to Part A (inpatient) costs by hospital was also used to adjust inpatient days to account for estimated outpatient visits. Finally, dividing “core” costs by “core” adjusted patient days results in the average cost per patient day shown in Table 2.

Importance of patient case mix, wages, age of plant, and hospital size in average cost

The Department of Health analyzed average cost in terms of hospital characteristics. Factors that are significantly associated with variation in this average cost include average wage, Medicare case mix index, teaching status, urban/rural location, age of plant, and size.⁶³ Generally speaking, urban hospitals, teaching hospitals, those with more severe or complex patients, those facing higher labor prices, and hospitals with newer equipment have higher average costs.

Controlling for these other factors, there appear to be economies of scale. One of the reasons why smaller hospitals seem to have lower average costs in Table 2 is likely due to their lower case mixes and lack of teaching status.

Because the constructed model can only explain approximately 40% of the variation in average cost, this study will not attempt to determine whether or not Wyoming hospital costs are efficient. Other studies that use more sophisticated models, however, indicate that in comparison to other states in the region, Wyoming hospitals may be less efficient.⁶⁴

⁵⁹ CMS, FY 2011. Worksheet A, Column 5, Line 200.

⁶⁰ CMS, FY 2011. Worksheet A, Column 6, Line 200.

⁶¹ Determined from Worksheet B, which allocates general service costs across specific cost centers.

⁶² Worksheet S-3, Part I; Column 8, Lines 14, 28 and 32.

⁶³ Regression analysis of cost report data for 2,863 hospitals reporting all variables. R^2 of 0.41, all factors significant at the 0.05 level or lower.

⁶⁴ “Analysis of Hospital Cost Shift in Arizona.” Lewin Group. March 6th, 2009. Page 16.
<http://www.azchamber.com/assets/files/Lewin%20Group.pdf>

Table 1: Wyoming Hospitals, by Reported Cost, CMS Adjustments, Excluded (non-Core) and Remaining Costs (CMS, FY11, Worksheets A and B)

Hospital	City	Size Category	Total Costs	Adjustments	Allowable	Excluded	Core
South Big Horn	Basin	Very Small	\$5,955,445	-\$98,400	\$5,857,045	\$1,968,432	\$3,888,613
North Big Horn	Lovell	Very Small	\$14,391,772	-\$291,015	\$14,100,757	\$5,072,105	\$9,028,652
South Lincoln	Kemmerer	Very Small	\$12,839,183	-\$891,787	\$11,947,396	\$2,465,437	\$9,481,959
Johnson County	Buffalo	Very Small	\$17,996,688	-\$2,690,023	\$15,306,664	\$4,635,272	\$10,671,392
Crook County	Sundance	Very Small	\$6,845,809	-\$189,658	\$6,656,151	\$2,139,930	\$4,516,221
Star Valley	Afton	Very Small	\$23,168,034	-\$2,589,253	\$20,578,781	\$2,162,983	\$18,415,798
Weston County	Newcastle	Very Small	\$10,465,482	-\$196,040	\$10,269,442	\$4,541,404	\$5,728,038
Mountain View Regional	Casper	Very Small	\$34,597,824	-\$3,257,261	\$31,340,563	\$0	\$31,340,563
Niobrara Health and Life	Lusk	Very Small	\$6,044,485	\$352,868	\$6,397,353	\$0	\$6,397,353
Carbon County Memorial	Rawlins	Very Small	\$21,432,634	-\$3,331,485	\$18,101,149	\$0	\$18,101,149
Community Hospital	Torrington	Very Small	\$17,913,750	-\$1,596,482	\$16,317,268	\$0	\$16,317,268
Converse County Memorial	Douglas	Very Small	\$35,426,232	-\$4,159,942	\$31,266,290	\$0	\$31,266,290
Hot Springs County Memorial	Thermopolis	Very Small	\$13,886,815	-\$838,730	\$13,048,085	\$0	\$13,048,085
Platte County Memorial	Wheatland	Very Small	\$13,810,272	-\$1,818,206	\$11,992,066	\$0	\$11,992,066
Powell Valley	Powell	Very Small	\$44,071,896	-\$7,933,129	\$36,138,769	\$9,821,565	\$26,317,204
Washakie Medical Center	Worland	Very Small	\$16,686,219	-\$1,378,628	\$15,307,591	\$0	\$15,307,591
West Park	Cody	Very Small	\$61,392,112	-\$3,456,321	\$57,816,712	\$9,242,997	\$48,573,715
Evanston Regional	Evanston	Small	\$21,494,140	-\$1,335,545	\$20,138,120	\$0	\$20,138,120
St. John's	Jackson	Small	\$72,569,264	-\$8,045,222	\$64,524,043	\$6,850,279	\$57,673,764
Riverton Memorial	Riverton	Small	\$32,882,884	-\$2,747,569	\$30,135,316	\$0	\$30,135,316
Lander Regional	Lander	Small	\$33,915,600	-\$8,044,843	\$25,870,757	\$3,160,314	\$22,710,443
Sheridan County Memorial	Sheridan	Small	\$60,094,156	-\$3,760,809	\$56,333,344	\$939,474	\$55,393,870
Iverson Memorial	Laramie	Small	\$60,259,256	-\$4,304,645	\$55,954,615	\$2,998,207	\$52,956,408
Campbell County Memorial	Gillette	Small	\$122,800,000	-\$12,000,082	\$110,677,515	\$13,515,826	\$97,161,689
Sweetwater County Memorial	Rock Springs	Small	\$53,467,132	-\$3,144,198	\$50,220,730	\$0	\$50,220,730
Cheyenne Regional	Cheyenne	Med - Teaching	\$231,300,000	-\$12,194,777	\$219,146,904	\$24,650,640	\$194,496,264
Wyoming Medical Center	Casper	Med - Teaching	\$191,200,000	-\$11,647,896	\$179,569,491	\$980,288	\$178,589,203
National Benchmarks (medians, 5055 hospitals reporting)		Very Small	\$15,800,000		\$15,000,000		\$13,500,000
		Small	\$34,100,000		\$31,100,000		\$28,900,000
		Med - Teaching	\$149,000,000		\$136,000,000		\$126,000,000

Table 2: Wyoming Hospitals, core costs, inpatient days, outpatient (B) to inpatient (A) cost ratio, adjusted days and average cost (CMS, FY11)

Hospital	City	Core Costs	Inpatient Days	Part B : A ratio	Adjusted Days	Average Cost/Day
South Big Horn	Basin	\$3,888,613	856	1.21	1,890	\$2,057.01
North Big Horn	Lovell	\$9,028,652	1,891	1.88	5,444	\$1,658.42
South Lincoln	Kemmerer	\$9,481,959	914	3.85	4,434	\$2,138.23
Johnson County	Buffalo	\$10,671,392	2,091	2.00	6,272	\$1,701.31
Crook County	Sundance	\$4,516,221	781	2.40	2,655	\$1,700.85
Star Valley	Afton	\$18,415,798	2,348	1.28	5,350	\$3,442.14
Weston County	Newcastle	\$5,728,038	2,203	3.05	8,918	\$642.33
Mountain View Regional	Casper	\$31,340,563	2,995	0.30	3,892	\$8,051.85
Niobrara Health and Life	Lusk	\$6,397,353	7,466	1.89	21,590	\$296.31
Platte County Memorial	Wheatland	\$11,992,066	2,078	1.28	4,738	\$2,531.02
Hot Springs County Memorial	Thermopolis	\$13,048,085	2,089	1.16	4,522	\$2,885.66
Carbon County Memorial	Rawlins	\$18,101,149	2,674	1.99	7,994	\$2,264.35
Community Hospital	Torrington	\$16,317,268	3,245	1.99	9,716	\$1,679.41
Washakie Medical Center	Worland	\$15,307,591	3,361	0.90	6,391	\$2,395.04
Converse County Memorial	Douglas	\$31,266,290	3,462	0.90	6,577	\$4,753.78
Powell Valley	Powell	\$26,317,204	3,592	1.78	9,981	\$2,636.85
West Park	Cody	\$48,573,715	6,138	0.61	9,873	\$4,920.03
Evanston Regional	Evanston	\$20,138,120	2,645	0.91	5,062	\$3,978.26
St. John's	Jackson	\$57,673,764	7,201	0.60	11,531	\$5,001.48
Riverton Memorial	Riverton	\$30,135,316	5,752	0.57	9,016	\$3,342.49
Lander Regional	Lander	\$22,710,443	6,826	0.35	9,207	\$2,466.72
Sheridan County Memorial	Sheridan	\$55,393,870	9,786	0.51	14,732	\$3,760.02
Iverson Memorial	Laramie	\$52,956,408	8,380	0.87	15,656	\$3,382.56
Campbell County Memorial	Gillette	\$97,161,689	13,439	0.74	23,372	\$4,157.16
Sweetwater County Memorial	Rock Springs	\$50,220,730	6,804	0.49	10,147	\$4,949.54
Cheyenne Regional	Cheyenne	\$194,496,264	39,716	0.24	49,264	\$3,948.02
Wyoming Medical Center	Casper	\$178,589,203	38,374	0.23	47,042	\$3,796.42

Calculating the “cost shift hydraulic”

Costs for various payers were determined from the following CMS worksheets:

- (1) Medicaid costs - Worksheet S-10, Line 7
- (2) SCHIP/indigent care program costs - Worksheet S-10, Line 11 plus 15.
- (3) Charity and bad debt cost - Worksheet S-10, Line 30
- (4) Medicare costs -
 - Cost-based Part B: Worksheet D, Part V, Line 202, Columns 6 plus 7.
 - PPS Part B: Worksheet D, Part V, Line 202, Column 5.
 - Cost-based Part A (Critical Access Hospitals): Worksheet E-3, Part V, Line 19
 - IPPS Part A: Worksheet D-1, Line 49, Column 1.
- (5) Private costs - Total reimbursable costs (Worksheet A, Line 118, Column 5) minus (1) through (4) above.

Revenue from various payers was determined from the following worksheets:

- (1) Medicaid revenue - Worksheet S-10, Lines 2 plus 4.
- (2) SCHIP/indigent care program revenue - Worksheet S-10, Line 9 plus 13.
- (3) Medicare revenue (includes patient deductibles and co-pays) -
 - Part B: Worksheet E, Part B, Lines 25 plus 26 plus 41-43
 - Cost-based Part A (Critical Access Hospitals): Worksheet E-3, Part V, Lines 20 plus 23 plus 31-33
 - IPPS Part A: Worksheet E, Part A, Lines 62 plus 63 plus 72-74.
- (4) Private revenue - Total patient revenue less contractual allowances less bad debt expenses (where applicable), less (1) through (3) above.

Appendix B: Predicting Standardized Prices from EGI Data

Objective and limitations

As mentioned in the report, standardizing prices to the greatest degree possible is necessary to facilitate cross-hospital or cross-year comparisons. Because claims data is paid retroactively instead of prospectively (unlike Medicare's Diagnosis-Related Groups), there is no way to standardize prices perfectly, even with more granular information.

Source dataset

The Department received 518,841 lines of raw hospital claims data from the HCMS Group under its contract to manage the Wyoming Health Information Network (WHIN), at a cost of \$3,000.

Important variables in the data include a unique ID for each employee, a relationship tag to indicate spouse or dependent, dates of service and dates of claim payment, primary, secondary and tertiary ICD-9 diagnoses, hospital Employer Identification Number (EIN), patient gender, birth year, procedure code (if applicable), the amount paid by EGI, and the amount paid by the member via deductible, coinsurance or copay.

Data preparation

(1) *Service years.* Only dates between 2001 and 2013 were retained. 3,989 lines were dropped.

(2) *Patient Age.* Patient age at time of service was calculated by subtracting birth date from service date. An additional 121,742 lines were dropped for all patients most likely to be eligible for Medicare (age greater than 64 years). This was done to ensure EGI was the most likely primary payer in the dataset.

(3) *Newborns and mothers.* Because hospital services for births are billed to mother and child separately, unique ID and relationship tags were processed to count newborns and mothers together as one ID while ensuring other dependents and spouses were counted separately. Newborns were identified as having an age of zero.

(4) *Episodes of care.* Episodes were generated using the assumption that all claim lines starting within 7 days of each other for the same individual belonged in the same hospital episode. Episode start and end dates were then calculated by taking the minimum start date and maximum end date for each episode. A length-of-stay variable was calculated from the difference between the episode start and end dates. An example is shown in Table 1, on the next page.

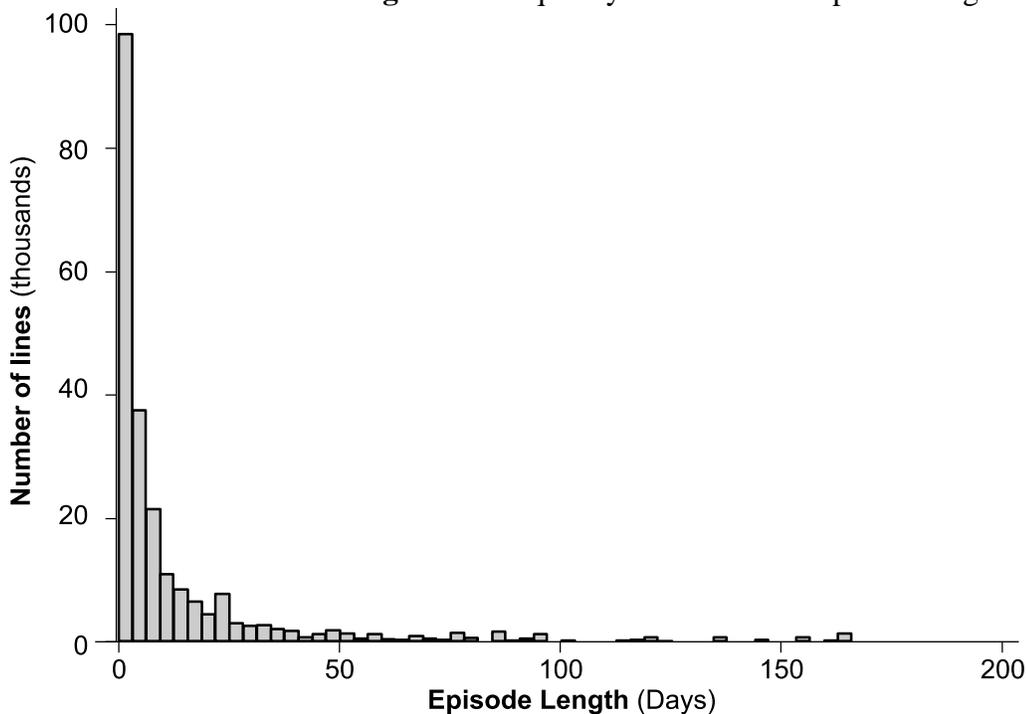
Table 1: Example of how episodes were bundled

Person	Line Start	Line End	Episode ID	Episode Start	Episode End	Length
001	01/01/2013	01/05/2013	1	01/01/2013	01/05/2013	4
001	01/03/2013	01/03/2013	1	01/01/2013	01/05/2013	4
001	01/11/2013	01/12/2013	2	01/11/2013	01/12/2013	1
002	01/01/2013	01/14/2013	3	01/01/2013	01/14/2013	13
002	01/02/2013	01/03/2013	3	01/01/2013	01/14/2013	13
002	05/01/2013	05/02/2013	4	05/01/2013	05/02/2013	1
003	02/01/2013	02/04/2013	5	02/01/2013	02/04/2013	3

The limitation with this cutoff is that two distinct back-to-back hospitalizations within 7 days would be counted as one episode, and long-term stays with line service start dates more than 7 days apart (e.g. line 3 in Table 1) would be counted as two or more episodes.

Episodes lasting longer than 200 days were dropped (3,825 lines). Figure 2 shows the distribution of episode lengths for remaining claim lines.

Figure 2: Frequency distribution of episode length



(5) *Hospital identification.* Medicaid claims data was used to match biller EIN (tax identification) with the hospital. 102,908 lines (35%) successfully merged (i.e., a hospital was identified for that line). There are two reasons for the majority of claims not merging:

- The hospital EIN was not in the Medicaid claims database.
- The billing provider was not a hospital; in many cases, doctors in a hospital work on contract and bill patients separately.

Any episode with at least one line billed to a hospital was attributed to that hospital; the remaining lines with no successful merge in that episode are assumed to be other non-hospital providers. Episodes with no lines successfully merging with a hospital ID were dropped (160,576 lines). At this point, the dataset contained 228,699 claim lines.

(6) *Total amount paid per episode.* Summing up the amount EGI paid per line per episode yielded a total amount paid per episode. A separate variable was calculated for the amount EGI paid to the hospital only (excluding contracted doctors, other providers, etc.). Outliers were again trimmed -- episodes with total amounts less than \$0 (1,880 lines) and above \$500,000 (5,388 lines) were dropped.

(7) *ICD-9 diagnosis cleaning.* Primary diagnoses were run through an algorithm made available by the Agency for Healthcare Research and Quality (AHRQ)⁶⁵ to remove trailing and leading zeroes and ensure standardized format for all diagnosis codes. The code “V30.00” (“single liveborn born in hospital delivered without cesarean section”), for example, would replace codes listed as “V30”, “V30.0” etc. to ensure consistency. The algorithm also grouped ICD-9 codes into a smaller number of major clinical classifications.

(8) *Diagnosis weight calculation.* Similar to the process for calculating DRG weights (though much less sophisticated) the median amount paid for a line associated with a given ICD-9 primary diagnosis was divided by the median paid for all ICD-9 diagnoses to determine a “weight” for that particular diagnosis code.

These diagnosis weights were then averaged together based on the amount paid per line to come up with a blended weight for that episode. Table 2, below, shows an example of this process.

Table 2: Example of blending line weights into episode weights based on amount paid

Episode ID	Amount Paid	Line Weight (Paid)	Diagnosis Weight	Blended Weight
1	\$10.00	10/1010	0.5	1.98
1	\$1000.00	1000/1010	2.0	1.98
2	\$50.00	50/100	1.0	1.05
2	\$50.00	50/100	1.1	1.05

At this point, claim lines were merged into 19,784 episodes of care.

(9) *Pruning hospitals with few observations.* Out-of-state hospitals with less than 50 episodes were dropped from the dataset. For in-state hospitals, the largest amount of observations (3,573) was for Cheyenne Regional; the fewest was for South Big Horn (19 episodes).

Constructing the model

The two episode-level factors that most influenced price paid were the length of each episode and the blended diagnosis weight of that episode. Both were strongly correlated with the total price for each episode (0.65 and 0.56 respectively) while only being moderately correlated with each other (0.35).

⁶⁵ <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp>

Demographic variables - patient age groups - and service year were also added to the model, along with interactions between variables.

For the cross-hospital comparisons, service year was added to the episode-level model specification. Only years after 2006 were used in this model, due to the low number of episodes prior to that date. All episodes over \$100,000 were dropped in order to prevent outliers from unduly influencing one or two hospitals over the others.

The final model used a fixed-effects regression, with hospitals as the group-level variable. Because the model suffers some problems with both heteroskedasticity and residual normality, robust standard errors were used.

Price paid for each episode was regressed on the following:

- Length of each episode, length squared (EpisodeLength, EpisodeLength2)
- Blended diagnosis weight, weight squared (EpisodeBlendWeight, EpisodeBlendWeight2)
- Episode length and diagnosis weight interaction (LengthBlend)
- Year of service (svc_year), as dummy variables for each year
- Patient age groups (dummies for newborn, kids, older adult)
- Interaction variables between patient age groups and episode length and diagnosis weight

Regression output for the fixed portion of the final model is shown in Exhibit 4. The 16,230 episodes fell into 39 hospitals, with the minimum number of episodes being 19 (South Big Horn) and maximum being 3066 (Cheyenne Regional). Note that almost all variables are significant; all are jointly significant when interactions are considered, and the model as a whole is significant (F-test statistic).

Exhibit 4: Hospital-level effects regression output

```

Fixed-effects (within) regression      Number of obs   =   16230
Group variable: HospitalID           Number of groups =    39

R-sq:  within = 0.4453                Obs per group:  min =    19
      between = 0.8738                    avg   =   416.2
      overall  = 0.5114                    max   =   3066

corr(u_i, Xb) = 0.2856                F(18,38)       =   718.38
                                           Prob > F        =    0.0000

```

(Std. Err. adjusted for 39 clusters in HospitalID)

EpisodePaid	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
EpisodeLength	2008.893	106.969	18.78	0.000	1792.345	2225.44
EpisodeLength2	-13.05841	1.603793	-8.14	0.000	-16.30512	-9.811702
EpisodeBlendWeight	7245.538	564.1423	12.84	0.000	6103.492	8387.584
EpisodeBlendWeight2	-558.5404	57.73716	-9.67	0.000	-675.4231	-441.6576
LengthBlend	165.066	55.65501	2.97	0.005	52.39828	277.7336
svc_year						
2	1681.722	550.3803	3.06	0.004	567.535	2795.908
3	2244.158	1107.812	2.03	0.050	1.509274	4486.806
4	1259.972	813.6605	1.55	0.130	-387.1978	2907.141
5	2348.783	1186.808	1.98	0.055	-53.78545	4751.351
6	2249.518	1015.847	2.21	0.033	193.0435	4305.993
7	3188.01	1201.948	2.65	0.012	754.794	5621.225
8	2536.751	1059.696	2.39	0.022	391.5087	4681.994
kids						
oldadult	-958.9151	447.7158	-2.14	0.039	-1865.268	-52.56189
oldadult	462.4735	896.8723	0.52	0.609	-1353.149	2278.096
Weightkids	-265.7061	790.9492	-0.34	0.739	-1866.899	1335.487
Weightold	2228.04	408.081	5.46	0.000	1401.923	3054.156
Lengthkids	-664.448	147.1814	-4.51	0.000	-962.4011	-366.4948
Lengthold	-253.0507	122.1059	-2.07	0.045	-500.2412	-5.860167
_cons	-165.4784	1433.948	-0.12	0.909	-3068.354	2737.398
sigma_u 3920.4884						
sigma_e 12084.839						
rho .09522266 (fraction of variance due to u_i)						

test kids Weightkids Lengthkids

- (1) kids = 0
- (2) Weightkids = 0
- (3) Lengthkids = 0

F(3, 38) = 17.93
 Prob > F = 0.0000

test oldadult Weightold Lengthold

- (1) oldadult = 0
- (2) Weightold = 0
- (3) Lengthold = 0

F(3, 38) = 11.53
 Prob > F = 0.0000

Hospital-level effects

Once the model was constructed, the hospital-level residual could be predicted. This residual -- the hospital level effect -- represents the difference between the hospital average and the State average, controlling for the episode-level factors mentioned previously. This residual is the result of all the factors that might affect price at the hospital (not episode) level, to include the degree of market concentration and uncompensated care.

Table 3: Hospital-level effects in EGI data

Hospital	City	Hospital-level Effect
Campbell County Memorial	Gillette	-\$3,888
Cheyenne Regional Medical Center	Cheyenne	\$2,130
Community Hospital	Torrington	-\$3,277
Converse County Memorial	Douglas	-\$3,199
Crook County	Sundance	-\$4,112
Evanston Regional	Evanston	\$644
Hot Springs County Memorial	Thermopolis	-\$4,893
Iverson Memorial	Laramie	-\$1,548
Johnson County Memorial	Buffalo	-\$4,437
Lander Valley	Lander	\$2,312
Carbon County Memorial	Rawlins	-\$2,348
Sheridan County Memorial	Sheridan	-\$3,005
Sweetwater County Memorial	Rock Springs	-\$352
North Big Horn	Lovell	-\$2,947
Platte County Memorial	Wheatland	-\$3,588
Powell Hospital	Powell	-\$3,331
Riverton Memorial	Riverton	\$3,546
South Big Horn CAH	Basin	-\$7,082
South Lincoln	Kemmerer	-\$2,339
St. John's	Jackson	-\$492
Star Valley	Afton	-\$4,058
Washakie Memorial	Worland	-\$3,527
West Park	Cody	-\$1,611
Weston County	Newcastle	-\$4,216
Wyoming Medical Center	Casper	\$5,886

Predicting year effects for WMC / CRMC

Instead of predicting hospital-level effects, the second model standardizes prices for a single hospital (Wyoming Medical Center and Cheyenne Regional Medical Center, in two separate regression frameworks) to show how price varies across years. The end result is Figure 11 in Part III.

The framework is a fixed-effects regression using the same episode dataset, with year of service as the group-level variable.

Amount paid for each episode is controlled for length, length squared, diagnosis weight, weight squared, the interaction between length and weight, patient age, and interactions between patient age, episode length and diagnosis weight.

Exhibit 5 and 6 show the regression outputs for WMC and CRMC, respectively. Note that model coefficients are either statistically significant on their own, or, in the case of interactions, jointly-significant. Adjusted R^2 for the two models are 0.66 for WMC and 0.57 for CRMC. Robust standard errors were used due to problems with residual normality and heteroskedasticity.

Exhibit 5: Fixed-effects regression output for Wyoming Medical Center

```

Fixed-effects (within) regression          Number of obs   =    1474
Group variable: svc_year                  Number of groups =     8

R-sq:  within = 0.6680                    Obs per group:  min =    111
        between = 0.0158                  avg =    184.3
        overall = 0.6565                  max =    270

corr(u_i, Xb) = -0.0862                    F(7,7)          =      .
                                           Prob > F         =      .

                                           (Std. Err. adjusted for 8 clusters in svc_year)
-----+-----+-----+-----+-----+-----+-----+-----+
          |               |               |               |               |               |               |
          | EpisodePaid |               |               |               |               |               |
-----+-----+-----+-----+-----+-----+-----+-----+
          |               |               |               |               |               |               |
          | EpisodeLength | 1230.493    | 185.8316     | 6.62    | 0.000    | 791.0714    | 1669.915
          | EpisodeLength2 | 9.395628    | 21.02501     | 0.45    | 0.668    | -40.32061   | 59.11187
          | EpisodeBlendWeight | 14014.27    | 2549.954     | 5.50    | 0.001    | 7984.587    | 20043.95
          | EpisodeBlendWeight2 | -777.8846   | 141.5437     | -5.50   | 0.001    | -1112.582   | -443.1869
          | LengthBlend | 227.3961    | 74.0817      | 3.07    | 0.018    | 52.2207     | 402.5714
          | pat_age | 133.283     | 67.04145     | 1.99    | 0.087    | -25.24485   | 291.8108
          | Lengthage | 15.65287    | 12.43547     | 1.26    | 0.248    | -13.75234   | 45.05809
          | Weightage | 29.8226     | 78.4156      | 0.38    | 0.715    | -155.6008   | 215.246
          | _cons | -2845.714   | 1823.639     | -1.56   | 0.163    | -7157.935   | 1466.507
-----+-----+-----+-----+-----+-----+-----+-----+
          | sigma_u | 5813.524
          | sigma_e | 25620.445
          | rho | .04896675 (fraction of variance due to u_i)

```

Exhibit 6: Fixed-effects regression output for Cheyenne Regional Medical Center

```

Fixed-effects (within) regression              Number of obs   =   3180
Group variable: svc_year                     Number of groups =     8

R-sq:  within = 0.5683                      Obs per group: min =   326
        between = 0.5777                      avg =   397.5
        overall = 0.5682                      max =   465

corr(u_i, Xb) = 0.0136                      F(7,7)          =     .
                                                Prob > F         =     .

                                         (Std. Err. adjusted for 8 clusters in svc_year)
-----+-----
      |               |               |               |               |               |               |
      | EpisodePaid |               | Robust        |               |               |               |
      |               | Coef.        | Std. Err.     | t             | P>|t|         | [95% Conf. Interval]
-----+-----+-----+-----+-----+-----+-----+-----
      | EpisodeLength | 3278.424     | 502.9849      | 6.52          | 0.000         | 2089.054   | 4467.794
      | EpisodeLength2 | -14.81789    | 3.478682      | -4.26         | 0.004         | -23.04367  | -6.592113
      | EpisodeBlendWeight | 10703.62     | 2953.758      | 3.62          | 0.008         | 3719.091   | 17688.15
      | EpisodeBlendWeight2 | -856.8791    | 67.82081      | -12.63        | 0.000         | -1017.25   | -696.5084
      | LengthBlend     | 201.8381     | 46.96457      | 4.30          | 0.004         | 90.78452   | 312.8916
      |   pat_age       | 64.83001     | 77.10942      | 0.84          | 0.428         | -117.5048  | 247.1648
      | Lengthage       | -16.20603    | 10.00129      | -1.62         | 0.149         | -39.85533  | 7.443268
      | Weightage       | 86.54391     | 65.2663       | 1.33          | 0.226         | -67.78637  | 240.8742
      |   _cons        | -4653.54     | 3418.53       | -1.36         | 0.216         | -12737.08  | 3429.999
-----+-----+-----+-----+-----+-----+-----
      | sigma_u        | 1731.2039
      | sigma_e        | 22604.904
      | rho           | .00583111   (fraction of variance due to u_i)
  
```

Once the models were built, group-level (year) residuals were estimated for each hospital and plotted on Figure 11 along with fitted functions intended to illustrate the overall trend.

Appendix C: Measuring Market Power in Wyoming

The Herfindahl-Hirschman Index (HHI) is the traditional method of measuring market power

In most industries, market competition is traditionally measured using the Herfindahl-Hirschman Index, or HHI. The HHI is defined as the sum of the squared market shares of each firm in the industry, as indicated in the formula below, where *i* represents the individual firm and *N* represents the total number of firms.⁶⁶

$$HHI = \sum_{i=1}^N (\text{Market Share}_i)^2$$

For example, if there are five firms in the industry and each firm has 20% market share, the HHI would be $(20)^2 + (20)^2 + (20)^2 + (20)^2 + (20)^2 = 2000$. If one firm in the industry had the entire market share, the HHI would be $(100)^2 = 10,000$. Generally speaking, regulators use the HHI to indicate the following degrees of market concentration:

HHI	Market
Below 1500	Unconcentrated
1500 - 2500	Moderately Concentrated
Above 2500	Highly Concentrated

Problems with using the HHI for hospitals

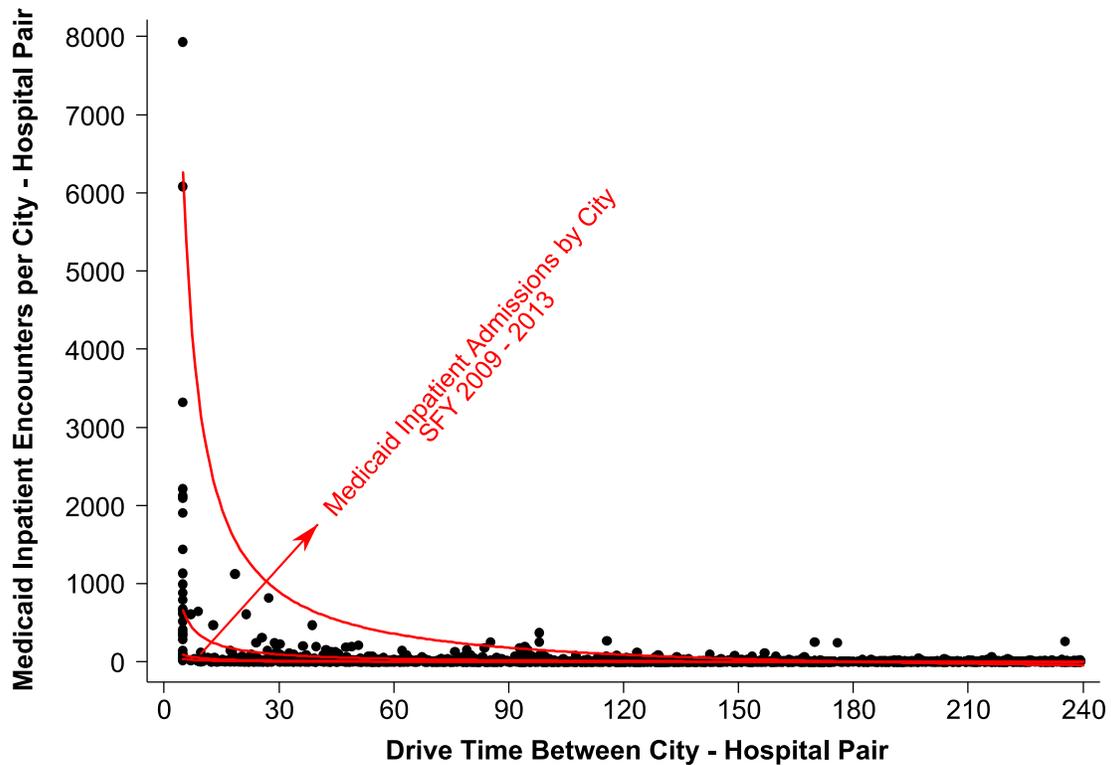
The HHI is effective in measuring market concentration for large-scale industries where geography is not an important factor -- soft drink manufacturers, cell phone carriers, retail clothing outlets, and so forth.

Hospital care, however, is not one of these industries. Geography is a critical factor, and hospital markets are generally local: people often need access to care quickly, and -- except in the case of specialty care -- often want to stay close to family and friends.

This is evident in an analysis of Wyoming Medicaid claims data. The figure below shows the number of Wyoming Medicaid hospital claims from a given city to a given hospital across five fiscal years (each dot), and how that number varies according to the travel time between that city-hospital pair.

⁶⁶ US Department of Justice and Federal Trade Commission. Horizontal Merger Guidelines. August 19th, 2010. <http://www.justice.gov/atr/public/guidelines/hmg-2010.html>

Figure 1: Inverse relationship between city-hospital encounter and travel time
(WY Medicaid claims data, FY09 - FY13)



The red lines show the fitted⁶⁷ function predicting the number of encounters in each city-hospital pair (\widehat{P}_{ch}) based only on travel time between the city-hospital pair (TT_{ch} , in minutes) and the total number of patients in that city (P_c) -- which causes the function to expand in the direction of the arrow:

$$\widehat{P}_{ch} = (-0.017694 \times P_c) + \frac{151.3532 + (3.2028 \times P_c)}{TT_{ch}}$$

Where geography plays a significant role, geographic boundaries must be drawn for an HHI to be calculated for that particular market. In most studies on hospital markets, this has been done by using administrative boundaries (county lines, ZIP codes). These boundaries, however, are arbitrary and rarely reflect actual patient flow patterns.

Even when boundaries can be estimated (e.g. Figure 5 in Part I), however, calculating the HHI for that region ignores potentially important cross-region flows. Wyoming Medical Center, for example, receives many patients from around Wyoming.

⁶⁷ With 1,879 Medicaid inpatient city-hospital observations, R^2 of 0.775, all terms jointly significant. A minimum travel time of 5 minutes is assumed.

The Logit Competition Index (LOCI) is a better measure of market concentration for hospitals

The alternative to the HHI used for this analysis is the Logit Competition Index.⁶⁸ The LOCI is bounded by 0 and 1, with 0 indicating an absolute monopoly and 1 indicating pure competition. Instead of measuring market shares by region, the LOCI draws on measuring discharges at a very granular level: in the case of Wyoming hospitals, we use any city or town that has ever had a client on Medicaid visit a hospital. The measure is therefore not only more sensitive to local markets, but it does not require any geographic boundaries be drawn.

This advantage is also the LOCI's disadvantage -- it requires a significant amount of data to calculate. In this study, the LOCI is calculated for each hospital by multiplying the market share the hospital has in a given city (share of patients from that city) by the relative importance of that city to the hospital's total volume, and summing up those weighted average submarket shares for all the hospital's submarkets.

$$LOCI_h = 1 - \sum_{c=1}^N (\text{Submarket Share}_{hc}) \times (\text{Submarket Weight}_{hc})$$

The table below shows a theoretical example of four cities (A-D) and three hospitals (X-Z). Total patients for each city and total encounters for each hospital are in the first column and row, respectively.

Table 1: Example LOCI calculation

Encounters		Hospital X		Hospital Y		Hospital Z	
		9,300		3,300		900	
City A	1,000	700	70%	200	20%	100	10%
			8%		6%		11%
City B	2,000	600	30%	1,000	50%	400	20%
			6%		30%		44%
City C	500	0	0%	100	20%	400	80%
			0%		3%		44%
City D	10,000	8,000	80%	2000	20%	0	0%
			86%		61%		0%
LOCI		0.24		0.71		0.54	

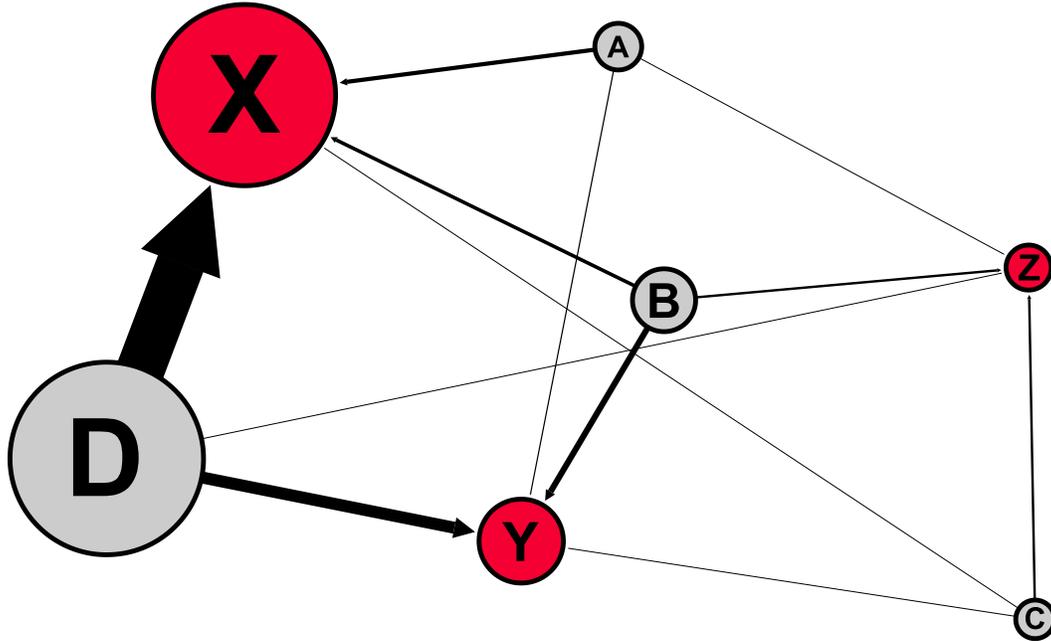
The large cells in the table represent the number of patients from that city visiting the particular hospital. The corresponding market share of each hospital in any given city is the top percentage, the weight of that city in the hospitals' discharges is the bottom percentage.

The LOCI is calculated by multiplying the two percentages together and summing up across hospitals. In the case of Hospital X, the LOCI would be:

$$0.24 = 1 - [(0.7 \times 0.08) + (0.3 \times 0.06) + (0.0 \times 0.0) + (0.8 \times 0.86)]$$

⁶⁸ The LOCI was derived by Yaa Akosa Antwi, Martin Gaynor and William Vogt in 2006.

Figure 2: Diagram for discharge patterns in example above.



Note that, in this example, while Hospital Z is the smallest of the three, it has the second-most market power. This is primarily due to its local monopoly in City C and strong showing in City B.

LOCI as applied to Wyoming Medicaid claims data

The approach taken with the Medicaid claims data is similar to the example above, except instead of four cities and three hospitals, there are 169 cities/towns, 140 hospitals, and a total of 61,237 city-hospital encounters, requiring statistical software to facilitate the calculations.

Ultimately, three different versions of the LOCI were generated:

- (1) Straightforward, as per the example above, using Medicaid patient flow data.
- (2) Using the same data, but accounting for hospital system ownership (Table 1 of Part I) -- assuming two hospitals owned by the same entity would not directly compete.
- (3) An 'instrumented' LOCI predicted using travel time and city population (as of the 2010 Census) per the equation shown in Figure 1, but also taking into account system ownership. This measure was used in the final analysis, for reasons explained after the table.

These are shown, by hospital analyzed, in Table 2, on the next page.

Table 2: LOCI measurements for 25 Wyoming hospitals

Hospital	LOCI (1)	LOCI (2)	LOCI (3)
Campbell County Memorial	0.27	0.27	0.43
Cheyenne Regional Medical Center	0.24	0.24	0.41
Torrington Community	0.60	0.58	0.56
Converse County Memorial	0.57	0.57	0.71
Crook County	0.89	0.87	0.66
Evanston Regional	0.42	0.42	0.45
Hot Springs County Memorial	0.64	0.61	0.64
Ivinson Memorial	0.42	0.42	0.47
Johnson County Memorial	0.64	0.64	0.67
Lander Valley	0.49	0.25	0.40
Carbon County Memorial	0.47	0.47	0.54
Sheridan Memorial	0.32	0.32	0.46
Sweetwater County Memorial	0.36	0.36	0.45
North Big Horn	0.87	0.76	0.63
Platte County	0.60	0.57	0.68
Powell	0.57	0.56	0.52
Riverton Memorial	0.53	0.26	0.40
South Big Horn	0.93	0.93	0.68
South Lincoln	0.74	0.74	0.60
St. John's	0.29	0.29	0.43
Star Valley	0.42	0.42	0.53
Washakie Medical Center	0.56	0.55	0.54
West Park	0.55	0.55	0.47
Weston County	0.83	0.83	0.51
Wyoming Medical Center	0.29	0.29	0.41

Note that (1) and (2) are similar for most hospitals, with one notable exception - Lander/Riverton, which were both owned by LifePoint in 2011 and are now formally merged as SageWest.⁶⁹

Market power and prices - the problem of reverse causality

The main problem with using any straightforward measure of market power like LOCI measures (1) or (2) when analyzing prices is “reverse causality”: price may well affect market power, and vice-versa. So might hospital quality, brand recognition, capacity or other underlying hospital characteristics driven by price but not included in the regression model.

Patients may visit a hospital with high prices, for example, because those high prices allow the hospital to offer advanced services or fireplaces in the waiting rooms. Those patient visits increase the hospital’s

⁶⁹ <http://sagewesthealthcare.com/>

market share. Increased market share allows the hospital to demand higher prices from insurers. Higher prices allow the hospital to increase its services or build more fireplaces. And so forth.

While Medicaid patients are likely less price-sensitive than private-pay consumers due to minimal cost-sharing requirements, patient flows may still be affected by factors like reputation.

To try and control for this problem, this analysis relies on “instrumental variables” (travel time and city population) to calculate a *synthetic* measure of market concentration based purely on hospital location compared with population centers.

Two key criteria must be met for an instrumental variable to be valid:

- The instrumental variable must be correlated with the original explanatory variable. In this case, travel time and city population correlate well with the city-hospital encounters which determine the LOCI, as shown in the equation in Part I.
- The instrumental variable must not be correlated with the outcome variable. In this case, there is little theoretical basis to imagine why travel time and city size would be correlated with hospital price.⁷⁰

Relationship between predicted prices and LOCI measures

Both the observed (2) and predicted (3) LOCI have statistically-significant associations with hospital-level effects, and account for just less than half of the variance by themselves. Figures 2 and 3 illustrate this relationship with scatterplots. Simple bivariate regressions are calculated and displayed as red lines, with relevant statistics also shown in red.

Note that the LOCI was transformed to the inverse (1/LOCI) in order to conform with OLS assumptions of linear relationships between independent and dependent variables.

⁷⁰ Justification for travel time as an instrument for LOCI was also done by Akosa Antwi et. al in their working paper, “A competition index for differentiated products oligopoly with an application to hospital markets.” 2006. See

Figure 2: Relationship between market power measure through observed Medicaid LOCI and hospital-level effects. Increased market concentration is significantly associated with higher prices.

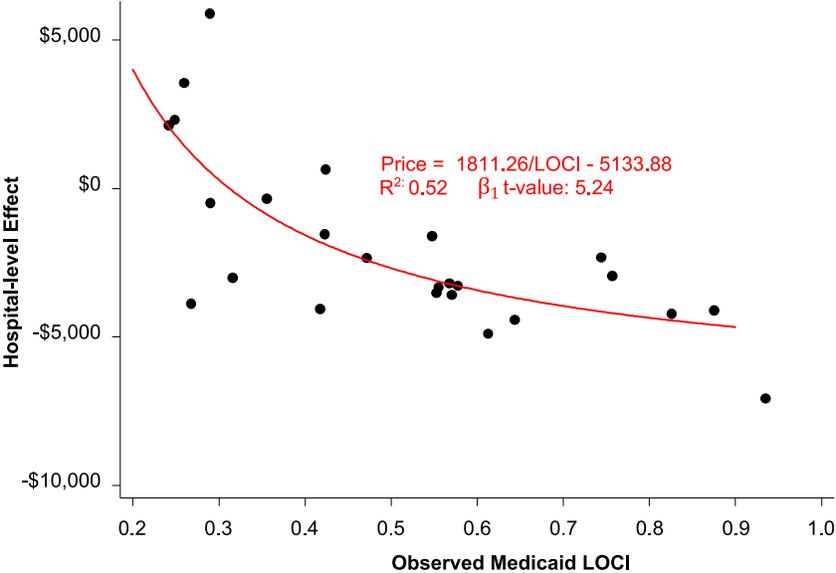
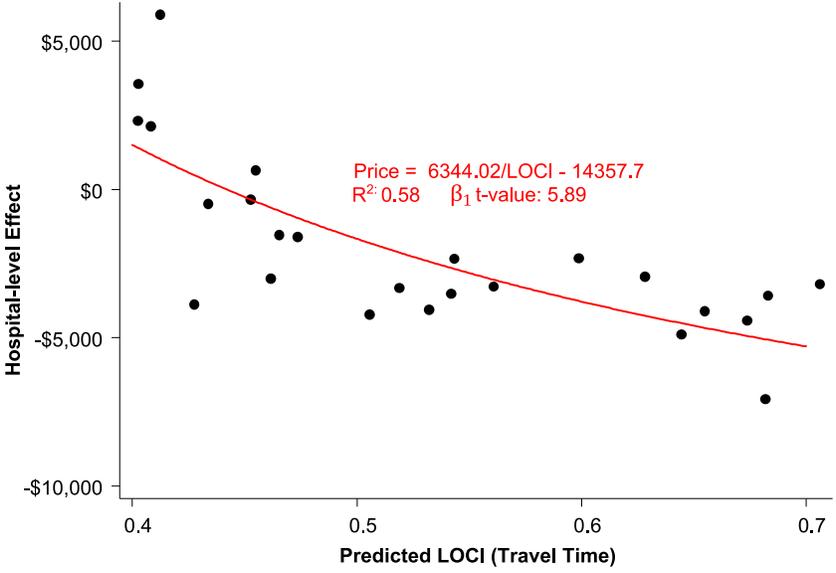


Figure 3: Relationship between market power measure through predicted LOCI and hospital-level effects. Again, increased market concentration is significantly associated with higher prices.



Appendix D: Final Model - Prices, Uncompensated Care, and Market Power

The final regression model links the hospital-level fixed effects with market concentration and a measure of uncompensated and unreimbursed care.

The dependent variable for the model is the hospital-level residual calculated in Table 3 of Appendix B.

Independent variables for analysis include:

(1) The predicted Logit Competition Index (LOCI) as calculated in Appendix C and shown in Table 2 of that Appendix is a measure of natural market concentration.

(2) Adjusted uncompensated care was calculated by multiplying the adjusted (for local government support) uncompensated and unreimbursed care percentage found in the last column of Part I's Table 5 by the average cost as shown in the last column of Part I's Table 3.

This figure is intended to illustrate the average dollar burden on each hospital, for uncompensated and unreimbursed care once local government support is factored in.

The model function is as follows:

$$\widehat{\text{Hospital Residual}} = \widehat{\beta}_0 + \widehat{\beta}_1 \times [\text{Adjusted Uncompensated Care}] + \frac{\widehat{\beta}_3}{[\text{Market Concentration}]} + \frac{\widehat{\beta}_4 \times [\text{Adjusted Uncompensated Care}]}{[\text{Market Concentration}]}$$

The inverse of LOCI was taken in order to conform with Ordinary Least Squares assumptions of linear relationships between variables. See Figure 3 of Appendix C.

Model coefficients are listed in Table 8. Final fit of the model is good - the R² is over 0.7.

Uncompensated care and its interaction are jointly significant (p-value of 0.0112); uncompensated care appears to explain just under 30% of the variation in hospital effects.

Note that the LOCI coefficient in the final model is significant at the p < 0.001 level, and that the addition of the market power measure and its interaction with uncompensated care explains an additional 40% of the variation (0.703 - 0.291 adjusted R² between models (3) and (2)) in standardized episode price.

Table 8: Regression outputs for predicted EGI standard price, three sequential models

	(1) Price	(2) Price	(3) Price
Uncompensated Average Cost		7.132** (2.167)	-11.37 (7.295)
1/(Competition Index)			4514.8*** (1063.6)
1/(Competition Index) x Uncomp. Cost			8.019* (3.743)
Constant	-1989.4** (591.7)	-2792.4*** (554.8)	-11526.8*** (1996.2)
Observations	25	25	25
Adjusted R ²	0	0.291	0.703
F-statistic	0	10.84	19.90
Residual degrees of freedom	24	23	21
Model degrees of freedom	0	1	3

Standard errors in parentheses

* p < 0.05 , ** p<0.01, *** p<0.001

The conclusion here, as noted in the end of Part II of this study, is that price increases associated with an increased burden of uncompensated care are also significantly associated with market concentration. This relationship can be visualized in Figure 10 of Part II.

Diagnostics

In order to verify that OLS assumptions hold, residuals were visually checked for heteroskedasticity and residual normality. Nothing problematic was found. When the two hospitals with the largest influence (i.e., leverage and discrepancy) were eliminated from the regression model, coefficients did not dramatically change, though the uncompensated average cost coefficient lost some statistical significance.

Appendix E: Loading and Using CMS Hospital Cost Report Data

Step 1: Download the data.

(a) CMS cost report data for hospitals, Skilled Nursing Facilities, and Home Health Agencies can be downloaded at the following link:

<http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/CostReports/Cost-Reports-by-Fiscal-Year.html>

This study used the FY2011 Hospital-2010 data file, which is the most complete as of June, 2014. The specific link for this file is at the hyperlink below. Note that the compressed file is approximately 125 MB in size.

<http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/CostReports/Cost-Reports-by-Fiscal-Year-Items/HOSPITAL10-DL-2011.html>

The final download will include three separate comma-separated value (.csv) tables:

- (1) “hosp10_2011_RPT.csv” -- This file is the backbone for linking reports together.
- (2) “hosp10_2011_NMRC.csv” -- This file contains numeric information from the cost reports. Most of the relevant information will be found here.
- (3) “hosp10_2011_ALPHA.csv” -- This file contains alphanumeric information, like hospital addresses and yes/no answers.

Step 2: Obtain the documentation.

(a) The data files are impossible to understand by themselves. In order to retrieve any information, you will need to know the specific worksheet number and the column and the row the information is on. You will also need to know the hospital Medicare ID.

You can look up this information by downloading the relevant section of the Provider Reimbursement Manual here:

http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/P152_40.zip

Within this file, “R5P240f.pdf” is the Acrobat file for the blank forms, and “pr2_40.pdf” are the instructions for filling out the cost report.

(b) Additional documentation for the dataset can be downloaded here:

<http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/CostReports/DOCS/HOSPITAL2010-DOCUMENTATION.zip>

The most important document in this file is the “HCRIS_DataModel.pdf”, which shows how the various tables link together. In essence, the Report Table provides the structure for the data, while the Numeric

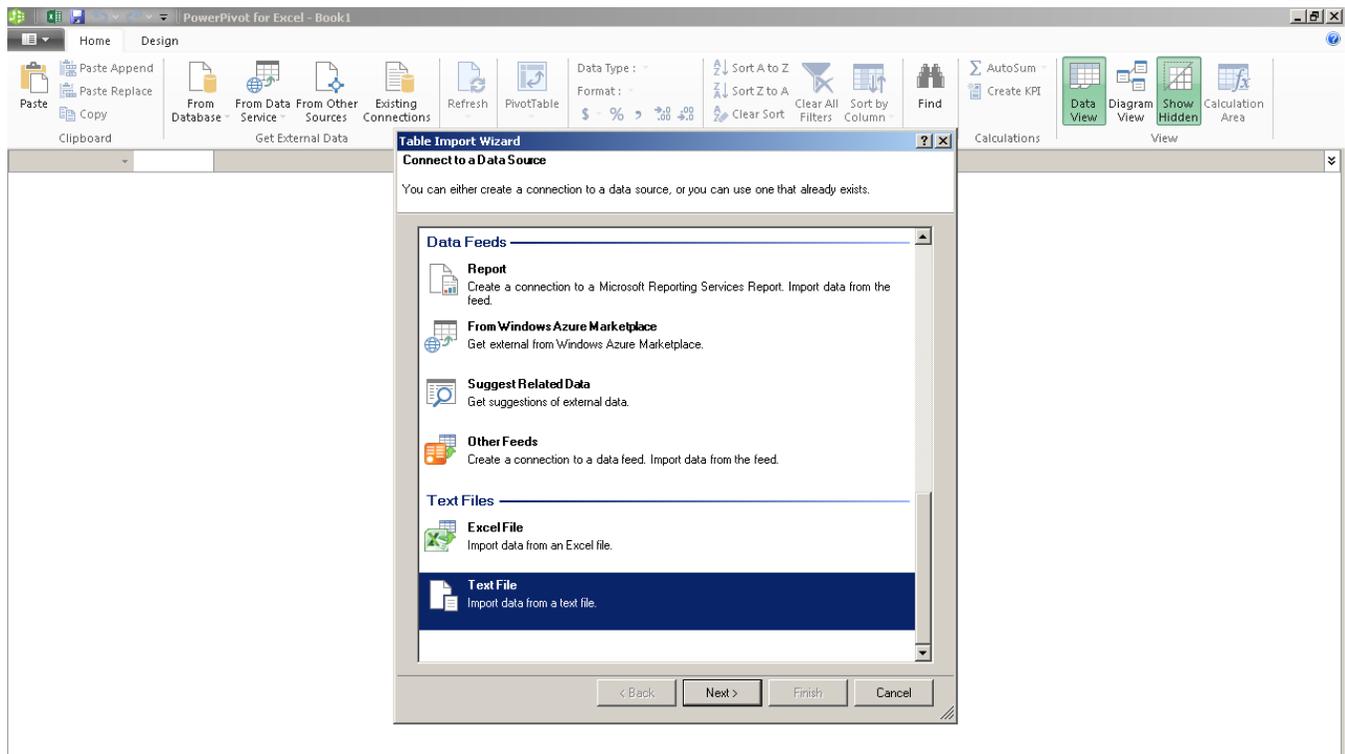
and Alphanumeric tables contain the data itself. The primary key is the first column in all tables - the report record number (RPT_REC_NUM).

Step 3: Load the data model.

(a) To load the data from the *.csv files, you will need the PowerPivot add-on for Microsoft Excel. The add-on is free, but requires some configuration. Start here for guidance:

<http://office.microsoft.com/en-us/excel-help/power-pivot-add-in-HA101811050.aspx>

(b) Once in PowerPivot, open the data model (“Manage”) and click “Get External Data - From Other Sources.” Scroll down to “Text File” at the bottom of the list. Click “Next”.

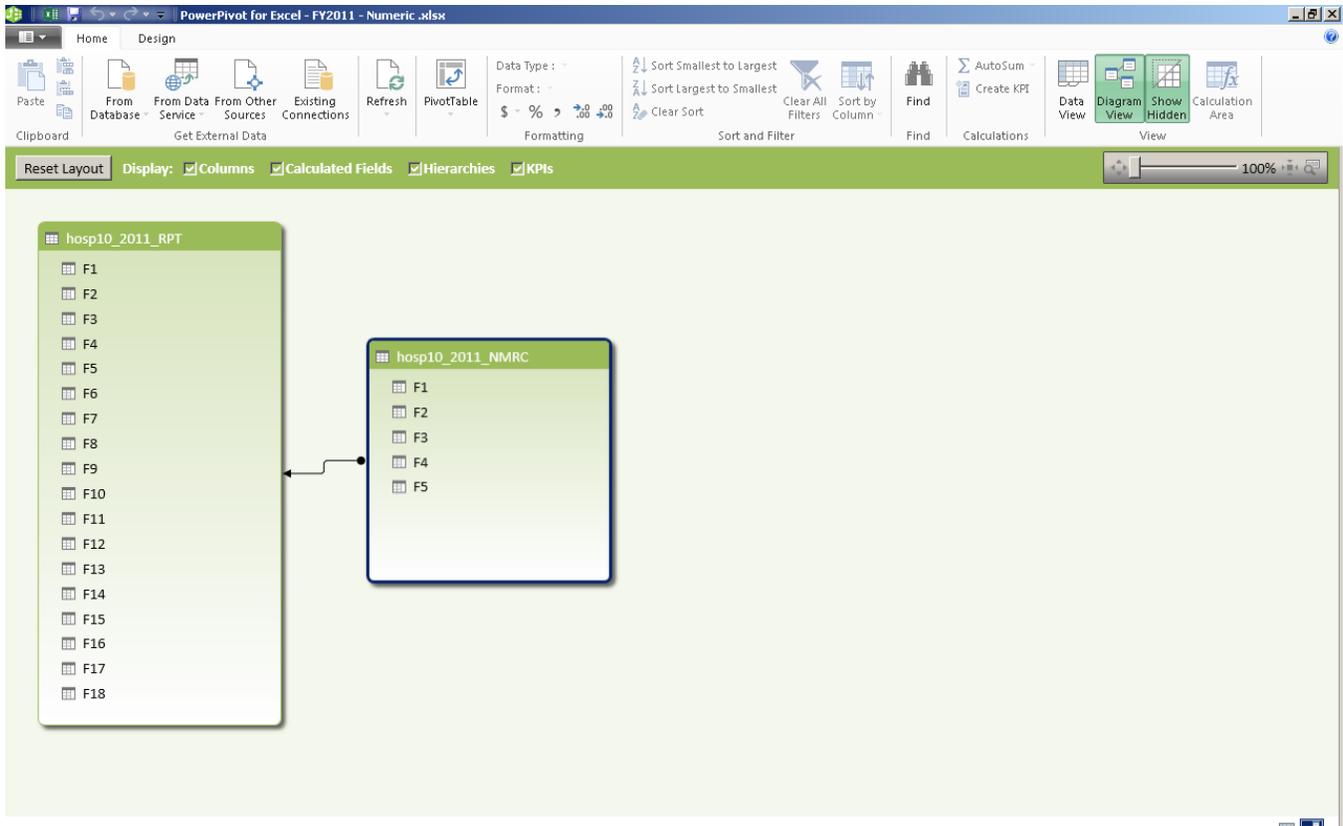


(c) Browse to the “hosp10_2011_RPT.csv” in File Path box and load the Report Table file. Do not use the first row as column headers.

Once complete, repeat the process for the “hosp10_2011_NMRC.csv”. There are several million records, so please be patient when importing this file.

(d) Connect the primary key (“F1”) from the RPT table to the NMRC table by dragging it over.

At this point, you should see something like this in Diagram View:



(e) It is helpful, but not necessary, at this point to rename the column headers (F1, F2, etc) to match the headers in the HCRIS_DataModel.pdf file by right clicking on each. Most important for reference are the Medicare provider number (“PRVDR_NUM”), the Worksheet (“WKSHT_CD”), the row (“LINE_NUM”), column (CLMN_NUM”) and value (“ITM_VAL_NUM”).

(f) Repeat (b) - (e) with a new Excel file for the Alphanumeric table.

Step 4: Explore data via PivotTables

(1) In PowerPivot, click on the PivotTable button, and create your new table in Excel.

(2) There are generally two ways to view the data: you can look at a single worksheet for a single hospital, or you can look at a single cell, row or column for all hospitals in the dataset.

(3) To see an entire worksheet for a single hospital, filter by worksheet and by hospital and use the row variable in the rows tab and the column variable in the column tab. See the screenshot below.

The screenshot shows an Excel spreadsheet with a PivotTable. The PivotTable Fields task pane is open on the right, showing the following configuration:

- ACTIVE** | ALL
- Choose fields to add to report: hosp10_2011_NMRC, hosp10_2011_RPT
- FILTERS:** F2, F3
- COLUMNS:** F4
- ROWS:** F3
- VALUES:** Sum of F5

The PivotTable data is as follows:

Row Labels	Column Labels	100	200	300	400	500	600	700
100					\$480,350.00	\$480,350.00	-\$346,123.00	\$134,227.00
200					\$130,847.00	\$130,847.00		\$130,847.00
400		\$19,173,857.00	\$19,173,857.00			\$19,173,857.00		\$19,173,857.00
500	\$19,464,806.00	\$24,635,697.00	\$44,100,503.00		-\$527,174.00	\$43,573,329.00	-\$3,282,205.00	\$40,291,124.00
600					\$2,255,787.00	\$2,255,787.00		\$2,255,787.00
700	\$1,292,581.00	\$4,466,722.00	\$5,759,303.00	-\$2,256,583.00	\$3,502,720.00		-\$50,926.00	\$3,451,794.00
1400		\$904,220.00	\$904,220.00		-\$220.00	\$904,000.00	-\$4,295.00	\$899,705.00
1500	\$1,702,818.00	\$802,180.00	\$2,504,998.00		-\$1,897.00	\$2,503,101.00		\$2,503,101.00
1600	\$2,150,892.00	\$1,928,659.00	\$4,079,551.00		\$592,561.00	\$4,672,112.00	-\$592,562.00	\$4,079,550.00
1700	\$4,563,183.00	\$893,827.00	\$5,457,010.00		-\$7,348.00	\$5,449,662.00	-\$6,055.00	\$5,443,607.00
1800	\$592,705.00	\$736,561.00	\$1,329,266.00		-\$703,174.00	\$626,092.00	-\$9.00	\$626,083.00
1900	\$2,442,745.00	\$17,328,608.00	\$19,771,353.00	-\$15,363,887.00	\$4,407,466.00		-\$19,302.00	\$4,388,164.00
2000	\$2,028,440.00	\$1,099,008.00	\$3,127,448.00		-\$215.00	\$3,127,233.00	-\$1,324.00	\$3,125,909.00
2100	\$16,143,724.00	\$5,880,020.00	\$22,023,744.00		-\$640,782.00	\$21,382,962.00	-\$2,058,154.00	\$19,324,808.00
2200	\$3,097,857.00	\$1,553,664.00	\$4,651,521.00		-\$263,248.00	\$4,388,273.00	-\$589,899.00	\$3,798,374.00
2300	\$1,593,964.00	\$1,185,791.00	\$2,779,755.00		-\$19,844.00	\$2,759,911.00		\$2,759,911.00
2400	\$1,585,437.00	\$969,371.00	\$2,554,808.00		-\$475,334.00	\$2,079,474.00		\$2,079,474.00
2500	\$724,170.00	\$297,625.00	\$1,021,795.00		-\$37,620.00	\$984,175.00		\$984,175.00
2600	\$1,788,168.00	\$1,156,828.00	\$2,944,996.00		-\$188,581.00	\$2,756,415.00	-\$5,318.00	\$2,751,097.00
2700	\$5,475,634.00	\$18,732,999.00	\$24,208,633.00		-\$14,912,425.00	\$9,296,208.00	-\$478,438.00	\$8,817,770.00
2800	\$1,476,909.00	\$676,523.00	\$2,153,432.00		-\$125,745.00	\$2,027,687.00		\$2,027,687.00

In the example above, viewing Worksheet A from Cheyenne Regional Medical Center (530014), columns F2 from the NMRC table (Worksheet) and column F3 from the RPT table (Hospital ID) are listed as FILTERS. Column F4 from the NRMC table (column) is listed under COLUMNS and F3 (rows from the NMRC table) is put in the ROWS area. The VALUES area is filled with F5 (sum) from the NMRC table.

(4) To compare values across multiple hospitals, move the Hospital ID (F3 from RPT table) from the FILTER to the ROWS area, and move either the row (F3 from the NMRC table) or column (F4 from the NMRC table) into the FILTER area. Filter to the row or column you want.

In the screenshot below, we have filtered to Line 200 of Worksheet A, across all hospitals reporting. Note that you can see all columns on the worksheet (100 - 700).

Having to remember what F2 and F4 mean, and which F3 refers to what in these examples points the utility of renaming your column headings initially, per Step 3(e).

The screenshot shows an Excel workbook with a PivotTable on Sheet2. The PivotTable has Row Labels and Column Labels. The PivotTable Fields task pane is open on the right, showing the source data and the fields assigned to the PivotTable.

Row Labels	100	200	300	500	600	700
10001	\$110,197,752.00	\$157,095,176.00	\$267,292,928.00	\$267,292,928.00	-\$41,924,985.00	\$225,367,943.00
10005	\$26,663,251.00	\$44,671,502.00	\$71,334,753.00	\$71,334,753.00	-\$10,427,183.00	\$60,907,570.00
10006	\$43,542,512.00	\$85,156,534.00	\$128,699,046.00	\$128,699,046.00	-\$19,712,121.00	\$108,986,925.00
10007	\$6,978,432.00	\$9,708,197.00	\$16,686,629.00	\$16,686,629.00	-\$2,460,364.00	\$14,226,265.00
10008	\$5,770,028.00	\$5,938,945.00	\$11,708,973.00	\$11,708,973.00	-\$192,487.00	\$11,516,486.00
10009	\$6,953,960.00	\$13,170,665.00	\$20,124,625.00	\$20,124,625.00	-\$4,393,177.00	\$15,731,448.00
10010	\$20,609,435.00	\$36,110,378.00	\$56,719,813.00	\$56,719,813.00	-\$11,760,027.00	\$44,959,786.00
10011	\$65,428,143.00	\$151,867,171.00	\$217,295,314.00	\$217,295,314.00	-\$44,470,302.00	\$172,825,012.00
10012	\$17,229,843.00	\$44,421,172.00	\$61,651,015.00	\$61,651,015.00	-\$18,466,712.00	\$43,184,303.00
10015	\$1,311,708.00	\$2,390,793.00	\$3,702,501.00	\$3,702,501.00	-\$1,528,745.00	\$2,173,756.00
10016	\$41,758,462.00	\$85,200,998.00	\$126,959,460.00	\$126,959,460.00	\$5,852,201.00	\$132,811,661.00
10018	\$8,528,729.00	\$20,768,178.00	\$29,296,907.00	\$29,296,907.00	-\$4,134,871.00	\$25,162,036.00
10019	\$24,348,196.00	\$47,391,052.00	\$71,739,248.00	\$71,739,248.00	-\$1,309,610.00	\$70,429,638.00
10021	\$13,597,957.00	\$14,840,438.00	\$28,438,395.00	\$28,438,395.00	-\$4,812,565.00	\$23,625,830.00
10022	\$5,894,678.00	\$16,091,974.00	\$21,986,652.00	\$21,986,652.00	-\$9,193,535.00	\$12,793,117.00
10023	\$82,039,072.00	\$193,973,904.00	\$276,012,976.00	\$276,012,976.00	-\$19,195,470.00	\$256,817,506.00
10024	\$59,111,060.00	\$104,258,819.00	\$163,369,879.00	\$163,369,879.00	-\$2,144,181.00	\$161,225,698.00
10025	\$19,409,791.00	\$23,228,867.00	\$42,638,658.00	\$42,638,658.00	-\$2,448,876.00	\$40,189,782.00
10027	\$5,179,615.00	\$6,136,378.00	\$11,315,993.00	\$11,315,993.00	-\$1,049,621.00	\$10,266,372.00
10029	\$89,569,255.00	\$135,965,140.00	\$225,534,395.00	\$225,534,395.00	-\$18,481,428.00	\$207,052,967.00

Note that for alphanumeric data, you should put the value (F5) along with the row, not under the VALUE tab, since the information is not numeric.

Step 5: Build your dataset

(1) Use the *.pdf documentation to look up the worksheet, row and column combination required. It is recommended to start your dataset with Medicare Provider ID and hospital name (Line 3, Column 1 of Worksheet S-2 Part I), found in the alphanumeric table.

(2) Manipulate your PivotTable to get the view you need.

(3) In your new workbook, copy and paste the data into another worksheet then use VLOOKUP command on the Provider ID to add columns to the new dataset. Not all hospitals report all values, so merely copying and pasting columns sequentially from the PivotTable to your new dataset will result in mismatched rows.