Emergency Health Care Professionals’ Understanding of the Costs of Care in the Emergency Department

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Background: Efficiency and fiscal responsibility are important to the equal, safe, and effective delivery of care in the emergency department, where all presenting patients must be evaluated for emergent conditions. Health care professionals’ understanding of the costs of care is a first step to developing rational approaches for the efficient distribution of the finite resources hospitals and emergency departments have at their disposal to reduce costs to patients and health care systems.

Objective: To determine emergency department health care professionals’ knowledge of the costs to patients of routine care delivered in the emergency department.

Methods: An internet-based survey of currently practicing emergency medicine health care professionals with various levels of training (physicians, residents, physician assistants, and nurse practitioners) was conducted to evaluate their ability to identify the cost of care for 3 common presentations to the emergency department: abdominal pain, dyspnea, and sore throat.

Results: Four hundred forty-one emergency medicine health care professionals participated. In the 3 cases presented, correct costs were determined by 43.0%, 32.0%, and 40.1% of participants, respectively. Geographic region was not related to cost determination. Larger institution size was related to greater cost chosen ($P=.01$). Higher level of training was significantly correlated with perceived understanding of cost ($P<.001$); however, it was not related to accurate cost assessment in this study.

Conclusion: Emergency medicine health care professionals have an inadequate understanding of the costs associated with care routinely provided in the emergency department.


Keywords: CMS, ED, emergency department

The current state of emergency department (ED) care in the United States requires that efficiency and fiscal responsibility take a high priority to ensure that evaluation and, if indicated, care be given to all patients effectively, equally, and safely. Unique among medical specialties, EDs operate within a system of finite resources to deliver care to patients with emergency medical conditions without regard to ability to pay for that care.¹ At hospitals that accept federal funding, the Emergency Medicine Treatment and Active Labor Act requires that EDs provide an appropriate medical screening examination for any patient who requests it to determine whether an emergency
medical condition exists or whether the patient is in active labor regardless of citizenship, legal status, or ability to pay for care. Emergency health care professionals (HCPs), therefore, must dictate many tasks, such as conducting screening examinations in triage, ordering tests, or transferring patients to higher levels of care. This mandate to treat means that patients receive the necessary care, but it also means that they will be billed for this care. It is not uncommon for this burden to be transferred to taxpayers or to the hospital.2

On average, ED HCPs are unlikely to see patients again, which limits patient feedback to their ED HCPs concerning the cost of the care. This relationship is in stark contrast to that between patients and their primary care physicians, which is established and more intimate, and patients can discuss costs with their physicians. The ED HCPs should strive to deliver the most effective and highest quality care that is indicated while at the same time taking into consideration how costs affect not only the patient but the entire health care system. Studies have looked at physicians’ understanding of the costs of testing and medications across many specialties.3,4 Studies dating back to the 1970s have been included in articles that show poor physician understanding of tests and medication cost.3,4 A survey-based study5 in June 2014 showed that understanding had not improved. The costs of diagnostic tests and medications have routinely been evaluated separately but not in the context of a patient encounter.3-5

Care delivered in an ED can be more expensive than care delivered in the outpatient setting.6 This factor makes the ED an excellent place to improve cost control. Being properly informed of cost is a logical first step to delivering cost-effective care in the ED. The purpose of this study was to evaluate the understanding of ED HCPs of various levels with regard to the costs associated with the management of 3 common ED presentations using patient-encounter vignettes. We hypothesized that the HCPs’ ability to accurately determine the costs would be poor (<50%).

Methods
Participants were recruited via e-mail. E-mails were sent to 107 emergency medicine program directors through the Council of Residency Directors listserv requesting program directors to forward the participation information to all of their ED attendings, residents, physician assistants, and nurse practitioners. Survey responses were gathered from May 5, 2015, through July 28, 2015. The inclusion criteria were any HCP currently practicing in an ED in the United States and employed at an ED residency site. The institutional review board approved this study.

Survey
Data were collected through an online survey (SurveyMonkey). The demographic portion of the survey asked for level of training, primary practice location, and institution size. The states where participants practiced were consolidated into regions to correspond with regional divisions used by the Centers for Medicare and Medicaid Services.

The cost-assessment portion of the survey presented 3 clinical vignettes of common presentations to the ED: (1) a 35-year-old woman with abdominal pain, (2) a 57-year-old man with dyspnea, and (3) a 7-year-old boy with a sore throat (Table 1). Participants were asked to read the vignette, which consisted of a medical history, focused physical examination, diagnostic tests, and interventions. They were then given the choice of 4 ranges representing the total cost of ED care for each patient. The correct range had been predetermined by the billing department at Lakeland Health, which coded the vignette encounters and produced billing charges for the different levels of care as well as for the interventions provided to the patients in the vignettes.

Statistical Analysis
We compared participant demographics against each cost range as well as correct vs incorrect answers. Analysis focused on comparison using nonparametric
Pearson $\chi^2$ testing with subsequent $P$ value evaluation to determine the statistical significance of any correlation. The main outcome measures—understanding of ED costs and level of training—were also compared using the $\chi^2$ test. Participants had to reply to both items for their responses to be included in the analysis.
Statistical significance was defined as $P<.05$. Analysis was performed with SPSS software (IBM).

**Results**

In total, 441 surveys were returned. Missing responses were found in 32 surveys (7.3%); however, all questions had a minimum of 409 responses and, therefore, were included in the study. Descriptive characteristics of the study participants are presented in Table 2. Participants were from the east (126 [28.6]), west (47 [10.7]), south (61 [13.9]), and Midwest (206 [46.8]) regions of the United States, including 33 states, Washington, DC, and Puerto Rico, and comprised HCPs of various levels of experience (Table 2).

### Table 2. Demographic Characteristics of Study Participants (N=441)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participants, No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of Training</strong></td>
<td></td>
</tr>
<tr>
<td>Resident</td>
<td></td>
</tr>
<tr>
<td>PGY 1-2</td>
<td>86 (19.5)</td>
</tr>
<tr>
<td>PGY 3-4/fellow</td>
<td>55 (12.5)</td>
</tr>
<tr>
<td>Physician assistant/nurse practitioner</td>
<td>51 (11.6)</td>
</tr>
<tr>
<td>Attending</td>
<td></td>
</tr>
<tr>
<td>0-5 y</td>
<td>68 (15.5)</td>
</tr>
<tr>
<td>&gt;5 y</td>
<td>180 (40.9)</td>
</tr>
<tr>
<td><strong>Primary Institution Type</strong></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>21 (4.8)</td>
</tr>
<tr>
<td>Community</td>
<td>148 (33.6)</td>
</tr>
<tr>
<td>Academic or tertiary center</td>
<td>271 (61.6)</td>
</tr>
<tr>
<td><strong>Perceived Understanding of Cost</strong></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>82 (18.6)</td>
</tr>
<tr>
<td>Average</td>
<td>272 (61.7)</td>
</tr>
<tr>
<td>Good</td>
<td>87 (19.7)</td>
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</tbody>
</table>

**Main Outcome Measures**

For each of the 3 case vignettes, the most common answer chosen by participants was correct, but overall, participants more frequently chose one of the incorrect answer choices. Case 1 had the greatest number of correct responses (182 [43.0%]) followed by case 3 (164 [40.1%]) and case 2 (132 [32.0%]). In case 2, the second most common response, which was incorrect, was given 31.8% of the time and represents a difference of 1 response (132 vs 131 responses). More advanced level of training was associated with choosing a higher cost range for the care delivered in the 3 cases ($P=.065$, .004, and <.001, respectively).

### Secondary Outcome Measures

Some statistically significant relationships were found between the demographic data and the responses to the vignettes. Participants from tertiary hospitals chose higher cost assessment compared with those from community or rural hospitals for the 3 cases ($P=.01$, .046, and .396, respectively). Higher level of training was strongly correlated with increased perceived understanding of cost of care ($P<.001$). Region of the country showed no relationship to cost assessment ($P=.874$, .455, and .916, respectively).

**Discussion**

Our survey was designed to mimic real-life scenarios using patient encounter vignettes, as opposed to presenting individual tests or medications, as other similar studies have done.3-5 We found that ED HCPs continue to have an inadequate overall understanding of the cost of care in the ED. Displaying the costs of diagnostic tests in the electronic health record and computerized physician order entry could be a useful way to educate HCPs. This strategy has been studied and showed a modest decrease in the rate of ordering tests whose cost was displayed.7,8 A 1996 study9 showed that making patient charges available to HCPs reduced the tests and medications ordered and, in turn, patient costs while maintaining effective and safe care.

Abbreviation: PGY, postgraduate year.
The most recent projection by the Centers for Medicare and Medicaid Services shows that national health expenditures will nearly double, from $2.9 trillion in 2013 to $5.5 trillion in 2025, a rate that will outpace national gross domestic product by 1.2% per year during this period. Studies have shown that physicians are generally cost-conscious and feel that it is their responsibility to control costs where possible for both patients and the health care system. These findings seem to indicate that improved understanding of cost would translate to decreased cost to both patients and the health care system overall to some degree.

In the current study, higher level of training had a significant positive correlation with perceived understanding of costs of care. However, a higher level of training was not predictive of correct responses to the cost of care chosen. It is likely that over a career, a physician gains knowledge about the costs of various interventions, such as computed tomographic imaging, leading to a perception of increased understanding. However, we suspect that other fees, not in the control of these HCPs, such as room fees, nursing fees, and radiologist fees, can make up a large percentage of a patient’s bill for an encounter. Education about these fees could inform HCPs’ decisions and aid in communication in the ED.

The relationship between being employed at a tertiary hospital and choosing a higher cost could be due to the location of most of these facilities in larger cities where prices may be higher. It could also be explained by the realization of HCPs who work in this environment that a larger facility with more equipment and personnel carries higher inherent costs. Institution size and reputation have both been reported to be related to increased costs.

Limitations
This study should be interpreted in the context of some limitations. In the dissemination of the survey, we relied on program directors to forward the survey to the specified HCPs. Although a large number of surveys were returned, the total number of possible participants cannot be defined, making a response percentage impossible to calculate.

An additional limitation of this study arises from the wording of the survey questions. The questions asked “What is the total cost of the care delivered in the following scenario?” The intent of the question was to assess what the patient would be charged for the care provided; however, participants could have interpreted the question as assessing costs charged to the hospital, thus confounding those data.

It is recognized that the cost ranges provided for the 3 scenarios would not apply to every hospital in the United States. The data showed that geographic region held no relationship to the range chosen and that even at large tertiary hospitals, where participants were more likely to choose a higher range, in no case was the highest range the most common answer for this subgroup. The ranges were left intentionally broad to account for geographical and institutional differences as much as was feasible.

Not all participants responded to every question, which slightly decreased the n for some of the data; however, a response rate of 92.3% to 100% for the individual questions was returned.

Conclusion
Health care professionals in the ED continue to have an inadequate understanding of the costs associated with care routinely provided in the ED. Education concerning cost, such as through the computerized physician order entry, is likely to improve efficiency and decrease costs to the patients as well as the health care system overall.

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Author Contributions
Both authors provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; both authors drafted the article or revised it critically for important intellectual content; Dr Hoffman gave final approval of the version of the article to be published; and Dr Hoffman agrees to be accountable for all aspects of the work in ensuring
that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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