From Library to Discharge: A Managing Care Student Project

Fredrick A. McCurdy, MD, PhD, MBA; David V. O’Dell, MD; Jeffrey Susman, MD; David J. Steele, PhD; Paul M. Paulman, MD; James L. Harper, MD; Naomi L. Lacy, PhD

Background and Objectives: The Patient Care Project (PCP) was a central component of the Undergraduate Medical Education for the 21st Century (UME-21) grant project at the University of Nebraska. With the primary goal of improving students’ critical thinking skills, the PCP was directed more toward an understanding of managing care than the business aspects of managed care and emphasized written communication skills, clinical hypothesis testing, and exploring ways to solve medical and ethical questions. Methods: All 239 students graduating in 2000 and 2001 were required to analyze the medical care received by one of their hospitalized patients. Using a criterion-based evaluation tool, students’ written critiques were assessed in five specific areas, all of which required critical thinking skills. Students also received an overall grade for the project. The UME-21 Graduation Survey was used to assess changes in attitudes and behavior. Students graduating in 1999, prior to the institution of the PCP graduation requirement, served as a control group. Results: The most frequently discussed topic of the PCPs was cardiovascular disease. The mean overall rating by the faculty for the PCPs was 3.7 and 3.8 in academic years 2000 and 2001, respectively (maximum=5). In a qualitative analysis of the PCPs, students demonstrated insight into their patients’ overall medical care, including the use of evidence-based medicine (EBM), quality improvement, and cost containment. There were no statistically significant differences, however, between the PCP and control groups on the UME-21 Graduation Survey. Nonetheless, more students who had completed the PCP reported that they had identified the total cost of a patient’s stay, designed a quality improvement loop, and obtained clinical evidence from an EBM computer database. On this same survey, all students agreed with the use of clinical practice guidelines and cost containment. Conclusions: The PCP appeared to be relevant to the students’ learning needs, and they provided cogent critiques of the medical care they had rendered as well as critical analyses of their patients’ discharge summaries and the cost of care including ways to reduce cost. On the other hand, we were unable to demonstrate any substantial differences in the results of the UME-21 Graduation Survey given to both the PCP and control groups. In spite of this lack of effect on students’ attitudes, the PCP was perceived by the faculty to be valuable and has been incorporated into the required third-year family medicine clerkship at the University of Nebraska.

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taught by Headrick et al. to medical students in a primary care clerkship. The third factor was evidence-based medicine (EBM), a systematic way to review the medical literature, which is best learned in a self-directed way and applied at the time it is most needed.6,7

Thus, the objectives for the PCP were fourfold. The first objective was for students to gain a better understanding of the necessary components of a discharge summary. The second objective was to have students critically critique the clinical care of one of their own patients vis-a-vis an applicable guideline, or a “landmark summary” of clinical care (eg, widely quoted review article, widely accepted standard textbook) and propose opportunities for improvement in the patient’s case. The third objective was for students to enhance their skills in searching the medical literature by honing their ability to apply EBM skills to the literature and apply this appraisal in everyday practice. The final objective was for students to develop a greater awareness of the cost of medical care and the effect that physicians’ clinical decisions have on the cost to the patient.

Methods
Course Description

All fourth-year medical students graduating between May 2000 and May 2001 were required to complete the PCP. Students selected an actual patient that they had cared for in the hospital setting during either the third or fourth year as the subject of their PCP. The PCP report was due prior to graduation. It had to be approximately 10–15 pages in length. Students were given a project workbook (available from the first author on request) that contained the goals, objectives, expectations, and evaluation criteria for the PCP. The workbook also contained information on further resource material that could be obtained, along with a set of appendices that contained specific information the student would need for completing the PCP report.

The PCP report was divided into five sections. It began with a one-page abstract summarizing the project. This was followed by the second section, which contained the actual discharge summary of the patient’s hospitalization (typically one to two pages long) with the patient’s name removed, along with the student’s written critique of the discharge summary (one to two pages) using a supplied set of criteria as the basis for this critique. This second section also contained a comparison of the patient’s hospital course to a peer-reviewed clinical guideline or clinical progression that the student had found on the Internet at one of several recommended Web sites (Table 1) or other Internet source. If an applicable clinical guideline did not exist, the student was allowed to use a review article or a well-referenced article on a particular disease/procedure from the peer-reviewed literature. In this second section, which was two or more pages long, students were required to comment on how they would use the “plan, do, check, act” quality improvement model summarized on the University of Nebraska UME-21 Web site (Table 1) to improve the patient’s hospital course.

The third section was an EBM review of a peer-reviewed publication relevant to either a diagnostic test, a specific treatment, or a prognosis, directly related to the care of the patient (one to two pages). The article could be a scientific report, a review article (meta-analyses), or a decision analysis. The PCP report workbook contained EBM worksheets that were created adapting checklists provided with Sackett’s textbook Evidence-based Medicine: How to Practice and Teach EBM,8 as well as items taken from another worksheet.9 Instructions guided the student through the process of completing the worksheets.

The fourth section was an analysis of the charges incurred during the patient’s hospitalization (two or more pages as necessary) focusing on appropriate or inappropriate use of resources compared to the guideline and/or “standard of care.” Charges were obtained from the hospital computer systems. Occasionally, a student would choose to evaluate a patient who had been hospitalized outside the university hospital system, making it virtually impossible to obtain charge data. Finally, students prepared detailed accounts of the literature search strategy (one to two pages) they used in preparing the PCP report, along with an applicable list of references (minimum of 10 references on one page) provided in a format standard for scientific publications.

Table 1

<table>
<thead>
<tr>
<th>Resource</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>American College of Physicians evidence-based medicine resource</td>
<td><a href="http://www.acponline.org/journals/ebm/ebmmenu">www.acponline.org/journals/ebm/ebmmenu</a></td>
</tr>
<tr>
<td>American Society of Internal Medicine</td>
<td></td>
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<tr>
<td>Cochrane Collaboration</td>
<td><a href="http://www.cochrane.org">www.cochrane.org</a></td>
</tr>
<tr>
<td>Agency for Health Care Policy and Research</td>
<td><a href="http://www.ahcpr.gov/clinic/">www.ahcpr.gov/clinic/</a></td>
</tr>
<tr>
<td>American Academy of Pediatrics</td>
<td><a href="http://www.aap.org">www.aap.org</a></td>
</tr>
<tr>
<td>American Academy of Family Physicians</td>
<td><a href="http://www.aafp.org">www.aafp.org</a></td>
</tr>
<tr>
<td>University of Nebraska UME-21 Web site</td>
<td><a href="http://www.unmc.edu/Pediatrics/managedcarePDCA.htm">www.unmc.edu/Pediatrics/managedcarePDCA.htm</a></td>
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</tbody>
</table>
Course Evaluation

Each PCP report was evaluated by one of the four physicians listed as coauthors on this paper, using a criterion-based evaluation tool containing seven items. The first six items addressed one of the sections of the report described earlier. Each component was scored with a description of a “passing level” (numerical value=3) followed by a rating scale that ranged from 0 (lowest) to 5 (highest). The last item asked for an overall assessment of the project with a scale ranging from 0 to 5 (5 being the highest score) and a rating of 3 equivalent to “meets expectations.”

After finishing the PCP, the students completed an anonymously administered questionnaire (the UME-21 Graduation Survey) pertaining to the importance of the core educational elements of the PCP. Students graduating in 1999 did not participate in the PCP and served as the control group. The students were asked to indicate their degree of exposure to specific aspects of managing patient care as well as their opinions about aspects of clinical practice management that were a part of the PCP. Comparisons of the differences in mean responses on the UME-21 Graduation Questionnaire were made between the control group and the two intervention groups using the Student’s t test (Table 2).

Table 2
Summary of Student Responses to Items on the UME-21 Graduation Survey Pertinent to the Primary Care Project*

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<tbody>
<tr>
<td></td>
<td>n** Mean</td>
<td>SD</td>
<td>n*** Mean</td>
</tr>
<tr>
<td>Identify the total cost of a patient’s hospital stay or other care#</td>
<td>41 1.46 .87</td>
<td>93 1.57 .97</td>
<td>113 1.78</td>
</tr>
<tr>
<td>Design a quality improvement loop for a clinical situation#</td>
<td>41 1.34 .82</td>
<td>93 1.76 1.2</td>
<td>110 1.85</td>
</tr>
<tr>
<td>Access clinical evidence from the Cochrane or other evidence-based medicine computer database#</td>
<td>41 1.98 1.3</td>
<td>92 2.35 1.5</td>
<td>113 2.71</td>
</tr>
<tr>
<td>Use the Internet to get medical information in caring for a patient#</td>
<td>41 3.68 .83</td>
<td>92 3.71 .79</td>
<td>113 3.79</td>
</tr>
<tr>
<td>Use a formal practice guideline in caring for a patient#</td>
<td>41 3.27 .92</td>
<td>93 3.05 1.2</td>
<td>113 3.39</td>
</tr>
<tr>
<td>Clinical practice guidelines are designed to improve the quality of care‡</td>
<td>107 3.52 1.0</td>
<td>93 3.85 .74</td>
<td>113 4.03</td>
</tr>
<tr>
<td>Trying to contain costs is the responsibility of every physician‡</td>
<td>107 4.00 .89</td>
<td>93 3.86 .79</td>
<td>113 3.96</td>
</tr>
</tbody>
</table>

SD—standard deviation
# Range: never=1, observed=2, assisted=3, performed=4
‡ Range: strongly disagree=1 to strongly agree=5
* There were no statistical differences detected between any of the responses given by the students on this questionnaire as determined by the Student’s t test
** Total in the class=110
*** Total in the class=125
**** Total in the class=114

Results

All students graduating in the years 2000 and 2001 completed the PCP because completion was required for graduation. The range of medical problems covered in the PCP reports was broad—one third pertained to the care of patients with cardiovascular disease, and the remaining two thirds were equally distributed among obstetric, surgical, infectious disease, and pediatric problems. All reports were considered creditable by the faculty and received a mean overall rating of 3.7 (SD=.75) and 3.8 (SD=.86) in academic years 2000 and 2001, respectively. On average, about 1 hour was needed to read and grade each report.

In reading the PCP reports, it became obvious that the students were able to demonstrate their understanding of issues through what they wrote. The students provided cogent critiques of the discharge summaries, their own care of the patient, and the charges incurred, as well as potential ways to reduce those charges.

Discharge Summaries

In general, the students tended to be less rigorous in their critique of their patients’ discharge summaries. Most made either no suggestion for improvement or only minor wording changes that would have done little
to alter the discharge summary. However, about one fifth (50) of the students did make significant comments as illustrated by the following: “The discharge summary gets the job done. But, there are some holes: no medications listed...no component of a physical exam...no record or description of his outpatient status...” Thus, some students were able to critique a discharge summary effectively and understand what would make a summary better.

**Patient Management**

Virtually all of the students commented on how minor changes in management could have resulted in a minimal-to-modest change in hospital stay or lower charges, yet they did not cast this as a means for applying the principles of quality improvement. Notable exceptions in this regard were (1) the report of an elderly person admitted for dyspnea who should have undergone a dobutamine stress echocardiogram when the patient’s hospital course was compared against an established clinical guideline and (2) the case of a teenager admitted for acetaminophen ingestion whose care was compromised by a delay in obtaining an acetaminophen level and a subsequent delay in administration of N-acetylcysteine. Both students commented that the departure from established guidelines placed their patients at significant risk for further complications and that the use of quality improvement could help providers avoid these mistakes in the future.

Further, when using quality improvement to analyze the hospital course of another patient, a student wrote: “You could argue that this patient did not meet the indications for a CABG established by the ACC/AHA...his cardiologist carefully outlined the many reasons why he was not a surgical candidate...Yet his disease was unrelenting...and he decided to try a very risky procedure.”

**Sources of Evidence**

Students also critically appraised the guidelines they had chosen and when doing an evidenced-based critique of the peer-reviewed literature, a student wrote: “…although this article had potentially relevant, practice-altering information, it was rejected because of the lack of blinded comparison group... (This) underscores the importance of conducting a critical review...before using such articles to alter established clinical practice.”

Another source of evidence that students used critical appraisal skills was that some students proposed research studies to answer clinical questions. For example, the subject of one PCP was the use of various forms of anesthesia in neonatal circumcision. This report contained a proposal for a double-blind, placebo control study on dorsal penile block.

**Charges and Use of Resources**

Of the 239 reports reviewed, 12 did not contain any analysis of charges. Of the remaining 227, most students accepted the charges incurred without suggestions for improvement. There were significant exceptions. For example, one student raised questions about the cost of end-of-life care. This student speculated that, for his patient’s family, the charges incurred while prolonging life for 2 days was offset by the fact that all family members were able to be at the bedside when the patient died, and the student concluded that these costs were justifiable. On the other hand, another student was more critical of charges incurred by a patient with aseptic meningitis, making reference to the peer-reviewed literature that did not support an expensive evaluation when the patient’s clinical manifestations indicated high probability for this disease.

**Graduation Survey**

The results of the UME-21 Graduation Survey items pertinent to the various components of the PCP are shown in Table 2. Students who graduated in 1999 and did not participate in the PCP served as the control group. The control group return rate was 37% (41/110) for the first five questions and 97% (107/110) for the remaining two. The return rates for the PCP groups were 74% (93/125) in 2000 and 99% (113/114) in 2001.

The first five questions asked students to indicate their degree of exposure to specific aspects of managing patient care. Although there were no statistically significant differences between the intervention and control groups, more students who had completed the PCP reported that they had identified the total cost of a patient’s stay, designed a quality improvement process, and obtained clinical evidence from an evidence-based medicine computer database. Only a minority of students indicated that they had ever “identified the total cost of a patient’s hospital stay” or “designed a quality improvement loop for a clinical situation,” even though all students graduating in 2000 and 2001 had completed a PCP report that required them to do both. More students reported that they had obtained clinical evidence from a computer database, and a majority of students indicated that they had used the Internet to get medical information and used a formal practice guideline in caring for a patient.

The last two questions in Table 2 are about students’ opinions regarding aspects of clinical practice management that were a part of the PCP. Students who had completed the project agreed with the use of clinical practice guidelines and the need for cost containment. The control students were more neutral on the use of clinical practice guidelines but agreed with the students who completed the PCP that cost containment was the responsibility of all physicians.
Discussion

We believe that our curricular innovation was a success for two reasons. First, all students required to complete the PCP did so in an acceptable fashion with salient comments written by the majority of students. Second, faculty determined that the PCP was valuable enough to remain as part of the third-year family medicine clerkship. Support for this decision came from a broad representation of family medicine faculty, as well as from the Dean’s Office.

The PCP was a “personalized” experience for students because students were given the latitude to choose the patient they would write about based on their own personal clinical experiences. Despite this flexibility, of the nine domains in the UME-21 grant requirements, six were incorporated into the PCP (health systems finance, economics, organization, and delivery; evidence-based medicine; communications skills; quality measurement and improvement; systems-based care; and medical informatics).

Many students, as evidenced by what they wrote, were critiquing the medical care that had been rendered to their patients and using guidelines and evidence-based medicine principles to discuss how they might improve patient care. In making the PCP an analysis of a patient they had actually cared for, it appeared relevant and timely to student learning needs. This is consistent with and reinforced by the observations of Pitkala et al[10] in their approach to teaching critical thinking skills to medical undergraduates, in which they found the best time for teaching this type of material is in the clinical years and that it must be related to the student’s past or present experience. Headrick et al[11] also suggested that the best time to present this type of learning experience was at the point where it is needed. Thus, the decision to place the PCP in years 3 and 4, when the need for acquiring these particular critical appraisal skills was being emphasized, appeared to be the right choice.

A lone limitation of our evaluation was the low response rate from 1999 graduates. An unanticipated change in the grant coordinator position resulted in problems of administering the UME-21 Questionnaire to the 1999 graduates, thus resulting in incomplete control data. This makes full interpretation of our results difficult.

Conclusions

The experience of creating and implementing the PCP reinforced that this type of activity is most effective when built into blended with the existing curricular structure, that time had to be allocated for project completion, and that this type of activity must be clinically relevant within the context of where clinical teaching actually occurs.

Curricular change can be accomplished through building acceptance. Change can be sustained if presented as relevant at an appropriate time and place. The most successful curricular changes are those that can be generalized to any school or any setting. At the University of Nebraska, the PCP is being continued as an integral part of the required, third-year family medicine clerkship. However, other schools may wish to implement a PCP-type project at another place within their curriculum.

Corresponding Author: Address correspondence to Dr McCurdy, Texas Tech University of the Health Sciences at Amarillo, Department of Pediatrics, 1400 S. Coulter Road, Amarillo, TX 79106, 806-354-5432. Fax: 806-354-5536. fred.mccundy@ttuhsc.edu.

REFERENCES