BRIEF REPORTS

Evaluating Ambulatory Resident Practice Using an Internet-Based System

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To improve faculty participation in providing feedback on resident outpatient practice, we designed and implemented an Internet-based evaluation system. Attending physicians scored residents on 7 questions related to specific practice behaviors, and completed a free-text comment section. Between January and June 1998, 516 evaluations for 107 residents were generated using the Internet-based system, compared with 29 handwritten evaluations for 82 residents between January and June 1997. The number of faculty evaluations was 527 for 121 residents in the second half of 1998. An Internet-based evaluation system can improve faculty compliance with performing evaluations.

KEY WORDS: medical education; evaluation; feedback.
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Evaluation of resident physicians, a requirement of graduate medical education,¹ facilitates development of knowledge and skills in the learner.² Optimal evaluation should provide timely, objective appraisal of performance.³ Specific faculty feedback to residents has been shown to improve certain practice behaviors.⁴ However, resident physicians have found feedback to be infrequent and ineffective.⁵ Evaluating resident outpatient practice is particularly challenging, as residents may work for short periods with several attending physicians at multiple sites. As new techniques for gathering prompt, behavior-based feedback are being developed, the effectiveness of such systems needs to be documented and studied further.

To improve the frequency of faculty feedback to residents, we designed and implemented an Internet-based system using a behavior-focused instrument to evaluate resident ambulatory practice.

METHODS

Cornell Internal Medicine Associates (CIMA) is a hospital-based, integrated faculty-resident general internal medicine practice at New York Presbyterian Hospital-Weill Cornell Center (NYPH). The practice is staffed by 17 full-time and 8 part-time attending physicians. Approximately 100 internal medicine residents spend one-half day each week in continuity practice as well as 2 months annually in an ambulatory rotation at CIMA. A second practice is located eight blocks from the hospital and is staffed by 3 faculty and approximately 20 residents. A third site contains two faculty and up to 10 residents who practice at a NYPH-affiliated family practice center in western Queens. All sites have full-time Cornell faculty supervising NYPH residents in continuity practice.

A 7-item evaluation form focusing on ambulatory practice behaviors was developed. A password-protected Internet Web site was constructed using Front Page 98 (Microsoft Corp) and maintained on a server by one of the authors. Faculty accessed the Web site via their office desktop computers, which are connected to the Internet, and selected their name and the resident's name from restricted scroll-down menus. A resident is to be evaluated by each faculty member with whom he/she works during the ambulatory block rotation. A resident works with 5 to 7 attending physicians per month. The continuity clinic attending physician should also evaluate the resident once every 6 months. Thus, each resident should have at least 5 evaluations in a 6-month period.

Using mouse clicks, evaluators entered scores for 7 evaluation questions, then typed in narrative comments. Entries were submitted electronically via mouse click as a text file into a database. These files were then sorted by resident in an Excel (Microsoft Corp) spreadsheet, from which resident-specific summary statistics and graphs were generated. These graphs and the narrative comments were then included in the printed evaluation packet given to the residents biannually.

Preceptors received Web-site training at weekly faculty meetings, and the authors provided subsequent assistance as requested. Attending physicians were reminded by electronic message to evaluate the residents they supervised during the last week of each ambulatory rotation, and to provide biannual evaluations to their continuity clinic residents.

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FIGURE 1. Example of a resident profile based on multiple evaluations from supervising attending physicians. The narrative comments would be attached to the above graph. PIC indicates physician in charge (faculty attending physician); HPI, history of present illness; PE, physical examination; HC, health care.

RESULTS

Faculty participation in performing resident ambulatory evaluation was greatly improved after the implementation of the system. Twenty-nine paper evaluations were completed between January and June 1997 for 82 residents, while 516 evaluations were collected on the Web site between January and June 1998 for 107 residents. So during the first half of 1998 the average number of evaluations per resident was 4.8. In reality, the evaluations were for 79 residents, an average of 6.5 evaluations per resident (range 1–16). Twenty-eight residents did not receive any evaluations through the system. The increased output of faculty evaluations of resident ambulatory practice persisted between July and December 1998, as 527 evaluations were collected for 117 of 121 residents, with an average of 4.5 evaluations per resident (range 1–15).

Summary statistics were calculated and transformed into graphic representation using the system. A mean score for each evaluation item was generated for each resident and for each resident group (year of residency). Graphs were generated, plotting each resident's mean item score in comparison with the group mean score (see Fig. 1). The mean aggregate scores were between 3.58 and 3.94 for the Likert scale of 1 to 5. The summary graphs were included with the narrative faculty comments as part of a comprehensive feedback packet.

Statistics regarding faculty participation in providing resident feedback were calculated. The mean number of

faculty evaluations per attending physician was 20.6 for the first half of 1998, with a range of 15 to 80 for full-time faculty. Part-time faculty performed fewer evaluations. The mean increased slightly to 22.0 between July and December 1998, with a similar range and similar part-time faculty performance.

DISCUSSION

An Internet-based resident evaluation system was constructed and implemented effectively, resulting in a marked increase in the submission of faculty evaluations compared with previous handwritten evaluations. Direct data entry delivered via electronic mail eliminated distributing, collecting, collating, and entering evaluations into a database. Given central data collection on a server, evaluations were readily analyzed, and residents were provided with instructive graphical peer comparisons. Similarly, the server facilitated accurate assessment of faculty compliance with completing evaluations.

Literature review reveals that residency programs began using computers to tabulate data about resident performance and evaluations 20 years ago, but these earlier systems still required an administrator to send out, collect, and enter evaluations.⁶ Our system eliminates paper forms and the need to manually reenter data. It allows off-site evaluations to be performed easily and to be transmitted via the Internet. Institutions could apply this tech-

nology easily to existing evaluation instruments, including the evaluation form recommended by the American Board of Internal Medicine.⁷ Furthermore, such a system can be integrated with other types of resident evaluation. Our Internet-based evaluation form is part of the overall resident feedback package, which includes other instruments to assess patient-physician communication and quantitative measures of quality of care.

There are limitations to this system. It requires both technical infrastructure (Internet access and a functioning server) and personnel with computer skills (database management and skills for formulating graphical output). However, most academic departments have these computer hardware and human resources available.

Our Internet-based resident physician evaluation system increased faculty participation in providing feedback, allowed feedback to be gathered from multiple sites, and added text files to a database that generated summary comparison statistics quickly and effectively. As medical educators strive to improve the frequency and quality of evaluation given to medical students and residents, tools that use emerging technologies may assist in achieving these goals.

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