Local Variation in Hospital Charges: 1995-96
An Experiment in Mandated Disclosure to the Public.

This observational study of local variation in hospital charges arose in the environment of one of the most comprehensive state attempts at health care reform. In the early 1990s, at the same time the Clinton health care reform plan was being debated in Washington, the Commonwealth of Kentucky enacted into law a comprehensive reform plan that in many ways was modeled on the Clinton strategy. Alas, we will never know what parts of this state experiment would have succeeded. It was largely repealed two years after enactment due to withering opposition by the health care industry. I have no way of knowing if the situation regarding hospital charges that I will describe below has changed from 1996. My informed suspicion is that it has not. To this day I still cannot understand my personal medical bills– and I used to be a health executive!

Certainly the same problems of quality and affordability are still with us. Indeed, for affordability, the problem is worse. With respect to quality it is difficult to know whether there has been improvement or not because of the related barrier of non-transparency. Certainly tremendous effort and much money have been put into attempting to measure quality, but I am not personally enthusiastic about the usefulness of the information received. For all the money Medicare and the hospitals themselves put into measuring hospital quality, it could recently be concluded that only a handful of hospitals have a mortality rate for heart attack that is either better or worse than average! I have to ask, why bother measuring at all if your method of study cannot find any difference? Measure something else or measure it differently! It is not true that all hospitals provide care of equal quality, and certainly not for the same cost.

Proposals to make health care information about cost and quality more public are still part of today's ongoing public policy debate. For that reason, I dusted off this old study. I was an old laboratory scientist back then and this was one of my very first forays into health policy research. I am the first to admit that it was, and is not cutting edge research, but I found it of great interest personally at the time and believe others will too. I abandoned efforts to publish it back then because of objections from my University. Even though such studies of institutional or regional variation make no initial value judgments, this kind of information is embarrassing to some hospitals. I regret that I was not in a position to further test the limits of my academic freedom at the time.

Kentucky's effort to provide more information to the public in 1995 did not work as planned. It was too easy to ignore by providers, it may not have asked the right initial questions, and the public was not assisted in transforming the information into something they could use. The same forces resisting change then still operate today. As I write this, the outcome of "National Health Care Reform 2010" in Washington is unknown to me. I will not be surprised, but will be disappointed if we are left as a nation with the status quo of declining access to a health care system of unknowable quality.

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Health Care Reform and Kentucky House Bill 250: Public Disclosure of Hospital Charges.

A preliminary review of the results from Jefferson County

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Executive Summary

The recent Kentucky health care reform law mandated public disclosure of the maximum charges for selected services by different categories of providers. For this study, I compared the posted charges of all the acute care hospitals in Jefferson County in 1995 and 1996. Not surprisingly, there were substantial differences. The results are summarized in the following pages. For example, the posted price of a mammogram at the most expensive hospital was almost triple that at the least expensive hospital. Charges varied considerably between categories of services. To attempt to predict the total charges of an aggregate package of services, a hypothetical admission was defined. Based on such a hypothetical construct, the most expensive hospital had a 37% higher charge than the least expensive. The charge for the hypothetical admission correlated very well with actual total charges to Medicare patients with pneumonia by the same hospitals ($r=0.8$, $p=0.022$). Quality of service does not provide an explanation for these differences.

Charges by hospitals cannot be said to be a meaningless construct just because not everyone pays them. For individual services, posted prices give consumers meaningful information on which to basis decisions. Posted prices appear to give a valid estimate of expected total charges of actual hospital admissions.

It is true that charges by themselves comprise only one input into the estimation of value. The quality and utility of the services purchased is also a part of the value calculus. Regardless of any independent variation in quality of medical care, without meaningful knowledge of the cost of that care, the prospective patient (and their advisors) have an invalid base on which to make a decision about where to go for medical services. The demonstration of substantial variation in medical charges by hospitals within a single county begs to be explained or defended, and has important public policy implications.

Selected Conclusions

- Compliance with HB 250 was not uniform, nor even good.

- Posted prices were not always, and probably not usually current.

- There were substantial differences in price for a specific item. Generally, the most expensive hospital posted more than double the price of the least expensive, but often the ratio was much higher.

- Prices of some items were difficult to interpret even for an experienced observer. This was due to different units of service used, ambiguity about associated charges, or arbitrary or unknowable determinations of level of service.

- No one hospital had the highest charges for all items. A hospital with the most expensive mammogram might have had average or low charges for other items.

- When different categories of services were combined in a hypothetical admission, services at the most expensive hospital cost 37% more than at the least expensive one. This figure increased to at least 41% in 1996.

- The differences in charges cannot be related to "quality of care."

- Hospitals do not appear to set their charges for a given service based on the cost of providing that service. Charges were increased across the board or within broad categories.

- For a common Medicare admission (DRG-89; Pneumonia) actual average charges to real patients correlated quite well with the cost of the hypothetical admission. It therefore cannot be said that posted prices are without value in identifying cost effective hospital providers.

- There are substantial differences in charges for some items that are frequently paid for out-of-pocket by a patient (such as screening mammogram, complete blood count, or cardiogram). It is clear that if it were available in a meaningful and convenient way, public disclosure of charges to the individual consumer would provide practical information of real value.

- How a hospital sets its charges tells you something about their corporate attitude towards their patients. The hospital with the highest charges in this study was owned by a company that subsequently was investigated by the Federal Government for issues of fraud and abuse. The financial settlement the company agreed to pay was one of the largest to that date. One can only wonder if more transparency of that hospital's financial practices would have led to earlier disclosures of benefit to its patients and community.

Introduction

In 1993, the Commonwealth of Kentucky enacted comprehensive health care reform legislation, HB 250. One portion of the new law (KRS 216, Section 3) required all hospitals and many other classes of health care providers "to post in a conspicuous place readily available to patients: (a) A statement of the maximum daily charge for room and board, inclusive of all nursing services, by level of care: and (b) A quotation of the maximum fee charged health care recipients for each of the 25 services, procedures, or tests as prescribed by the [Health Policy] board." These 25 items were intended to represent common services within each different class of provider. Requiring hospitals to post such a list by July 1, 1995 was perhaps the first result of the new legislation visible to the public.

The legislative intent for this and other public disclosure of financial (and outcome or quality) information is to permit the individual citizen and other purchasers of health care services to make more informed decisions. Corporate entities and other increasingly sophisticated payers have access to such information, but even these organizations are still learning how to use it. The extent to which disclosure of such potentially complex or even confusing information can or does influence decisions made at an individual level remains to be demonstrated. A second potential intended benefit of this legislation was to promote financial competition among providers such that health care costs would not continue their same increase.

As a result of intense lobbying by interest groups, most of HB250 was withdrawn or altered such that on July 1, 1996, posting of typical charges was no longer required by law. Whether that section of the bill served its intended purpose cannot be known. Because the principles of disclosure are still supported by many policy makers and public advocates, it is appropriate to learn what we can from this pilot venture.

For purposes of this initial analysis, I visited all the acute care hospitals in Jefferson County to compile the financial information they displayed. One year later, I revisited the same hospitals. The following discussion is a summary of those observations and serves to introduce issues and questions that will need to be considered for future implementations of public disclosure. A variety of other charts and indices were prepared.

Methods

In the months of April and May 1995, all nine acute care general hospitals in Jefferson County, Kentucky, were visited with a standardized data collection form. No notice of the visit was given unless the posted prices could not be located. The accessibility and readability of the notices was judged. A charge "index" for an item or package of items is defined as the ratio of the charge at a given hospital to the average charge for the same item(s) at all hospitals. Thus, an index of 2 means the charge of that item was double the average. A ratio of the maximum to the minimum (MMR) hospital charge was calculated for each item. A Max/Min Ratio of 7 means that the most expensive hospital charged seven times as much as the least expensive hospital for that item. Table 1 lists the items for which the state required reporting.

During the same time period of 1996, the hospitals were visited again. Data were compiled and compared, and price increases were calculated for each individual item in each hospital.

There was considerable variation in charges for a given item among hospitals, and different relative charges for groups of services. For example, bed rates might be modest at one hospital, but laboratory costs relatively high. To provide a meaningful "average" charge and to attempt prediction of total charges for an actual admission, the total charge for a hypothetical three-day admission was derived. The items used for this calculation are listed in Table 2 and include most of the items for which unambiguous information was available. In three hospitals, one item was not offered as a service, or not posted. One hospital did not have MRI equipment, and the other two did not post the charge for a blood cross match or a hot pack. In these three cases, the average charge from the other hospitals was substituted in the hypothetical calculation so as not to distort the result one way or the other.

As an independent test of the validity of the hypothetical admission concept, actual total charges to individual Medicare patients for a single common medical condition were obtained for each hospital. Data were extracted from the Health Care Financing Administration Medicare files (MEDPAR) for all admissions in the calendar year 1992 to 1994 for DRG-89 (pneumonia and pleurisy with complications or comorbidity). These data were obtained courtesy of the Data Management Group, Inc. (Peoria, IL) from their product, MEDPAR*Connect*.™. These actual charges for a real admission were then compared to the hypothetical admission described above. The specialty children's hospital was not included in this portion of the analysis.

Results

Compliance

At the first visit, posted prices could be located with varying degrees of success in the admitting areas. At one hospital the posting could not be found, even when a request was made of the staff. (The frame holding the page had fallen behind a file cabinet an undetermined time earlier and no one had apparently asked to see it before me.) A few hospitals had made easily readable signs with large type, but most were typed on business stationery. The location of the signs was not always convenient. At one hospital it was posted well back and high above a desk such that even this investigator had a difficult time reading it. A potential observer might feel they were in the way of hospital staff or patients at some hospitals. At the second visit, a different hospital brought out their posting only at my request.

Although state law required a listing of the current maximum charges, most signs had no date listed on them. At the second visit one year later, three of the hospitals had exactly the same prices posted as the year before, despite the fact that hospital staff

informed me that prices had been raised at least once in the intervening year. One of these hospitals immediately provided me current charges and these are included in the calculations below. Two hospitals (owned by the same corporation) would not provide me with current charges despite several visits, phone calls and letters. One did send some updated charges later, but these were not included in the comparisons below as they were provided only after the hospital administration was aware of this study. At a third hospital, the posted prices had been raised from the previous year, but when I was observed recording them, the staff brought out a list of even more current charges. In a fourth hospital the former year's charges were posted in one location, and a more current set in another. At a fifth hospital, this investigator identified two obvious typographical errors in the charges for the second visit. It is apparent that hospitals may alter their charges more than once a year, and that the required postings were frequently not current.

Variation in charges

There was substantial variation in virtually every individual item among the hospitals. (See Table 3.) No one hospital had the lowest nor the highest charge for every item. For purposes of discussion, a ratio of the maximum to the minimum charge (Max/Min Ratio) for each item is calculated. The average MMR for all individual items was 2.9. For most items, the MMR was greater than 2, and for some laboratory and imaging studies it was in the range of 4 to 8. For example, the MMR for obstetrical ultrasound was 4.8. A consumer would certainly consider these differences meaningful.

Because no one hospital's charges were highest for every item, the MMR of total charges for the hypothetical admission was 1.4, which is less than that for most individual services. Nonetheless, this represents a substantial difference. An individual receiving the designated services in the most expensive hospital for $7011 would pay $1865 more than if the services were provided at the least expensive hospital, an increase of 36%. When the component services of the hypothetical admission were broken down by category, the MMR was 1.2 for imaging studies, 2.2 for Lab studies, and 2.3 for cardiology services.

Differences of similar magnitude were observed for services commonly obtained as an outpatient. An individual could obtain a bilateral diagnostic mammogram (hospital component only) in 1995 for as little as $65 or as much as $184; a complete blood count for $34 or $74; or a cardiogram for $62 or $90.

The average price of the hypothetical admission at the four for-profit hospitals was $6444 compared to $5747 for the four not-for profits. The investor owned hospitals were priced 12.1% higher than the not-for-profit institutions. (Although not the most expensive hospital, the single specialty children's hospital had charges that were higher than those of the other acute care hospitals. Although it was operated as a non-profit hospital, because of its unique status as a children's hospital, it was excluded from this latter calculation.)

Actual Medicare charges for DRG-89

The variation in the actual average total charges to individual patients with pneumonia was even greater than predicted from consideration of posted prices. The mean total charge for the 8 hospitals was $9891. The average bill at the least expensive hospital was $6939 but at the most expensive hospital the average bill to the patient was a stunning 78% higher at $12,328!

There was very good statistical correlation of the charge for the hypothetical admission with the real-life charge for DRG-89; r=0.78, p=0.022. The hospital with the most expensive hypothetical admission nearly tied for the highest actual Medicare charges. The hospital with the lowest posted charges also had the lowest Medicare charge. (Anecdotally, this latter hospital is well respected and certainly provides care of excellent quality.)

Changes in the second year of implementation

Information from only 7 of the 9 hospitals was available for this analysis. All had changed their posted charges. For the hypothetical admission, the average increase was 5.8%. The charge for the hypothetical admission at the hospital with the lowest hypothetical admission charge the prior year actually decreased by 1.4%. At the other hospitals, the hypothetical admission charge increased from as little as 2.0 to 15.4%. Of the seven hospitals for which data were available in 1996, the one with the highest posted prices charged $2108, or 41% more for the hypothetical admission than the hospital with the lowest posted charges. The hospital with the highest posted charges in 1995 did not provide figures for 1996 so the actual difference between lowest and highest may be even higher. In general, hospitals retained their relative rank for posted charges in year 2. The three hospitals with the lowest charges in 1995 retained their respective positions. The hospital with the third highest charges in 1995 increased its rates more than any other and posted the highest charges overall in 1996.

Analysis of individual items yielded insights into how hospital charges are determined. Changes for each item were not generally made individually, but rather reflected a fixed increase across the board, or within a category of service. For example, all levels of emergency room charges in a given hospital would be increased by 9%, or laboratory studies by 8%. One hospital increased its charge for therapeutic exercise by 44%. Another hospital increased all its laboratory charges by 30%. Some of the individual differences in 1996 prices between hospitals were stunning. The charge for a mammogram at one (excellent) hospital was $64.67, and at another hospital was $222.20, a ratio of 3.4. This latter hospital, already having the highest charge for mammogram in 1995, increased its charge by 21% in 1996.

Table 1.

Required Posted Charges and Fees for HB250

Inpatient Care

Private
Semi-private
ICU-Regular
TCU

ER Visit

Level 1
Level 2
Level 3
Level 4
Level 5
Level 6

Outpatient Observation

Radiology

Screening Mammogram
Bilat, Diag. Mammogram
Chest, Portable
Chest, 2 view
CT Head w/wo contrast

Laboratory

CBC
Hematocrit
Prothrombin time
ABG
Glucose venous
Glucose finger
Urinalysis
Urine culture
Blood culture
Blood cross match
CPK

Magnesium
SMA 7 (Electrolytes)
Chem 18 (Chemical Profile)

Ultrasound

Obstetrical
Gallbladder

Cardiac

EKG
Stress test/treadmill

Rehab

Therapeutic exercise, 1 hr
Cold/Hot pack

MRI

Head without contrast
Head with contrast
Head with and without contrast

Table 2: Elements of a Hypothetical Admission
(Used to compare hospital charges)

CPT Code	
•	Semi-private bed, (2 days)
•	ICU-Regular, (1 day)
•	Level 4 ER Visit
	Imaging Studies
•76091	Bilat, Diag. Mammogram
•71020	Chest, 2 view
•70470	CT Head w/wo contrast
•70553	MRI of Head ± contrast
•76805	Obstetrical Ultrasound
•76705	Gallbladder Ultrasound
	Laboratory
•	CBC
•85610	Prothrombin time
•82803	ABG
•	Glucose venous
•81000	Urinalysis
•87083	Urine culture
•87040	Blood culture
•86920	Blood cross match
•82550	CPK
•83735	Magnesium
•80007	SMA 7
•80018	Chem 18
	Cardiology
•93005	EKG
•93017	Stress test/treadmill
	Other
•	Therapeutic exercise, 1 hr
•	Cold/Hot pack

Posted Hospital Charges and Fees, 1995: Summary Data

CPT Code	Item	Hosp. A	Hosp. B	Hosp. C	Hosp. D	Hosp. E	Children's Hosp. F	Hosp. G	Hosp. H	Hosp. I	Mean	Ratio Maximum/ Minimum
	Inpatient Care											
	Medical/Surgical											
	Private	405.00	460.00	340.00	430.00	357	645.00	418.00	460.00	476.00	443.44	1.90
•	Semi-private	405.00	432.00	315.00	430.00	294	635.00	405.00	445.00	441.00	422.44	2.16
•	ICU-Regular	1300.00	1298.00	890.00	1180.00	966	1575.00	1150.00	1220.00	1288.00	1207.44	1.77
	TCU	995.00	1067.00	615.00	900.00	715	1275.00	875.00	775.00	833.00	894.44	2.07
	ER Visit											
	Level 1	20.93	48.00	50.25	33.00	50.00	20.93	35.00	37.90	47.00	38.11	2.40
	Level 2	82.40	87.00	109.00	55.00	118.00	82.40	70.00	79.00	112.00	88.31	2.15
	Level 3	122.95	221.00	227.00	99.00	149.99	122.95	130.00	170.25	169.00	156.90	2.29
•	Level 4	209.28	435.50	346.00	176.00	275.00	209.28	210.00	241.25	349.00	272.37	2.47
	Level 5	327.00	650.50	452.00	275.00	405.00	327.00	360.00	463.60	709.00	441.01	2.58
	Level 6	542.82			440.00		542.82				508.55	
	Outpatient Observation											
	First Hour		75.50	79.00	17.32	105.00		116.00	157.30	35.00	83.59	9.08
	ER Critical Care		15.50	13.40	17.32	9.00		13.00	13.05	17.50	14.11	1.94
	Radiology											
76092	Screening Mammogram	85.80	99.00	64.67	110.00	91.80	85.80	110.00	89.30	70.00	89.60	1.70
•76091	Bilat, Diag. Mammogram	85.80	99.00	64.67	110.00	183.60	85.80	110.00	111.40	80.00	103.36	2.84
71010	Chest, Portable		193.50	90.00	115.50	80.00		125.00	77.35	193.00	124.91	2.50
•71020	Chest, 2 view	104.02	112.50	74.80	85.00	85.92	104.02	90.00	102.35	134.00	99.18	1.79
•70470	CT Head w/wo contrast	751.11	463.70	625.00	736.32	754.68	751.11	780.00	770.00	549.99	686.88	1.68
	Laboratory											
•	CBC	40.27	74.00	37.45	44.90	33.70	40.27	50.00	67.50	38.56	47.41	2.20
85014	Hematocrit	11.72	40.50	29.45	n/a	15.00	11.72	42.00	19.00		24.20	3.58
•85610	Prothrombin time	23.46	40.00	31.50	36.30	22.80	23.46	48.00	33.00	44.37	33.65	2.11
•82803	ABG	94.96	61.50	56.00	80.00	66.10	94.96	90.00	70.15	90.00	78.19	1.70
•	Glucose venous	29.29	60.00	20.80	27.50	22.40	29.26	30.00	29.95	25.08	30.48	2.88
	Glucose finger				16.19	22.40			29.95	25.08	23.41	1.85
•81000	Urinalysis	28.00	44.00	12.25	25.00	20.00	28.00	30.00	43.00	24.83	28.34	3.59
•87083	Urine culture	68.00	120.50	43.55	75.00	65.80	68.00	90.00	46.20	72.32	72.15	2.77
•87040	Blood culture	74.17	133.00	58.00	62.70	60.00	74.17	75.00	68.75	92.00	77.53	2.29

•86920	Blood cross match	50.86	133.25	104.80	55.44	63.96	50.86	30.00	27.50	59.00	63.96	4.85
•82550	CPK	43.09	88.90	11.25	66.00	34.90	43.09	45.00	33.15	63.00	47.60	7.90
•83735	Magnesium	48.71	99.00	20.00	47.89	40.00	48.71	45.00	33.00	63.12	49.49	4.95
•80007	SMA 7	59.00	135.00	44.50	61.00	50.00	59.00	80.00	60.50	56.93	67.33	3.03
•80018	Chem 18	81.00	152.50	81.00	80.00	80.00	81.00	110.00	66.00	92.00	91.50	2.31
	Ultrasound											
•76805	Obstetrical	277.44	295.40	264.00	246.65	333.50	277.44	292.00	382.75	80.00	272.13	4.78
•76705	Gallbaldder	308.42	340.20	258.00	330.00	274.60	308.42	345.00	283.30	99.00	282.99	3.48
	Cardiac											
•93005	EKG	65.00	89.00	65.85	75.00	61.60	65.00	90.00	66.00	68.00	71.72	1.46
•93017	Stress test/tredmill	274.68	504.50	205.00	250.00	202.20	274.68	250.00	192.50	242.00	266.17	2.62
	Rehab											
•	Therapeutic exercise, 1 hr	103.46	143.00	92.65	51.70	141.60	103.46	100.00	155.80	136.08	114.19	3.01
•	Cold/Hot pack	36.95	27.50	28.67	42.90	16.68	36.95	85.00	44.90	28.67	38.69	5.10
	MRI											
70553	Head without contrast		1197.40							1450.00	1323.70	1.21
70553	Head with contrast		1372.60							1450.00	1411.30	1.06
•70553	Head ± contrast	1100.00	1197.40	1080.00	1327.32	1,200.00	1100.00	1226.59	1193.50	1614.50	1226.59	1.49
	Imaging Studies Only	2627	2508	2366	2835	2832	2627	2844	2843	2557	2671	1.20
	Index	0.98	0.94	0.89	1.06	1.06	0.98	1.06	1.06	0.96		1.20
	Lab Studies Only	641	1142	521	662	560	641	723	579	721	688	2.19
	Index	0.93	1.66	0.76	0.96	0.81	0.93	1.05	0.84	1.05		2.19
	Cardiology Only	340	594	271	325	264	340	340	259	310	338	2.30
	Index	1.01	1.76	0.80	0.96	0.78	1.01	1.01	0.77	0.92		2.30
	Hypothetical Admission	6067	7011	5146	6133	5643	6802	6262	6232	6272	6174	1.36
	Overall Index	0.98	1.14	0.83	0.99	0.91	1.10	1.01	1.01	1.02		1.36

The four indexes (blue) listed just above are the ratios of the charges for that institution to the average of all hospitals. For each hospital, the sums of all listed items in each category were compared to the sums of all other hospitals.

The bulleted items were used in the hypothetical admission.

Data (yellow) in the two crosshatched cells for items included in the hypothetical admission were not provided by those hospitals and were replaced by the mean charge of the other hospitals as explained in the text.

The Maximum to Minimum charge Ratio (MMR) compares the highest and lowest charge for in individual item across all the hospitals.