

Cost discrepancies for common acute care surgery diagnoses in Ohio: Influences of hospital characteristics on charge and payment differences

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Background. Charge and payment discrepancies exist between hospitals, although such variation is understood incompletely. We hypothesized that hospital characteristics may account for such differences.

Methods. The 2011 Medicare Inpatient Prospective Payment System for Ohio hospitals was queried for discharge diagnoses of gastrointestinal bleed (GIB), GI obstruction (GIO), and laparoscopic cholecystectomy (LC). Analyses were performed to assess the association of hospital variables with charges and payments.

Results. For all three diagnoses, urban hospitals had greater median charges than rural hospitals; payments were not significantly different. Consequently, urban centers had lesser cost to charge ratios than rural centers for GIB, GIO, and LC: 0.29 versus 0.32 ($P = .004$), 0.27 versus 0.47 ($P = .0007$), and 0.26 versus 0.40 ($P = .04$), respectively. Centers with the greatest bed size had higher median charges and payments. Other discrepancies for all three diagnoses were greater payments at verified Level 1 centers and major teaching institutions (P value range $<.0001$ to $.03$). On multivariate analysis, excess charges were greater at urban centers for both GIB (\$4,482, $P = .02$) and GIO (\$5,700, $P < .01$).

Conclusion. Hospital characteristics are associated with differences in charges and payments for acute care surgery diagnoses. Further study should investigate whether these cost discrepancies are associated with outcomes. (*Surgery* 2014;156:814-24.)

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NATIONAL EXPENDITURE ON HEALTH CARE is approaching 20% of the United States' gross domestic product and more than 50 million individuals remain uninsured.^{1,2} Recent passage of the Patient Protection and Affordable Care Act aims to accomplish three major goals: (1) increase access to care through insurance reform, (2) reform payment to decrease expenditures, and (3) redesign delivery systems to emphasize performance measures.^{2,3} The goal of high-quality care delivered at decreased expense, a cornerstone of the statute, is being exemplified by an increase in federal

reporting of institutional charge and payment data. In May 2013, the Centers for Medicare and Medicaid Services (CMS) released data detailing inpatient charges and payments under Medicare by diagnosis-related group (DRG) for the 100 most-billed discharges at 3,000 hospitals nationwide for fiscal year 2011.⁴ By doing so, average hospital charges and Medicare payments became visible by institution for common discharge diagnoses.

The wide discrepancy of charges and payments between institutions for common diagnoses ignited a national dialogue regarding the complexity of health care pricing and the implications of excess charging by hospitals.⁵ The supporting arguments for these excess charges are not without merit—recouping losses for patients who cannot pay, expensive overhead associated with the complexity of running a health care practice, and substantial up-front costs of advanced diagnostic and therapeutic infrastructure. The continued practice of excess charging, however, is neither sustainable nor, in reality, well understood or regulated.

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The chargemaster, a tool by which hospitals determine charges for a given service rendered, is becoming publicly relevant as healthcare finances are being debated locally and nationally. Every hospital has a unique approach to chargemaster computations that affect ultimately the institutional offices of compliance, finance, managed care contracting, care management, decision support, and the bill the individual patient receives.⁶ These calculations of charge, neither standardized nor regulated, have profound impacts on individuals. Although insured patients may be buffered from these excess charges by prearranged negotiations between third-party payers and health systems, the uninsured or underinsured can be devastated by the nonnegotiated health care costs. In fact, illness or medical bills contributed to 62% of all bankruptcies in 2007 for those living in the United States.⁷

More than 4 million people annually experience a condition that requires evaluation by a surgeon with a practice that encompasses acute care surgery (AC surg).⁸ AC surg surgeons practice emergent surgical care, which includes general surgery, critical, and trauma care, and often serve as the surgical safety net for their communities. Patients requiring services of AC surg are oftentimes financially vulnerable, with Medicare being the single largest payment source (and self-pay being the third).⁹ To date, little is understood regarding the discrepancies between charges and payments of regional institutions providing AC surg. To address this knowledge gap, we sought to identify which hospital characteristics influenced charges and payments for three common diagnoses in AC surg in the state of Ohio. We hypothesized that differences in hospital charges, payments, and cost to charge ratios exist between hospitals in a similar region, for standardized DRGs, and may be associated with definable hospital characteristics. By clarifying these differences, we aimed to expand the discussion for patients, payers, and hospitals to better understand the relationships between health care finances and improved, cost-effective care.

METHODS

An ecologic study of hospitals included in the 2011 Medicare Inpatient Prospective Payment System (IPPS) was performed.⁴ The IPPS is a product of the Center for Medicare and Medicaid Service's Medicare Provider Analysis and Review, detailing hospital level Medicare billing data for the most frequent 100 DRGs. The dataset includes detailed encounter information from more than 3,000

hospitals nationwide. The IPPS dataset was correlated to hospital demographics provided by the American Hospital Association and verified trauma center status provided by the American College of Surgeons Committee on Trauma (ACS COT).^{10,11} Charge and Medicare payment information is presented in the IPPS dataset as mean values for DRG discharge diagnoses by each reporting institution.

Only reporting institutions located in the state of Ohio were included to reduce the effect of regional differences within the United States. The final study cohort included data from 3 ACS DRGs without complication/co-morbidity, chosen for their high frequency of use and to identify a relatively homogenous population for comparison. DRGs for analysis included: gastrointestinal bleed (379, GIB), gastrointestinal obstruction (390, GIO), and laparoscopic cholecystectomy (419, LC). The following hospital characteristics were examined specifically: ACS COT trauma level designation (none, 1, 2, 3), teaching affiliation (none, minor, major), hospital location (rural, urban), bed size by thirds (small [<204], medium [$204-381$], large [>381]), and total annual admissions by thirds (low [$<9,640$], medium [$9,640-18,789$], large [$>18,789$]) (Table I). In an effort to understand charges in excess of Medicare payment, two metrics were calculated. The first was excess determined by the difference of charge and payment and the second was the cost to charge ratio (CCR). The CCR was calculated by dividing payments by charges so that institutional outliers could be identified by the use of a standardized, proportional metric.

Univariate analyses were performed using median comparisons of reported average values provided by each Ohio institution. Wilcoxon rank-sum tests were used to compare groups. To account for confounding variables, logistic regression was used to determine hospital characteristics associated with excess charges and CCR. In these models, bed size and annual admission volume were treated as continuous variables, whereas trauma level (Level 1 as the reference value), teaching affiliation (major teaching affiliation as the reference), and location (urban as the reference value) were analyzed as categorical variables. All data analysis was performed using SAS Version 9.3 (Cary, NC). Geomap creation was performed using Maptitude Geographic Information System software (Caliper Corporation, Newton, MA) to understand spatially the relationship of charge excess to metropolitan regions in the state. Statistical significance was determined at a $P < .05$.

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