

# Dichotomy Between Physicians' and Patients' Attitudes Regarding EMR Use During Outpatient Encounters

Cynthia S. Gadd, PhD<sup>1</sup> and Louis E. Penrod, MD<sup>2</sup>

<sup>1</sup>Section of Medical Informatics, Department of Medicine, and

<sup>2</sup>Department of Physical Medicine and Rehabilitation,  
University of Pittsburgh, Pittsburgh, PA

## ABSTRACT

*Detrimental effects on physician-patient rapport are an often-voiced concern regarding the impacts of implementing an EMR in busy outpatient healthcare environments. Our objectives in this study were to: 1) identify significant concerns of physicians regarding implementation of an EMR in an outpatient clinic, both prior to implementation and after 6 months of use, and 2) assess patients' satisfaction with their outpatient encounters in this clinic, including general and EMR-specific factors. For physicians, physician-patient rapport was a concern prior to EMR implementation and increased with use of the system. In contrast, patients did not indicate a sense of loss of rapport with their physicians when an EMR was used during their outpatient visits. However, physicians and patients shared a concern about the privacy of medical information contained in an EMR.*

## INTRODUCTION

Implementations of electronic medical record (EMR) systems in outpatient care settings are rapidly increasing. A prominent feature of many of these implementations is physician use of the system for documentation and ordering during the patient encounter. A commonly expressed barrier to the implementation of EMRs is physician resistance; one component of which is concern for negative impacts on physician-patient relationships resulting from use of an EMR while the patient is present.<sup>1-7</sup>

Several studies that have examined the anticipated and actual impacts of outpatient EMRs (featuring documentation, ordering, and results reporting) on patient care, have identified physicians' concerns for the physician-patient interaction as a potential barrier to successful implementation.<sup>5-7</sup> Results have shown that many physicians are concerned about losing eye contact with patients<sup>5</sup>; keeping the patient encounter personal while focusing on data entry in the exam room<sup>6</sup>; or interacting with the computer in front of the patient.<sup>7</sup> However there is some evidence that these issues fade with increased user proficiency.<sup>8</sup> Other researchers have reported a more positive physician response to the use of EMRs in the exam

room. When the EMR became available in Kaiser Permanente Northwest outpatient exam rooms via radio frequency-enabled laptops, it was perceived as enhancing the care experience for physicians whose access had been previously limited to their offices, perhaps because it increased the time physicians were able to spend with the patient.<sup>9,10</sup>

Review of the literature shows that there is very little empirical data on patient reactions to an EMR. Many of the published studies are from Europe, where these systems have been in common usage for many years.<sup>1,11-13</sup> Studies from the United States are very few in number, although they tend to be more current than the European studies.<sup>2-4,14,15</sup> Cruickshank published several early studies based on the implementation of the "First Aid" system in Great Britain.<sup>11,12</sup> Cruickshank found that when patients had actual experience with an EMR use during the encounter, their attitudes toward the EMR were more positive.<sup>11</sup> However, when asked to compare their physician against their ideal physician, patients' ratings were less positive when the EMR was used.<sup>12</sup> There appeared to be an effect of both age and gender, with females and older individuals exhibiting less favorable attitudes toward computer use. Brownbridge, et al. studied the effect of an EMR use in a primary care setting in Sheffield, England.<sup>1</sup> They found that computer use during the encounter did not affect satisfaction with the physician. Furthermore, they found no differences as a function of age or gender. Rethans, et al. reported on the implementation of an EMR in a general practice setting in the Netherlands.<sup>13</sup> In this study, patients felt that computer use did not make their care less personal or their communication with the physician more difficult. Notably, this group felt that with the computer, the physician was able to more efficiently assess their overall care. There was also a minority of patients in this study that expressed significant concerns about privacy with use of the EMR.

In the few published reports from the United States, the paper of Chin and McClure<sup>14</sup> and Aydin, et al.<sup>15</sup> stand out as the most significant. Chin and McClure reported on the implementation of a commercially

available EMR within an HMO setting. Patient reactions to the EMR were determined by asking the physicians how the patients felt about the system. Four months after implementation, 63% of the physicians felt that patient satisfaction had improved. Since this data was not obtained directly from the patients, any effect of age or gender could not be captured. Aydin, et al. reported on use of a diagnostic-support system by nurse practitioners and physician assistants in an HMO setting. There were no differences in patient satisfaction as a function of computer use. In this study, there were no clear differences in satisfaction based on gender. However, computer users, who tended to be younger, reported less overall satisfaction. Research in which both physician and patient attitudes toward computer use were assessed, first-hand, in the same EMR implementation is very limited.<sup>9</sup>

Our objectives in this study were to: 1) identify significant concerns of physicians regarding implementation of an EMR in an outpatient clinic, both prior to implementation and after 6 months of use, and 2) assess patients' satisfaction with their outpatient encounters in this clinic, including general and EMR-specific factors.

#### METHODS

In Spring 1998, we began a comprehensive, longitudinal, multimethod assessment of physician and patient attitudes as part of the evaluation of the pilot implementations of an outpatient EMR in 6 practices of a large academic health system, within the context of financial, quality, and other organizational evaluation metrics. This ongoing evaluation effort seeks to develop validated, re-usable instruments and methods for evaluating these effects and to use them to improve the pilot implementations, as well as the subsequent EMR rollout to all 1700+ physicians in the health system.

The EMR implemented during this study was EpicCare, produced by Epic Systems Corporation of Madison, Wisconsin. Physicians performed all of the functions related to their outpatient practice using system workstations present in the examination rooms. Typically, past history documentation, order entry for both medications and diagnostic testing, specifications of level of service and follow-up are all handled directly with the patient present. Documentation specific to the encounter varied by provider, with some providers completing their documentation in front of the patient, and others using the system to take brief notes that were completed after the patient contact. The first pilot implementation occurred in a university-based Physical Medicine and Rehabilitation (PM&R) outpatient practice. The encounters included follow-

up evaluations of individuals discharged from the inpatient rehabilitation service, as well as ambulatory evaluations for musculoskeletal problems.

We utilized the following methods in the evaluation of the EMR pilot in the PM&R outpatient facilities: 1) pre-implementation physician survey, 2) post-implementation physician survey, 3) post-implementation physician interviews, and 4) post-implementation patient surveys. The assessment methods are described in the following sections. Every effort was taken to maintain subject anonymity in the surveys. Survey data were entered into a database using a double entry method to ensure accuracy. Statistical analysis was performed using the SPSS statistical package.

**Pre-implementation physician survey.** A validated instrument developed by Cork, et al.<sup>16</sup> (and rooted in the instrument used in the oft-cited Teach and Shortliffe study<sup>17</sup>) was used to assess PM&R physicians' general attitudes regarding applications of computers in medicine prior to the EMR implementation. Survey items focused on physicians' demand for specific computer system features (the "feature demand" attribute) and the potentially beneficial or detrimental effects of computers on medicine and healthcare in general (the "computer optimism" attribute). Survey items also obtained demographic and computer familiarity data. Additional items were developed for this study to assess physicians' attitudes regarding the potential effects of an EMR on the respondents' medical practice. These items were adapted from the general "computer optimism" items of Cork, et al. and the results of published studies on physicians' attitudes towards EMR use. Preliminary results of a study to assess the measurement properties of this "EMR optimism" attribute support a single-factor, 21 item scale that explained 32% of the total variance with reliability of .89 (based on an N=108). The survey was distributed to 17 PM&R physicians (attendings, fellows, and residents), several months prior to implementation of the EMR in PM&R facilities.

**Post-implementation physician survey.** The post-implementation survey repeated sections from the pre-implementation survey for comparison. Two additional sections assessed specific EMR functionality and elicited suggested system implementation improvements. The survey was distributed to 11 PM&R physicians who had been using EpicCare during the six months since its implementation.

**Post-implementation physician interviews.** Semi-directed interviews were conducted with all PM&R attendings approximately one year after the system was deployed. Interview questions were developed to

further explore issues raised by the pre- and post-implementation survey responses and to obtain physician responses to several survey items used in other EMR evaluation studies. The interviews were transcribed and analyzed using standard qualitative analysis methods.<sup>18</sup>

**Post-implementation patient surveys.** Following approval by the Institutional Review Board, a survey instrument for patient attitudes was developed and validated. This instrument was based on existing patient satisfaction surveys and the results of published studies on patient attitudes towards EMR use during encounters. An assessment of the measurement properties of the instrument (N=154) support a two-factor solution for patient satisfaction: a General Satisfaction attribute (a 10 item scale that explained 48% of the total variance with reliability of .94) and a Physician Computer Use attribute (a 5 item scale that explained 10% of the total variance with reliability of .84). The survey also contains items to obtain demographic data including patient familiarity with computer use. Two hundred sequential patients were surveyed over a six-month period in 1999. Both new and return patients were included, but each patient was included only once. Typically, the patient completed the survey before leaving the office after the encounter, although a small percentage returned the completed survey by mail.

### RESULTS

Review of EpicCare user logs at 6 months post-implementation, indicated that the PM&R attendings were the only users of the system with enough consistent exposure to the system to assess it at this point. Therefore the results for the pre- and post-implementation surveys and the post-implementation interviews are reported for the five attending physicians who completed both surveys. Respondents included two females and three males.

Their average age was 36.6 years when the pre-implementation survey was conducted.

**Pre-implementation physician survey.** Prior to implementation of the EMR the respondents viewed themselves as neither sophisticated nor unsophisticated users of computers. They averaged 14.2 hours of computer use per week, most frequently for such tasks as writing, preparation of presentations, communication, and occasionally to search the medical literature and the Internet and access clinical data.

Using the "EMR optimism" scale, these physicians believed that the overall effect of the EMR would be beneficial to their practices, average 0.79 (S.D. = 0.23) on a scale of -2 to 2 (-2 = highly detrimental and 2 = highly beneficial). They indicated that their chief concerns about using an EMR were related to issues of physician-patient rapport, time to document and place orders, patients' satisfaction with quality of care received, overall quality of care delivered, and physician autonomy. Results are shown in Table 1.

**Post-implementation physician survey.** Six months after implementation, physicians averaged a marginally significant (.089) increase of 4.4 hours per week of computer use, S.D.= 4.39 hours. While they still perceived the overall effect of the EMR to be beneficial, average 0.30 (S.D. = .07), their optimism was significantly (.005) decreased, average -0.49 (S.D. = .19). Table 1 shows that physicians' chief concerns after implementation continued to be the impact of the EMR on the time required to enter orders and document encounters and on the rapport established between physician and patient during the visit. Several decreases in individual item mean responses were significant, including patient privacy, the overall quality of healthcare that patients receive, and physician's autonomy.

**Table 1. Physicians' Concerns – Pre- and Post-Implementation Survey Results\***

| Physicians' Concerns   | Pre-implementation Survey |      | Post-implementation Survey |       | Change between Pre- and Post-implementation Periods |       |                 |
|--|---------------------------|------|----------------------------|-------|---|-------|-----------------|
|  | Mean                      | S.D. | Mean                       | S.D.  | Mean  | S.D.  | Sig. (2-tailed) |
| The rapport established during the encounter between clinicians and patients | -.40                      | .548 | -.80                       | .447  | -.40  | .548  | .178            |
| Time required for documentation, such as progress notes                      | .20                       | .837 | -.80                       | 1.095 | -1.0  | 1.871 | .298            |
| Patients' satisfaction with the quality of care they receive                 | .20                       | .447 | .00                        | .000  | -.20  | .447  | .374            |
| Time required to enter orders, such as for tests or medications              | .40                       | .894 | -1.0                       | .707  | -1.40   | 1.52  | .108            |
| Patient privacy  | .40                       | .894 | -.20                       | .447  | -.60  | .548  | .070            |
| The overall quality of health care that you give your patients               | .80                       | .447 | .20                        | .447  | -.60  | .548  | .070            |
| Physician autonomy   | .80                       | .837 | .20                        | .837  | -.60  | .548  | .070            |

\*Responses ranged from negative two ("highly detrimental") to two ("highly beneficial").

**Post-implementation physician interviews.** During interviews, physicians elaborated on the physician-patient rapport issue. Some stated that patients seem to pause more often while their physician was typing, requiring periodic reassurances that s/he was listening before continuing to speak. One physician owed the more halting style of his patient interactions to, *"I'm not talking to the patient as much because it is hard to type, think, and talk all at the same time."* Other physicians described the effect of using an EMR in the exam room as creating a physical barrier causing the patient to be more distant. However, several physicians stated that their patients were "getting used to the new system," that some had expressed sympathy with their physician's struggles to use it, and that most appreciate that their physician has ready access to progress notes from previous visits. Physicians could not identify any instance when a patient had expressed concern about the privacy of their medical record in the EMR.

**Post-implementation patient surveys.** A total of 165 surveys were completed, for an 82% response rate. Patients who refused participation were not statistically different from the rest of the sample with respect to age, but there was a tendency for a greater rate of refusal by females. The average age of respondents was 46, with a median age of 45. The age ranged from 19 to 83. Thirty-seven percent of the sample indicated that they were unsophisticated in computer use, with forty-five percent reporting no computer use during a typical week. Sixty-five percent had not encountered use of a computer during medical care in previous settings.

Results of the satisfaction scores are contained in Table 2. Patients reported being very satisfied with their medical care on the General Satisfaction Scale. The Physician Computer Use Scale also indicated very little impact of the EMR on patient satisfaction. Patient age, gender, self-rated computer sophistication or computer use did not correlate with either the General Satisfaction or the Physician Computer Use Scale. Patients reported that they did not perceive an impact of the EMR on communication or eye contact with the physician. Visits were felt to be more efficient because the doctor was using a computer, but data on length of the visits were not obtained to objectively corroborate this impression. A small percentage of patients were concerned about possible breaches of privacy through use of an EMR. This sub-group's concerns over privacy accounts for the slightly lower mean score on the Physician Computer Use Scale compared to the General Satisfaction Scale.

#### DISCUSSION

Detrimental effects on physician-patient rapport are an often-voiced concern regarding the impacts of

**Table 2. Patients' Satisfaction Post-implementation Survey Results\***

| Scales  | Mean | S.D. |
|---|------|------|
| General Satisfaction Scale<br>10 overall visit and patient satisfaction items                   | 4.59 | .47  |
| Physician Computer Use Scale<br>5 computer-related satisfaction items                           | 4.00 | .68  |
| <b>Physician Computer Use Scale Component Items</b>   |      |      |
| With my medical files in the computer, I feel that my privacy is more secure than it was before | 3.64 | 1.06 |
| I can talk easily with my doctor when (s)he uses the computer                                   | 4.23 | .79  |
| My physician is able to maintain good personal contact with me while using the computer         | 4.18 | .86  |
| My visits are more efficient because by doctor uses the computer                                | 3.79 | .83  |
| I am comfortable with the idea of my doctor using a computer to track information about me      | 4.15 | .77  |

\*Responses ranged from one ("strongly disagree") to five ("strongly agree").

implementing an EMR in busy outpatient healthcare environments. For physicians surveyed in this study, physician-patient rapport was a concern prior to EMR implementation and this concern was increased at the end of six months of use. In contrast, patients did not indicate a sense of loss of rapport with their physicians when an EMR was used during their outpatient visits with physicians in this clinic. However, physicians and patients (to a lesser degree) shared a concern about the privacy of medical information contained in an EMR.

The sample of patient's attitudes toward physician use of an EMR appears to be the largest study utilizing a validated instrument published to date. Since many of the previous studies were done in Europe or are relatively old compared to the pace of technological change, these results are important in contemplating installation of an EMR in the United States at this time. The fact the patients in this study did not feel that EMR use has a negative impact on their encounter with the physician corroborates the findings of previous studies both in Europe<sup>1,11-14</sup> and the United States.<sup>2-4,9,15</sup> The lack of an effect of age or gender parallels the findings of Brownbridge, et al.,<sup>1</sup> Rethans, et al.,<sup>13</sup> and Legler and Oates.<sup>2</sup> The minority of patients with serious concerns regarding privacy is similar to the finding of Rethans, et al.<sup>13</sup> This deserves further investigation, as privacy issues are likely to be an ongoing concern as EMR systems are implemented.

The study by Aydin, et al.<sup>15</sup> is most comparable to the findings presented here. That recent study from the United States had a slightly larger sample size, but the providers were nurse practitioners and physician assistants. Although it is reasonable to expect the exact type of provider should not affect the findings,

replication of the results with physician providers is significant. Notably, the current study did not duplicate Aydin's finding that computer users were less satisfied with care.

Triangulation of quantitative survey data with qualitative semi-directed interviews leverages the value of our initially small physician sample. We will report the results of the full pilot implementation (100+ physicians) as the survey data is obtained. Other research has suggested that a six-month period of EMR use is too short to avoid learning-curve effects, therefore we plan to survey physicians again at two years to examine longitudinal effects.

Cruickshank showed that actual experience caused patients to have more positive attitudes towards EMR use.<sup>11</sup> The lack of pre-implementation patient data in the current study does not allow corroboration of this finding. Future studies using the validated patient survey tool developed for this study prior to EMR implementation would be of interest to see if patient attitudes shift as a result of experience with EMR use.

### CONCLUSIONS

We have shown that physicians and patients do not agree that EMR use negatively affects physician-patient rapport during outpatient clinical encounters. However they share a concern for the privacy of the electronic medical record.

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