ORIGINAL ARTICLE

Knowledge of the Costs of Diagnostic Imaging: A Survey of Physician Trainees at a Large Academic Medical Center

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Abstract

Purpose: To study the awareness of postgraduate physician trainees across a variety of specialties regarding the costs of common imaging examinations.

Methods: During early 2016, we conducted an online survey of all 1,238 physicians enrolled in internships, residencies, and fellowships at a large academic medical center. Respondents were asked to estimate Medicare national average total allowable fees for five commonly performed examinations: two-view chest radiograph, contrast-enhanced CT abdomen and pelvis, unenhanced MRI lumbar spine, complete abdominal ultrasound, and unenhanced CT brain. Responses within ±25% of published amounts were deemed correct. Respondents were also asked about specialty, postgraduate year of training, previous radiology education, and estimated number of imaging examinations ordered per week.

Results: A total of 381 of 1,238 trainees returned complete surveys (30.8%). Across all five examinations, only 5.7% (109/1,905) of responses were within the correct ±25% range. A total of 76.4% (291/381) of all respondents incorrectly estimated every examination's cost. Estimation accuracy was not associated with number of imaging examinations ordered per week or year of training. There was no significant difference in cost estimation accuracy between those who participated in medical school radiology electives and those who did not ($P = .14$). Only 17.5% of trainees considered their imaging cost knowledge adequate. Overall, 75.3% desire integration of cost data into clinical decision support and/or computerized physician order entry systems.

Conclusions: Postgraduate physician trainees across all disciplines demonstrate limited awareness of the costs of commonly ordered imaging examinations. Targeted medical school education and integration of imaging cost information into clinical decision support / computerized physician order entry systems seems indicated.

Key Words: Costs of imaging, resident and fellow education, medical student education, health care economics

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INTRODUCTION

In an era of rising health care expenditures, physicians are increasingly expected to provide leadership in efforts to deliver high-quality and low-cost care [1,2]. Numerous prior studies focusing on laboratory tests, medications, diagnostic imaging examinations, and subspecialty consultations, however, have demonstrated that physicians possess only a limited understanding of the costs of services they both order and provide [3-8]. Some of these services are relatively inexpensive, but others such as diagnostic imaging can carry substantial costs [9-11]. As physicians across a wide spectrum of specialties request imaging services for their patients—and in the academic setting many of these orders are

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placed by trainees [12]—it is reasonable to expect interns, residents, and fellows to possess a working understanding of the costs of diagnostic imaging examinations they commonly request.

To date, the only large-sample-size study focusing on physician awareness of diagnostic imaging costs was restricted to a radiology trainee population [13]. No large-scale studies on the costs of imaging examinations have focused on a broader graduate medical educational trainee population. Such information could be helpful in developing, implementing, and improving appropriate medical school, residency, and fellowship educational programs for trainees and possibly for practicing physicians as well. Accordingly, the aim of our study was to investigate the awareness of postgraduate physician trainees across a variety of specialties regarding the costs of commonly performed diagnostic imaging examinations. Trainee awareness of the costs of common imaging examinations is hypothesized to be poor, particularly given the precedent in the literature, which currently demonstrates limited physician knowledge of health care costs in general [3-8].

METHODS

This investigation was evaluated by Emory University's Institutional Review Board and was granted exempt status before survey deployment.

Study Population

The Graduate Medical Education (GME) Office at Emory University School of Medicine maintains a database containing e-mail addresses of all physicians enrolled in all ACGME-accredited residency and fellowship programs. Our study population included all trainees in that database.

Survey Instrument and Data Collection

Our survey instrument was largely based upon a recently published survey distributed to a radiology trainee–specific audience [13] that drew upon elements employed by Rock et al [6] and Graham et al [8] to query pediatricians and hospitalists, respectively, about the costs of health care services. That survey asked participants to estimate CMS Medicare Part B Physician Fee Schedule national average allowable fees for five commonly performed diagnostic imaging examinations representing several modalities. We adapted that prior instrument, which was intended for a radiology-specific audience, to apply to a broader audience by asking about global allowable fees rather than more nuanced professional (ie, physician interpretive) and technical (ie, facility) fees.

Based on prior studies, we used the Medicare national average allowable fee as a surrogate of the financial implications of these imaging examinations to society. This value reflects the actual dollar amount that changes hands for a given diagnostic imaging examination (total Medicare payments and patient co-insurance payments) in a large segment of the US population, and has been used as a surrogate of cost in prior published studies [13-15]. Within the medical literature, there is considerable variation in how "cost" is defined. True health care costs are often very challenging to ascertain, as they differ widely across institutions based on negotiated agreements between facilities and payers. As such, respondents were asked to specifically consider the national average Medicare allowable fee value when making their estimates, as this approximates the societal costs of these services.

We asked respondents about the following demographic information: level and year of postgraduate training, training program specialty, estimated number of diagnostic imaging examinations requested per week, whether or not they have received formal education related to the cost of diagnostic imaging during medical school or postgraduate training, and whether they participated in a medical student radiology elective. Using a Likert scale of 1 to 5, we asked recipients to rate their perception of the adequacy of their awareness of the costs of diagnostic imaging and their interest in having cost-related information integrated into computerized physician order entry (CPOE) or clinical decision support (CDS) tools. We then asked them to provide their best estimate in US dollars of national average Medicare global allowable payments (taking into account both radiologist and facility components of fees) for five commonly performed examinations (two-view chest radiography, contrast-enhanced CT abdomen and pelvis, unenhanced CT brain, unenhanced MRI lumbar spine, and complete abdominal ultrasound).

Our online survey was created and distributed using the web-based SurveyMonkey professional platform (SurveyMonkey LLC, Palo Alto, CA). An initial recruitment e-mail with a hyperlink to our survey was distributed via the GME e-mail distribution list to all subscribed trainees in mid January 2016. Reminder e-mails were sent through the GME office once per week for a total of four weeks, until the survey was closed in mid February 2016. Additionally, we sent unique