INNOVATIONS IN EDUCATION AND CLINICAL PRACTICE

Teaching Resource and Information Management Using an Innovative Case-based Conference

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Physicians play a critical role in controlling resource use in medicine. This paper describes an innovative, interdisciplinary conference that teaches housestaff and medical students about resource and information management in the hospital setting. The objectives are to help foster communication between physicians and other members of the health care team, to improve the understanding of hospital reimbursement, and to influence attitudes toward practicing cost effectiveness. The conference structure includes the following components: case presentation by the treating physician and follow-up information provided by the primary care physician, a review of the itemized hospital bill, discussion of coding issues, discussion of hospital reimbursement comparing case data to institutional and state averages, and a summary of key take-home points and lessons.

KEY WORDS: cost; information; multidisciplinary; training; education.

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Physicians play the most critical role in controlling resource use in medical practice but are often unaware of the fiscal impact of their clinical decisions. The Joint Commission on Accreditation of Hospital Organizations has provided a framework for institutions to define, manage, and measure the information needed to better utilize resources.¹ The key to success is the integration of patient-specific, aggregate, comparative, and knowledge-based information. Physicians have expertise in patient-specific data, such as clinical history and exam, and are also skilled in using their medical knowledge to generate differential diagnosis and treatment plans. However, it is the nonclinical personnel who manage information in aggregate and who generate an institution's comparative data.

The Accreditation Council for Graduate Medical Education endorses the teaching of managed care principles, including resource management and cost containment, to house officers. Educational and institutional interventions have demonstrated positive impact on cost and length of stay.^{2,3} Evidence suggests, however, that managed care

educational objectives are not being universally attained in residency training programs.⁴

Bringing together health care professionals with different areas of expertise in an educational forum could result in a rich learning experience for all. At Johns Hopkins Bayview Medical Center such an interdisciplinary case-based conference was created for physicians (faculty members and housestaff) and medical students. Invited guests have included hospital vice presidents, clinical and administrative nurses, pharmacists, laboratory directors, finance directors and staff, quality assurance staff, risk managers, utilization reviewers, record coders, and librarians. The educational goals of the conference are to improve the learner's (especially physician's) understanding of reimbursement in hospital medicine; improve the learner's (especially physician's) attitude toward managing resources, and emphasize the importance of collaboration among the entire health care team in providing efficient, effective health care.

MONTHLY CONFERENCE STRUCTURE

The conference is offered monthly in place of standard morning report and is facilitated by one of the authors (SK). Cases selected for the conferences have been discharged from the hospital long enough for the finance department to generate a bill and for the medical records department to complete the coding. Common, rather than unusual cases, are chosen to represent routine practice. The facilitator works with the chief residents to find cases that emphasize 1 or more core fundamental topics such as documentation, coding, resource use, and reimbursement. These core topics are covered over the course of the year by varying the content and themes of each conference. While most attendees contribute their perspective spontaneously, the facilitator will occasionally ask an attendee with particular expertise to prepare a brief presentation on a relevant topic. The following description includes the presentation of a case to help the reader understand the flow of information during the conference. Just as in the actual conference, the purpose of the case is to set a clinical tone for the discussion that will focus predominantly on resource and information management.

Case Presentation

The case is presented briefly and includes a summary of the hospital course. The presenter is the house officer or

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attending physician who cared for the patient during their hospital stay. This physician addresses any clinical questions including quality of care and outcomes before this segment is completed. Lastly, ambulatory follow-up from the primary care physician is incorporated, as this valued component is often lacking in traditional medical conferences.⁵ Lengthy debates about clinical management are discouraged to allow time for a focus on financial and administrative aspects.

A 62-year-old female presented to the emergency department with a complaint of hemorrhoidal pain and rectal bleeding for 1 day. While in the emergency department she complained of 10 minutes of substernal chest pain. She was admitted for assessment of the bleeding and chest pain.

Her past medical history included previously stable exertional angina. She suffered a non-Q wave myocardial infarction 2 months prior to admission. A myocardial perfusion scan postinfarction was positive for a small reversible inferior defect and preserved ejection fraction. Other history included hepatitis C, gastroesophageal reflux disease, alcoholism, and tobacco use.

Physical exam was unremarkable except for a nontender, distended abdomen without evidence of ascites or hepatosplenomegaly, and a tender rectal exam with stool positive for occult blood.

The patient was ruled out for myocardial infarction with normal cardiac enzymes. Her electrocardiogram remained unchanged. Her hematocrit fell to 25%, and she was transfused 2 units of packed red cells. A cardiology consultant considered cardiac catheterization. A decision was made not to pursue catheterization at that time, as the patient remained symptom-free after the transfusion.

Review of the Itemized Hospital Bill

The patient-specific focus is maintained as the itemized hospital bill is reviewed. The itemized bill is available through the patient accounts department of the hospital. It shows the individual facility charges for the patient's hospitalization. Elements of the bill are selectively reviewed and learners are given opportunities to ask questions and comment on specific charges. Charges are compared for different medications, procedures, and laboratory tests. Charges for room rates and service items such as occupational and physical therapy, anesthesia time, and emergency department time are also highlighted (see Table 1). Professional physician fees are occasionally obtained separately from the billing office and reviewed during the conference.

Principles in Medical Record Coding

The participants are asked to identify a final diagnosis representative of the hospitalization. Hospital coding experts assist the physicians in translating their clinical opinions into coding language. Important issues, such as

Table 1. Select Charges from the Patient's Itemized Hospital Bill

Description	Charges, \$	Quantity	Total Charges, \$
Complete blood count	14.88	4	59.52
Troponin I	32.34	3	97.02
Electrocardiogram	13.17	2	26.34
Packed red cell unit	169.50	2	406.20*
Ward room and board, per day	654.00	5	3,270.00

* Total charges of \$406.20 include charges for typing and matching blood products.

the distinction between symptoms and diagnoses, are repeatedly raised. The importance of clear and thorough documentation is emphasized. Physicians are taught the complexities of coding cases and how poor communication handicaps the professional coders.

The opportunity to teach about the International Classification of Diseases and Diagnosis Related Group systems usually presents itself during this portion of the conference. These systems are used to aggregate similar cases into a common language. Consensus is reached for the most appropriate DRG for the case in question. For each conference, a coder prepares a table that lists the selected DRG and other potential DRGs had the case been slightly different or the documentation less or more specific (see Table 2).

Hospital Comparisons

Comparative data is compiled by submitting the applicable DRGs to the director of hospital finance or his/her designee. The final charges for the presented case are compared to both institutional and state averages for the assigned DRG and potential comparison DRGs (see Table 3). Attendees are taught that individual cases fit into a broader context and that institutions are held accountable for variances from benchmarks.

With this as a background, mechanisms for hospital reimbursement are reviewed. The facilitator directs a discussion about prospective payment and charge-based reimbursement. The financial impact on the hospital of documenting severity of illness, improving utilization, and minimizing denied payment days is emphasized. Periodically, discussions centered on capitation, managed care, and inpatient risk share emerge. Administrators, nurses, utilization managers, attending physicians, students, and housestaff have the opportunity to see how each of their individual roles effects the final product, the episode of care.

Take-home Points

At the end of the conference, the most important lessons brought forth by the case are summarized. In this example, the attendees learned about the costs involved in

transfusion, how inappropriate use of cardiac enzymes can lead to excess expense, and the significant contribution to total charges of extra hospital days. The importance of clear documentation was emphasized as coders discussed possible choices for the principle diagnosis related to hemorrhoidal bleeding versus chest pain. Learners were taught the importance of specifying the diagnosis of coronary artery disease, when appropriate, rather than using the term chest pain. The significant difference in relative weight and federal payment for otherwise similar cases with and without complications was reviewed. Finally, our institution's actual charges and length-of-stay comparisons for the selected DRGs were emphasized.

RECOMMENDATIONS FOR IMPLEMENTATION

In order to offer this conference at other institutions, certain key data and participation are needed. One facilitator will need to take responsibility to organize and compile the information. The itemized bill should be requested from the hospital's patient accounts department. Occasionally, assistance may be needed from the finance personnel (those who set the charge masters) to interpret abbreviations and codes. The record coders can provide information about the case-specific DRGs using standard coding manuals. To generate the comparison DRGs and broaden the discussion, coders should be asked to list the possibilities if the case scenario had varied slightly. Once the DRGs are identified by the coders, they should be forwarded to finance personnel to request state and institution comparisons for charges and length of stay. Establishing a relationship with key members of these departments is essential. Inviting these staff members to join the conference will not only improve the quality of the discussions, but will assure their cooperation with deadlines.

CONFERENCE EVALUATION

At the end of the fourth year, all housestaff, attendings, and hospital staff members who had participated during

Table 3. Comparisons of State and Institutional Length of Stay (LOS) and Average Charges by Possible Diagnosis Related Groups (DRG)*

DRG	State		Institution	
	LOS, d	Charges, \$	LOS, d	Charges, \$
188	4.81	6,115	4.85	7,400
189	2.36	3,185	1.83	3,570
143	1.44	2,645	1.14	2,268
132	2.33	3,547	1.96	3,837

* Actual charges totaled \$4,270.

that year were anonymously surveyed. The overall response rate was 64%, with 15 residents, 9 attendings and 6 administrator/nursing respondents (30/47). More than two thirds of respondents attended 5 or more conferences.

All questions were answered using a 5-point Likert scale. The survey queried attendees' opinions about the individual components of the conference. They were asked to assess the interdisciplinary setting as well as the introduction of information management. They were also asked whether their attitude toward practicing cost-effective medicine had been influenced and if their understanding of hospital reimbursement had improved.

The overall ratings were favorable with the components receiving good to excellent scores (3 to 5) from more than 90% of respondents. Seventy-six percent rated the case-based interdisciplinary setting as very good to excellent (4 or 5). Seventy-nine percent noted the conference had greatly improved (4 or 5) their understanding of hospital reimbursement. All of the respondents described improvement in their attitude toward practicing cost effectively.

The following are representative comments made about the conference: "This is an excellent teaching method ... seeing the costs was eye opening." "The conference is well done, I am always amazed at the cost of things. It has helped me to value the tests/procedures/therapies I do and my cost effectiveness." "I believe the forum has an important role in the training program." "This is an excellent innovative conference." "The presentations

Table 2. Possible Diagnosis Related Groups (DRGs)

DRG	Principle Diagnosis	DRG Description	Relative Weight*	Length of Stay†	Federal Payment, \$‡
188	Hemorrhoids	Other digestive system diagnoses, age >17, with complication	1.0758	4.1	4,411§
189	Hemorrhoids	Other digestive system diagnoses, age 17, without complication	0.58	2.4	2,390
143	Chest pain	Chest pain	0.5263	1.8	2,158
132	Coronary artery disease	Atherosclerosis with complication	0.6698	2.5	2,746

* Federally designated approximation of resource intensity based upon DRG. The summary of a hospital's cases by relative weight determines the overall acuity of illness.

† Federally designated proposed length of hospitalization based upon DRG.

‡ Average prospective payment based upon DRG. Actual amounts may vary regionally.

§ DRG 188 was selected for the presented case; the actual charges totaled \$4,270.

are interesting, entertaining, and are certainly an asset to this program." "I really enjoyed the different viewpoints." "Please continue these reviews...they allow for a lot of interaction between personnel." "We (record coders) have noticed an improved understanding and cooperation from physicians when documentation clarifications are requested."

DISCUSSION

The conference was designed to teach resource and information management. Responses from learners suggest the educational goals of improving understanding of reimbursement and influencing learners' attitudes toward managing resources were achieved. In addition, the importance of collaboration among the entire health care team has been illustrated.

Physicians at different levels of training and those in different specialties have wide variations in utilization.⁶⁻⁸ Furthermore, physicians at different levels of training do not always share the same attitudes toward using guidelines to improve resource management.^{9,10} There have been descriptions of multiple short-term interventions designed to influence physician utilization patterns. The inclusion of residents in utilization conferences has demonstrated short-term improvement in referral patterns.¹¹ Physician profiling has demonstrated a cost savings.¹² Decision support tools, such as practice guidelines, have achieved variable success in controlling utilization.¹³⁻¹⁶ Pharmacists and nurses accompanying the medical teams on rounds has been demonstrated to reduce costs associated with medication use.¹⁷ Attending physician role models who discuss utilization can significantly reduce charges without compromising care.¹⁸ The common thread in all of these interventions is provision of feedback to physicians about their decisions.

One component of the conference described in this paper offers feedback through review of the itemized bill. Others have shown this to be a valuable method to teach resource management.^{3,19} Detailed examination of the hospital bill can remind physicians of simple ways to reduce charges. Discouraging routine orders for large chemistry panels, appropriate use of oxygen saturation instead of arterial blood gases, and limiting routine stool samples for *Clostridium difficile* have all been shown to make a difference.^{20,21} In our conference, these issues are emphasized repeatedly, with the bill serving as a springboard for discussion of other aspects of medical economics.

A benefit of structuring a conference to include clinicians and other members of the health care team is the fostering of communication. It has been suggested that a hospital can help change its own culture through internal champions who advocate for efficient and effective medical practice.²² There is a well-established benefit of collaboration between nurses and physicians.²³ Outcomes noted include enhanced understanding and changes in attitude toward collaboration, improved job satisfaction, and im-

proved patient functional status on discharge.²⁴ Evaluation of this conference suggests that the interdisciplinary setting is useful in enhancing communication. Personal introductions and direct conversation have allowed for establishment of new professional relationships between physicians and nonclinical members of the health team. This is further evidenced in real practice as record coders note an improved understanding and cooperation from physicians when clinical clarifications are requested.

This educational intervention has limitations. The formal evaluation is largely qualitative, and the small number of respondents precludes drawing statistically significant conclusions. However, attending physicians as well as physicians in training rated this conference highly for improving their understanding of reimbursement and for influencing their attitudes toward practicing cost-effective medicine. An attempt to measure whether individual physicians actually practice more efficiently as a result of the conference has not been done and would be complicated due to the bias of our team decision-making structure. Recent evidence suggests that affecting attitudes, not improving testable knowledge of costs, best correlates with improved resource management.³ Future evaluations could include an objective measurement of attendees' knowledge of finance terminology, such as "(1) the meaning of a DRG, (2) the methods by which it is selected, and (3) its influence on reimbursement."

Teaching principles of resource and information management in a supportive, clinically based conference can help academic health centers meet their educational and administrative goals. Both the conference content and the participation of multiple learners from different levels and disciplines represent an innovation in medical education.

Dr. Carrese is a Robert Wood Johnson Generalist Physician Faculty Scholar.

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