Charges for Medical Care at Different Hospitals

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Background: The United States has a high proportion of people without health insurance (15%) and a low proportion of people without employment (5%), resulting in millions who lack insurance but have some ability to pay. We tested whether hospitals charge similar prices for well-specified elective services to individuals paying out-of-pocket for medical care.

Methods: We surveyed the 2 largest general hospitals from every large city (population >500,000) in the United States and Canada. At each hospital we evaluated 5 diagnostic, 7 therapeutic, and 3 nonclinical services to determine the total charge to patients who pay directly.

Results: Overall, 66 hospitals were included (average, 758 beds; not-for-profit, 97% [n=64]; teaching, 80% [n=53]). The range in charges was substantial; for example, a screening mammogram was $40 at one hospital in Los Angeles, Calif, and $346 at one hospital in Quebec City. Charges for a screening mammogram were relatively stable between 1996 and 1997 (r=0.79; 95% confidence interval, 0.68-0.87) and unrelated to the hospital's location or charges for other services. The relative amount of variation in charges was similar for high-priced and low-priced services, similar for diagnostic and therapeutic services, and similar for the United States and Canada.

Conclusions: Charges for the same hospital service vary substantially. Greater visibility might reduce some variation by bringing outliers into closer scrutiny. Patients seeking care and paying out-of-pocket could save financially by comparison shopping.

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METHODS

IDENTIFYING HOSPITALS

We included all cities in the United States and Canada with a population of at least 500,000. In each city we selected the 2 largest acute care general hospitals as defined by the number of staffed inpatient beds. For the United States, we excluded facilities that were classified as federal government or specialty hospitals. For Canada, we excluded facilities that were long-term care or specialty care hospitals. Of note, hospitals in the United States can be investor owned, government operated, or controlled by a nonprofit organization, whereas hospitals in Canada are private nonprofit corporations that receive funding from provincial governments.

SELECTING SERVICES

We selected hospital services that satisfied 3 criteria. First, the service could be plausibly sought on an elective basis by a patient who had no health insurance. Second, the service was available in most acute care general hospitals. Third, the service was reasonably standardized so that different hospitals could be compared fairly. The final list included 5 diagnostic services (such as a screening mammogram) and 7 therapeutic services (such as a total knee replacement). In addition, we evaluated 3 nonclinical services (such as a small cup of black coffee from the hospital cafeteria) and 1 nonhospital service (a 5-mile taxi ride to the hospital).

ELICITING CHARGES

Between May 1996 and September 1997 we surveyed each hospital by telephone and asked for the total charge to an individual patient who was willing to pay out-of-pocket for the designated service. If a hospital did not offer the service, an alternate local provider as specified by the hospital was contacted. To avoid inadvertently cueing individual respondents, each hospital was asked about only one service during any call, with sufficient time between contacts to avoid carryover effects. Additionally, we tried to obtain the data directly from the responsible department whenever possible; for example, charges for knee surgery were obtained by separate contacts for the hospital fee, surgeon’s fee, anesthesiologist’s fee, and autologous blood donation fees.

JUSTIFYING REQUESTS

We constructed succinct scenarios to justify our request. For example, data on mammography were elicited by stating, “My aunt is visiting from England and wants to get a screening mammogram while here. What is the total charge at your hospital, including interpretation?” Hospitals were informed that amounts would be paid in cash or by credit card and should include all taxes, technical charges, and professional fees. We were careful to list all possible items (such as anesthesiologist’s fees for surgery) and verified quotes that were remarkably high or low (such as knee surgery for less than $1000). The study protocol was approved by the University of Toronto Ethics Committee.

STATISTICAL ANALYSIS

Charges were converted to American currency using a standard exchange rate ($1.00 US=$1.35 Canadian). Descriptive statistics were based on parametric tests, and correlations were measured using the Pearson coefficient. The sample size was designed to provide an 80% power of detecting correlations that could explain 10% or more of the variability in charges. In addition to correlations, the extent of variability was analyzed using the coefficient of variation, a measure used in marketing research for evaluating price dispersion (calculated as the SD divided by the mean). All P values were 2 tailed and unadjusted for multiple comparisons.

RESULTS

The study included 66 hospitals (48 American, 18 Canadian) in cities accounting for 30.6 million Americans and 12.6 million Canadians. The average hospital had 758 beds (range, 348-1481), 97% (n=64) were not-for-profit, and 80% (n=53) had teaching status. We contacted all selected hospitals or their designated alternate provider (100% response rate). We collected data on all services, with no missing values (100% completion rate). Multiple telephone calls were often required and convincing rhetoric was sometimes necessary before a hospital would disclose its charge. No respondents made remarks to suggest they had detected the nature of our research.

The range in charges for clinical services was substantial, particularly compared with some nonclinical services (Table). For example, the charge for a mammogram ranged from $40 at one hospital in Los Angeles, Calif, to $346 at one hospital in Quebec City. In contrast, the charge for coffee ranged from $0.33 at one hospital in San Jose, Calif, to $1.00 at one hospital in Cleveland, Ohio. The largest absolute difference was for knee surgery, amounting to a differential of $39825 (7-fold relative difference). The second-largest difference was for a normal vaginal delivery, amounting to a differential of $13322 (27-fold relative difference). The smallest absolute difference was for a Prozac (fluoxetine hydrochloride) prescription, amounting to a differential of $67 (4-fold relative difference).

We explored 2 rudimentary explanations to account for the wide range in charges for a single service. First, we recontacted all hospitals 1 year later and again elicited their charge for a screening mammogram. We found that initial and subsequent responses were similar, suggesting that the observed variation was not due to unreliable reporting (Figure 1). Second, we compared the price of a screening mammogram at the 2 hospitals in each city. We found that charges within the same
city could be markedly different, suggesting that the variation was not merely a reflection of the location or the size of the hospital (Figure 1). In every city, charges for at least one service varied by at least 100% between the 2 hospitals.

Several other explanations were evaluated by examining pairs of services. We tested whether a hospital’s charge for a mammogram correlated with its charge for an electrocardiogram and found no significant association (Figure 2). Thus, institutions that were expensive for one service were not necessarily expensive for all services. We examined a hospital’s charge for prenatal classes relative to its charge for a normal vaginal delivery and also found no significant association (Figure 2). This suggested that hospitals were not deliberately setting low prices as loss leaders. Of the 66 possible pairings of clinical services, only 13 yielded correlation coefficients that were significantly positive ($P<.05$), and 12 yielded correlation coefficients that were paradoxically negative ($r<0.00$). Furthermore, no single hospital was the high-price leader for more than one clinical service.

We checked 3 final explanations by calculating coefficients of variation. We found no large difference in the degree of variation for clinical services that were relatively more and less expensive (Figure 3). This suggested that differences in fixed accounting costs were not the sole source of variation in charges. We found that the degree of variation was smaller in the United States than in Canada for 6 of the 12 services (Figure 3). This suggested that variation in charges was not a unique element of the American culture. Finally, we found that the degree of variation was similar for diagnostic services and for therapeutic services (0.44 vs 0.53, $P=.43$). This suggested that the extent of variation in charges did not simply reflect a weakened patient position.

### Comment

We identified 12 clinical services and surveyed their charges for patients paying out-of-pocket at the 2 largest hospitals in every large city in North America. We found a remarkable range of charges, particularly compared with some nonclinical services. The variation could not be explained by differences in the age, severity of disease, comorbidity, willingness to pay, or insurance status of the patient. Several other explanations were tested and received partial support, including the theory that hospitals set charges based on their own past standards. The overall degree of variation was far greater than the mean difference in charges between the United States and Canada. Together, these observations suggest that charges for hospital services do not always follow the market discipline observed for other goods and services in society.
In a perfectly competitive market, the charge faced by consumers for a particular service should equal the long-run marginal cost of producing the service. Variation in charges can occur for multiple reasons, such as differences in resource costs, differences in production efficiency, measurement error, imperfect information, and market imperfections. The variation in charges observed in this study seems very large and random, and there is no single explanation except a lack of knowledge by those who set prices. It is inconceivable to us that true costs vary to this degree for defined services. No one expects that the health care sector will behave like a perfectly competitive market, yet we believe that market imperfections do not explain this degree of variation. To us, the most likely explanation is inconsistent accounting practices or inattention by those responsible.

Our study has several limitations. First, we tried to identify comparable services, but there may be unmeasured differences in quality. However, large differences in quality are unlikely for a simple blood test, for filling a prescription, or for other standard services. Second, the sample size was small. Hence, our study may underestimate the range in charges and did not test detailed explanations for the observed variation. Third, we have not shown that higher charges are associated with higher profits for institutions. Indeed, most hospital revenues are from insured patients, and most hospital losses are from uninsured patients. Finally, our study does not address the potential adverse effects that might occur if patients only sought low-cost providers, encountered discontinuities of care, or lost time through excessive searching.

Charges are relevant when individuals pay. Those without health insurance may not pay charges and create bad debt; however, some hospitals reduce bad debt by asking for up-front payment or a credit card imprint. Those with health insurance, furthermore, are not immune to charges if their plan requires a co-payment, large deductible, or other fees; if they travel and receive care outside their area; if they obtain treatment for a preexisting condition that is excluded from their

**Figure 2.** Charges for mammogram vs electrocardiogram and charges for uncomplicated delivery vs prenatal classes.

**Figure 3.** Coefficient of variation vs the average charge for all selected services (logarithmic scale) and coefficient of variation in the United States vs coefficient of variation in Canada for all selected services.
plan; or if they seek an uncovered service, such as prenatal classes. Even insured services may not be reimbursed if the individual misplaces the receipt or does not correctly complete all paperwork. Finally, some individuals may be price sensitive when contemplating medical care even if they do not make a direct financial payment.

Our findings carry implications for Americans who are employed but have no health insurance. Studies suggest that such patients without insurance face barriers in access to care. The principal contribution of this research is to suggest that they also face inconsistencies in charges for care. Our main finding is that the degree of variation in charges is greater than generally appreciated and greater than that observed for patients with insurance. Perhaps hospitals should disclose their charges at the point of service, on the Internet, or in other outlets. Perhaps hospital administrators should compare data themselves, particularly if receipts are a growing part of total revenues. Visibility could help correct some price variations by bringing outliers into scrutiny.

The widespread variation in charges may signify that accountants have only a poor idea about how to price hospital services. Such uncertainty is cause for concern given that these professionals are perhaps the best-qualified individuals. Clinicians, in contrast, are unlikely to provide an adequate substitute given that they are notoriously imperfect at estimating charges for medical services. The uncertainty of the accountants may have further implications if it extends to a hospital’s negotiations with private insurers and other bulk purchasers. Furthermore, the uncertainty calls into question the price estimates that may be used by medical economists when calculating the cost-effectiveness of an intervention and establishing priorities concerning the allocation of scarce societal resources.

Our results also carry implications for health policy. In particular, many have claimed that greater consumer involvement would raise cost-consciousness and promote efficient medical services. However, our data suggest that asymmetries of information and other market imperfections are sufficiently large that other reforms might be required before consumers could generate appropriate market forces. These findings raise concerns about proposals, such as medical savings accounts and other point-of-service plans, that encourage individuals to pay directly for medical care. Instead, the findings may highlight a role for large purchasers, regulators, and other groups to negotiate prices on behalf of patients.

Patients who have income but no health insurance would be well advised to comparison shop when considering uncomplicated elective hospital services. Physicians who refer and have some regard for the economic well-being of their patients should be aware of low-price leaders in their vicinity. Members of a hypothetical family who obtained all 12 clinical services in our study could expect to pay as little as $9000 or as much as $70’000. Even in the American city with the lowest average charges, a hypothetical family could pay as little as $24’000 or as much as $34’000. Economic theory rests on the assumption that consumers take advantage of market imperfections. Failure to shop around, in contrast, could result in some people leaving the market and forgoing necessary care.

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REFERENCES