

**Annotated Bibliography  
for  
Connected: Communicating and Computing in the Exam Room**



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Note: Since “Connected” was first introduced more than eight years ago, the research literature has grown significantly. Much of the data and resulting discussion concerning use of new communication technologies in health care are now on-line rather than found exclusively in hard copy journals. We invite learners to explore not only the resources below, but also the research and active discussions to be found on the Internet.

Als A. (Institute of General Practice, University of Aarhus, Denmark.) Family Practice. 1997;14:17–23. The desktop computer as a magic box: patterns of behaviour connected with the desktop computer; GPs’ and patients’ perceptions.

Background: The use of computers in general practice is becoming increasingly common. There has been concern about effects on doctor-patient communication.

Objectives: The aim of this study was to identify common patterns in the use of desk-top computers by GPs with regard to interaction with the patients, and to assess the GPs’ and patients’ perceptions of the use of the computer.

Method: Thirty-nine video-taped consultations with five different GPs were analysed inductively, inspired by the principles of ‘grounded theory’. On separate occasions the five GPs and 12 of the previously video-taped patients watched and commented on the video recordings of their own consultation.

Results: The study showed that the computer was sometimes used in a way that was not originally intended. Use of the computer could be identified as a way of obtaining ‘time-out’ in the consultation. It could also be a referral to a ‘magic box’. The conversation often changed when the computer was used. The interviews showed that the patients lacked understanding about the computer’s functions. They also lacked knowledge about the possibility of loss of confidentiality with electronic files. The patients found it disturbing not knowing what their doctor was doing when he worked on the computer, and they preferred being able to see the computer screen. The GPs were surprised at how their own use of the computer looked on the video, and as a result of the interview they wanted to change their behaviour.

Conclusions: It is concluded that patients need more information about the use of computers by GPs, and that GPs may benefit from paying more attention to their computer use.

Aydin CE, Rosen PN, et al. Presented at the Proc. Annu. Symp. Comput. Appl. Med. Care. 1995;824–8. Computers in the examining room: the patient’s perspective.

Beckman HB, Markakis KM, et al. Archives of Internal Medicine. 1994;154:1365–70. The doctor-patient relationships and malpractice: lessons from plaintiff depositions.

Callen JL, Bevis M, McIntosh JH. (School of Health Information Management, Faculty of Health Sciences, The University of Sydney, Lidcombe, NSW 1825, Australia. j.callen@fhs.usyd.edu.au) HIM J. 2005;34(1):8-12. Patients’ perceptions of general practitioners using computers during the patient-doctor consultation.

In this study 85 adult patients attending a Sydney general practice were asked for their views on computer-assisted consultations; 77 (91%) agreed to participate. In general, patients agreed they could still talk easily with their doctor, and felt listened to, while the doctor used

the computer (87% & 75% respectively). More than half the patients felt the computer contributed to better treatment, although a quarter believed consultations were prolonged. About half the patients agreed that the doctor did not often explain the role of the computer. Given the national plans for increasing computerisation of health records (HealthConnect), this research suggests that more attention should be given to involving patients in e-health developments.

PMID: 18239223 [PubMed - indexed for MEDLINE]

Fam Med. 2002 May;34(5):362-8.

DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, Kaushal R, Levy DE, Rosenbaum S, Shields AE, Blumenthal D.

Institute for Health Policy, Massachusetts General Hospital, Boston 02114, USA.  
cdesroches@partners.org. N Engl J Med. 2008 Jul 3;359(1):50-60. Epub 2008 Jun 18.

Comment in: N Engl J Med. 2008 Oct 23;359(17):1848-9; author reply 1849. N Engl J Med. 2008 Oct 23;359(17):1848; author reply 1849. N Engl J Med. 2008 Oct 23;359(17):1849; author reply 1849. N Engl J Med. 2008 Oct 23;359(17):1849; author reply 1849. Electronic health records in ambulatory care--a national survey of physicians.

**Background:** Electronic health records have the potential to improve the delivery of health care services. However, in the United States, physicians have been slow to adopt such systems. This study assessed physicians' adoption of outpatient electronic health records, their satisfaction with such systems, the perceived effect of the systems on the quality of care, and the perceived barriers to adoption.

**Methods:** In late 2007 and early 2008, we conducted a national survey of 2758 physicians, which represented a response rate of 62%. Using a definition for electronic health records that was based on expert consensus, we determined the proportion of physicians who were using such records in an office setting and the relationship between adoption and the characteristics of individual physicians and their practices.

**Results:** Four percent of physicians reported having an extensive, fully functional electronic-records system, and 13% reported having a basic system. In multivariate analyses, primary care physicians and those practicing in large groups, in hospitals or medical centers, and in the western region of the United States were more likely to use electronic health records. Physicians reported positive effects of these systems on several dimensions of quality of care and high levels of satisfaction. Financial barriers were viewed as having the greatest effect on decisions about the adoption of electronic health records.

**Conclusions:** Physicians who use electronic health records believe such systems improve the quality of care and are generally satisfied with the systems. However, as of early 2008, electronic systems had been adopted by only a small minority of U.S. physicians, who may differ from later adopters of these systems. 2008 Massachusetts Medical Society

Publication Types: Research Support, Non-U.S. Gov't Research Support, U.S. Gov't, Non-P.H.S.  
PMID: 18565855 [PubMed - indexed for MEDLINE]

Dworkin LA, Krall M, Chin H, Robertson N, Harris J, Hughes J. Proc AMIA Symp. 1999;:741-4. Experience using radio frequency laptops to access the electronic medical record in exam rooms.

Kaiser Permanente, Northwest, evaluated the use of laptop computers to access our existing comprehensive Electronic Medical Record in exam rooms via a wireless radiofrequency (RF) network. Eleven of 22 clinicians who were offered the laptops successfully adopted their use in the exam room. These clinicians were able to increase their exam room time with the patient by almost 4 minutes (25%), apparently without lengthening their overall work day. Patient response to exam room computing was overwhelmingly positive. The RF network response time was similar to the hardwired network. Problems cited by some laptop users and many of the eleven non-adopters included battery issues, different equipment layout and function, and inadequate training. IT support needs for the RF laptops were two to four times greater than for hardwired desktops. Addressing the reliability and training issues should increase clinician acceptance, making a successful general roll-out for exam room computing more likely.

PMID: 10566458 [PubMed - indexed for MEDLINE]

Frankel R, Altschuler A, George S, Kinsman J, Jimison H, Robertson NR, Hsu J. (Center on Implementing Evidence-Based Practice, Roudebush, VAMC, Indianapolis,

IN, USA. RFrankel@IUPUI.Edu). J Gen Intern Med. 2005 Aug; 20(8):677-82. Effects of exam-room computing on clinician-patient communication: a longitudinal qualitative study.

Objective: To evaluate the impact of exam-room computers on communication between clinicians and patients.

Design and methods: Longitudinal, qualitative study using videotapes of regularly scheduled visits from 3 points in time: 1 month before, 1 month after, and 7 months after introduction of computers into the exam room.

Setting: Primary care medical clinic in a large integrated delivery system.

Participants: Nine clinicians (6 physicians, 2 physician assistants, and 1 nurse practitioner) and 54 patients.

Results: The introduction of computers into the exam room affected the visual, verbal, and postural connection between clinicians and patients. There were variations across the visits in the magnitude and direction of the computer's effect. We identified 4 domains in which exam-room computing affected clinician-patient communication: visit organization, verbal and nonverbal behavior, computer navigation and mastery, and spatial organization of the exam room. We observed a range of facilitating and inhibiting effects on clinician-patient communication in all 4 domains. For 2 domains, visit organization and verbal and nonverbal behavior, facilitating and inhibiting behaviors observed prior to the introduction of the computer appeared to be amplified when exam-room computing occurred. Likewise, exam-room computing involving navigation and mastery skills and spatial organization of the exam-room created communication challenges and opportunities. In all 4 domains, there was little change observed in exam-room computing behaviors from the point of introduction to 7-month follow-up.

Conclusions: Effective use of computers in the outpatient exam room may be dependent upon clinicians' baseline skills that are carried forward and are amplified, positively or negatively, in their effects on clinician-patient communication. Computer use behaviors do not appear to change much over the first 7 months. Administrators and educators interested in improving exam-room computer use by clinicians need to better understand clinician skills and previous work habits associated with electronic medical records. More study of the effects of new technologies on the clinical relationship is also needed.

PMID: 16050873 [PubMed - indexed for MEDLINE]

Garcia-Sanchez R. (Departamento Medico GlaxoSmithKline, Parque Tecnologico de Madrid, Calle Severo Ochoa 2, Tres Cantos, Spain. [ricardo.rgs@telefonica.net](mailto:ricardo.rgs@telefonica.net))

Inform Prim Care. 2008;16(2):93-9. The patient's perspective of computerised records: a questionnaire survey in primary care.

Background: The general practice consultation today has become a three-way process where patient, doctor and computer interact. Some studies have shown that the introduction of the computer has caused concern to some patients, possibly affecting their behaviour. If patients are less frank about their problems in a computer-mediated consultation this may cause concerns among doctors and become a barrier to computer use.

Objectives: A questionnaire was developed to test the prevalence of worries among patients about confidentiality breaches of computer records and to identify whether those worries translated into a reduction in patients' frankness.

Results: The study had a 62% response rate. Almost 48% of responders had experienced confidentiality worries during past consultations. All responders denied withholding any relevant information from their general practitioner (GP) as a result of confidentiality worries. Gender, computer literacy, knowledge of computer uses in consultation and patients' perceptions of computer record safety were selected covariates in the multivariate logistic regression model explaining patients' worry. Thirty-three percent of patients stated they always understand what their GP is doing at the computer during consultation, 9.7% stated they did not ever know; though 64% judged it important to know what their GPs were doing.

Conclusions: Patients worry about the confidentiality of their computer record and it seems that those less familiar with computers, females and those less aware of their GP's actions at the computer worry more. Patients' understanding of their GPs' actions at the computer during consultation is far from complete and they seem to place great importance on this. Those patients who place greatest importance on needing an understanding of their GP's actions are those most likely to worry about confidentiality.

PMID: 18713525 [PubMed - indexed for MEDLINE]

Garrison GM, Bernard ME, Rasmussen NH. (Department of Family Medicine, Mayo Clinic, Rochester, MN 55905, USA. garrison.gregory@mayo.edu). *Fam Med.* 2002 May;34(5):362-8. <http://www.ncbi.nlm.nih.gov/pubmed/12038718>. 21st-century health care: the effect of computer use by physicians on patient satisfaction at a family medicine clinic.

**Background and objectives:** Trust and satisfaction in the physician-patient relationship is the cornerstone of family medicine. Today, computers are playing an increasingly prominent role in the delivery of health care, yet recent data detailing their effect on the physician-patient relationship are limited. For physicians to “first do no harm,” it is critical to determine that computers used at the point of care do not decrease patient satisfaction, because this is a good proxy for the physician-patient relationship. This study assessed patients’ views of computer use and its effect on patient satisfaction in a family medicine clinic before and after implementation of an electronic environment developed by our institution.

**Methods:** A survey was mailed to patients who had been evaluated at a family medicine clinic for hypertension, high blood pressure without hypertension, or hyperlipidemia. These diseases were selected because they are common and require strong physician-patient relationships for successful treatment. The survey assessed patients’ overall satisfaction with health care received at the clinic and their opinions about how their physician’s computer use affected their visit. This survey was compared with a survey done in 1995 at the same clinic, before adoption of the electronic environment.

**Results:** A total of 478 patients were enrolled in the study; 304 (63.6%) of these returned surveys. A majority of the patients (74.6%) thought that the computer had an overall positive impact on the quality of care provided. There was a positive association between a physician’s computer skills, as rated by patients, and the patients’ satisfaction with the computer’s effect on the visit. There were no differences in overall satisfaction between the 1995 survey and the current survey.

**Conclusions:** This study shows that physician competence with computers plays an important role in patient satisfaction and that computers can be integrated into the office visit without a detrimental effect on patient satisfaction. Surprisingly, patient familiarity with computers was shown to have a slight negative correlation with patient satisfaction. These findings are significant in view of research indicating that compliance, health outcomes, perception of physician competence, and malpractice suits are all related to physicians’ interpersonal skills and patient satisfaction.

PMID: 12038718 [PubMed - indexed for MEDLINE]

Greenfield S, Kaplan S, et al. *Journal of General Internal Medicine.* 1998;3:448-457. Patients’ participation in medical care: effects of blood sugar control and quality of life in diabetes.

Hsu J, Huang J, Fung V, Robertson N, Jimison H, Frankel R. (Kaiser Permanente Medical Care Program, Division of Research, Oakland, CA, USA. jth@dor.kaiser.org) *J Am Med Inform Assoc.* 2005 Jul-Aug;12(4):474-80. Epub 2005 Mar 31. Health information technology and physician-patient interactions: impact of computers on communication during outpatient primary care visits.

**Objective:** The aim of this study was to evaluate the impact of introducing health information technology (HIT) on physician-patient interactions during outpatient visits.

**Design:** This was a longitudinal pre-post study: two months before and one and seven months after introduction of examination room computers. Patient questionnaires (n = 313) after primary care visits with physicians (n = 8) within an integrated delivery system. There were three patient satisfaction domains: (1) satisfaction with visit components, (2) comprehension of the visit, and (3) perceptions of the physician's use of the computer.

**Results:** Patients reported that physicians used computers in 82.3% of visits. Compared with baseline, overall patient satisfaction with visits increased seven months after the introduction of computers (odds ratio [OR] = 1.50; 95% confidence interval [CI]: 1.01-2.22), as did satisfaction with physicians' familiarity with patients (OR = 1.60, 95% CI: 1.01-2.52), communication about medical issues (OR = 1.61; 95% CI: 1.05-2.47), and comprehension of decisions made during the visit (OR = 1.63; 95% CI: 1.06-2.50). In contrast, there were no significant changes in patient satisfaction with comprehension of self-care responsibilities, communication about psychosocial issues, or available visit time. Seven months post-introduction, patients were more likely to report that the computer helped the visit run in a more timely manner (OR = 1.76; 95% CI: 1.28-2.42) compared with the first month after introduction. There were no other significant changes in patient perceptions of the computer use over time.

**Conclusion:** The examination room computers appeared to have positive effects on physician-patient interactions related to medical communication without significant negative effects on other areas such as time available for patient concerns. Further study is needed to better understand HIT use during outpatient visits.

PMID: 15802484 [PubMed - indexed for MEDLINE]

Johnson KB, Serwint JR, Fagan LA, Thompson RE, Wilson ME, Roter D.  
(Department of Pediatrics, Vanderbilt University Medical Center, 2209 Garland Ave, Nashville, TN 37232, USA. kevin.johnson@vanderbilt.edu)  
Pediatrics. 2008 Sep;122(3):590-8. Comment in: Pediatrics. 2009 Feb;123(2):e357-8; author reply e358. Computer-based documentation: effects on parent-provider communication during pediatric health maintenance encounters.

**Objective:** The goal was to investigate the impact of a computer-based documentation tool on parent-health care provider communication during a pediatric health maintenance encounter.

**Methods:** We used a quasiexperimental study design to compare communication dynamics between clinicians and parents/children in health maintenance visits before and after implementation of the ClicTate system. Before ClicTate use, paper forms were used to create visit notes. The children examined were  $\leq 18$  months of age. All encounters were audiotaped or videotaped. A team of research assistants blinded to group assignment reviewed the audio portion of each encounter. Data from all recordings were analyzed, by using the Roter Interaction Analysis System, for differences in the open/closed question ratio, the extent of information provided by parents and providers, and other aspects of spoken and nonverbal communication (videotaped encounters).

**Results:** Computer-based documentation visits were slightly longer than control visits (32 vs

27 minutes). With controlling for visit length, the amounts of conversation were similar during control and computer-based documentation visits. Computer-based documentation visits were associated with a greater proportion of open-ended questions (28% vs 21%), more use of partnership strategies, greater proportions of social and positive talk, and a more patient-centered interaction style but fewer orienting and transition phrases.

Conclusions: The introduction of ClicTate into the health maintenance encounter positively affected several aspects of parent-physician communication in a pediatric clinic setting. These results support the integration of computer-based documentation into primary care pediatric visits.

Kaplan S, Greenfield S, et al. *Medical Care*. 1989;27 (Suppl 3):S1:10–27. Assessing the effects of physician-patient interactions on the outcomes of chronic disease.

Linder JA, Schnipper JL, Tsurikova R, Melnikas AJ, Volk LA, Middleton B. (Division of General Medicine, Brigham and Women's Hospital, Boston, MA, USA.). *AMIA Annu Symp Proc*. 2006;:499-503. Barriers to electronic health record use during patient visits.

The effectiveness of electronic health record (EHR)-based clinical decision support is limited when clinicians do not interact with the EHR during patient visits. To assess EHR use during ambulatory visits and determine barriers to such use, we performed a cross-sectional survey of 501 primary care clinicians. Of 225 respondents, 53 (24%) never or only sometimes used any EHR functionality during patient visits. Non-physician clinicians (e.g., nurse practitioners) were marginally more likely to be EHR non-users than physicians (39% versus 21%, respectively;  $p = .05$ ). The most commonly reported barriers to using the EHR during patient visits were loss of eye contact with patients (62%), falling behind schedule (52%), computers being too slow (49%), inability to type quickly enough (32%), feeling that using the computer in front of the patient is rude (31%), and preferring to write long prose notes (28%). EHR developers and healthcare system leaders must address social, workflow, technical, and professional barriers if clinicians are to use EHRs in the presence of patients and realize the full potential of ambulatory clinical decision support.

PMID: 17238391 [PubMed - indexed for MEDLINE]

Lelievre S, Schultz K. (sarah\_lelievre@hotmail.com). *Can Fam Physician*. 2010 Jan;56(1):e6-12. Does computer use in patient-physician encounters influence patient satisfaction?

Objective: To assess whether computer use by physicians during the patient-physician encounter influences patient satisfaction in a family medicine teaching centre.

Design: Cross-sectional mailed survey.

Setting: Queen's University Family Medicine Centre in Kingston, Ont.

Participants: A random sample of 300 patients from the family medicine centre, all of whom were older than 18 years of age and had visited their family physicians in the past year.

Main outcome measures: Patient preference for or against computer use by the physician and effect of computer use on various aspects of patient-physician interaction.

Results: The response rate was 58.3%. Most respondents (51.4%) had no preference about computer use in the office, and most (88.0%) were either “very satisfied” or “satisfied” with their visits. When assessing the influence of patient and visit characteristics on computer preference, only the “doctor’s attitude toward computer use” had a positive correlation with patient preference ( $P=.0012$ ). Respondents were most likely to indicate “positive” or “very positive” effects of computer use on all aspects of the patient-physician interaction, except “level of distraction of the doctor” and “time spent chatting about nonmedical matters,” which were most commonly reported as being unaffected by computer use. Specifically, 57.1% of respondents thought that computer use had either a “positive” or “very positive” effect on their overall satisfaction with their visits, with another 30.3% believing there was no effect.

Conclusion: Most patients expressed no preference for whether or not computers were used in their physicians’ offices, although computers did seem to have a positive effect on overall satisfaction with visits. Doctors’ attitudes toward computer use influenced their patients’ preferences.

PMID: 20090064 [PubMed - in process]

Jeffrey A. Linder, MD, MPH,<sup>a</sup> Jeffrey L. Schnipper, MD, MPH,<sup>a</sup> Ruslana Tsurikova, MA,<sup>ab</sup> Andrea J. Melnikas, BA,<sup>ab</sup> Lynn A. Volk, MHS,<sup>b</sup> and Blackford Middleton, MD, MPH, MSc (a Division of General Medicine, Brigham and Women’s Hospital, Boston). Barriers to Electronic Health Record Use during Patient Visits

Abstract: The effectiveness of electronic health record (EHR)-based clinical decision support is limited when clinicians do not interact with the EHR during patient visits. To assess EHR use during ambulatory visits and determine barriers to such use, we performed a cross-sectional survey of 501 primary care clinicians. Of 225 respondents, 53 (24%) never or only sometimes used any EHR functionality during patient visits. Non-physician clinicians (e.g., nurse practitioners) were marginally more likely to be EHR non-users than physicians (39% versus 21%, respectively;  $p = .05$ ). The most commonly reported barriers to using the EHR during patient visits were loss of eye contact with patients (62%), falling behind schedule (52%), computers being too slow (49%), inability to type quickly enough (32%), feeling that using the computer in front of the patient is rude (31%), and preferring to write long prose notes (28%). EHR developers and healthcare system leaders must address social, workflow, technical, and professional barriers if clinicians are to use EHRs in the presence of patients and realize the full potential of ambulatory clinical decision support.

McGrath JM, Arar NH, Pugh JA. Health (Department of Communication, Trinity University, One Trinity Place San Antonio, TX 78212, USA. [jmcgrath@trinity.edu](mailto:jmcgrath@trinity.edu))

Informatics J. 2007 Jun;13(2):105-18. The influence of electronic medical record usage on nonverbal communication in the medical interview.

This study examined nonverbal communication in relation to electronic medical record (EMR) use during the medical interview. Six physicians were videotaped during their consultations with 50 different patients at a single setting Veterans Administration Hospital. Three different office spatial designs were identified and named ‘open,’ ‘closed’ and ‘blocked’. The ‘open’ arrangement put physicians in a position to establish better eye contact

and physical orientation than did the alternative 'closed' and 'blocked' office configurations. Physicians who accessed the EMR and took 'breakpoints' (short periods of no computer use and sustained eye contact with patients) used more nonverbal cues than physicians who tended to talk with their patients while continuously working on the computer. Long pauses in conversational turn taking associated with EMR use may have positively influenced doctor-patient communication. High EMR use interviews were associated with patients asking more questions than they did in low EMR use interviews. Implications for medical education and future research are discussed.

PMID: 17510223 [PubMed - indexed for MEDLINE]

Peled JU, Sagher O, Morrow JB, Dobbie AE (jpeled@aecom.yu.edu (JUP); osagher@med.umich.edu (OS); Jay.Morrow@UTSouthwestern.edu (JBM); Alison.Dobbie@UTSouthwestern.edu (AED) (2009) PLoS Med 6(5): e1000069. doi:10.1371/journal.pmed.1000069 <http://www.plosmedicine.org/article/info:doi%2F10.1371%2Fjournal.pmed.1000069>  
Do Electronic Health Records Help or Hinder Medical Education?

This on-line debate began as an essay spontaneously submitted by Peled and Sagher, which underwent peer review. PLoS Medicine then invited Morrow and Dobbie to participate in the debate, and their contribution was not peer reviewed.

Rethans J, Hoppener P, Wolfs G, Diederiks J. British Medical Journal. 1988;296:1446-8.  
Do personal computers make doctors less personal?

Abstract: Ten months after the installation of a computer in a general practice surgery a postal survey (piloted questionnaire) was sent to 390 patients. The patients' views of their relationship with their doctor after the computer was introduced were compared with their view of their relationship before the installation of the computer. More than 96% of the patients (n=263) stated that contact with their doctor was as easy and as personal as before. Most stated that the computer did not influence the duration of the consultation. Eighty one patients (30%) stated, however, that they thought that their privacy was reduced.

Unlike studies of patients' attitudes performed before any actual experience of use of a computer in general practice, this study found that patients have little difficulty in accepting the presence of a computer in the consultation room. Nevertheless, doctors should inform their patients about any connections between their computer and other, external computers to allay fears about a decrease in privacy.

Emran Rouf, Heidi S Chumley and Alison E Dobbie. BMC Medical Education 2008, 8:13doi:10.1186/1472-6920-8-13. <http://www.biomedcentral.com/1472-6920/8/13>  
Electronic health records in outpatient clinics: Perspectives of third year medical students

Background: United States academic medical centers are increasingly incorporating electronic health records (EHR) into teaching settings. We report third year medical students' attitudes towards clinical learning using the electronic health record in ambulatory primary care clinics.

**Methods:** In academic year 2005–06, 60 third year students were invited to complete a questionnaire after finishing the required Ambulatory Medicine/Family Medicine clerkship. The authors elicited themes for the questionnaire by asking a focus group of third year students how using the EHR had impacted their learning. Five themes emerged: organization of information, access to online resources, prompts from the EHR, personal performance (charting and presenting), and communication with patients and preceptors. The authors added a sixth theme: impact on student and patient follow-up. The authors created a 21-item questionnaire, based on these themes that used a 5-point Likert scale from “Strongly Agree” to “Strongly Disagree”. The authors emailed an electronic survey link to each consenting student immediately following their clerkship experience in Ambulatory Medicine/Family Medicine.

**Results:** 33 of 53 consenting students (62%) returned completed questionnaires. Most students liked the EHR’s ability to organize information, with 70% of students responding that essential information was easier to find electronically. Only 36% and 33% of students reported accessing online patient information or clinical guidelines more often when using the EHR than when using paper charts. Most students (72%) reported asking more history questions due to EHR prompts, and 39% ordered more clinical preventive services. Most students (69%) reported that the EHR improved their documentation. 39% of students responded that they received more feedback on their EHR notes compared to paper chart notes. Only 64% of students were satisfied with the doctor-patient communication with the EHR, and 48% stated they spent less time looking at the patient.

**Conclusion:** Third year medical students reported generally positive attitudes towards using the EHR in the ambulatory setting. They reported receiving more feedback on their electronic charts than on paper charts. However, students reported significant concerns about the potential impact of the EHR on their ability to conduct the doctor-patient encounter.

Emran Rouf<sup>1</sup>, Jeff Whittle, Na Lu and Mark D. Schwartz. *J Gen Int Med*, 22:1, January 9, 2007 (print and on-line) Computers in the Exam Room: Differences in Physician-Patient Interaction May Be Due to Physician Experience

**Background** The use of electronic medical records can improve the technical quality of care, but requires a computer in the exam room. This could adversely affect interpersonal aspects of care, particularly when physicians are inexperienced users of exam room computers.

**Objective** To determine whether physician experience modifies the impact of exam room computers on the physician–patient interaction.

**Design** Cross-sectional surveys of patients and physicians.

**Setting and Participants** One hundred fifty five adults seen for scheduled visits by 11 faculty internists and 12 internal medicine residents in a VA primary care clinic.

**Measurements** Physician and patient assessment of the effect of the computer on the clinical encounter.

**Main Results** Patients seeing residents, compared to those seeing faculty, were more likely to agree that the computer adversely affected the amount of time the physician spent talking to (34% vs 15%,  $P=0.01$ ), looking at (45% vs 24%,  $P=0.02$ ), and examining them (32% vs

13%,  $P=0.009$ ). Moreover, they were more likely to agree that the computer made the visit feel less personal (20% vs 5%,  $P=0.017$ ). Few patients thought the computer interfered with their relationship with their physicians (8% vs 8%). Residents were more likely than faculty to report these same adverse effects, but these differences were smaller and not statistically significant.

**Conclusion** Patients seen by residents more often agreed that exam room computers decreased the amount of interpersonal contact. More research is needed to elucidate key tasks and behaviors that facilitate doctor–patient communication in such a setting.

Randall F Stewart<sup>1</sup>, Philip J Kroth<sup>1</sup>, Mark Schuyler<sup>3</sup> and Robert Bailey<sup>2</sup> (1 Health Sciences Library & Informatics Center, MSC09 5100, 1 University of New Mexico, Albuquerque, New Mexico 87131-0001, USA) BMC Psychiatry 2010, 10:3 The electronic version of this article is the complete one and can be found online at: <http://www.biomedcentral.com/1471-244X/10/3> Do electronic health records affect the patient-psychiatrist relationship? A before & after study of psychiatric outpatients

**Background:** A growing body of literature shows that patients accept the use of computers in clinical care. Nonetheless, studies have shown that computers unequivocally change both verbal and non-verbal communication style and increase patients' concerns about the privacy of their records. We found no studies which evaluated the use of Electronic Health Records (EHRs) specifically on psychiatric patient satisfaction, nor any that took place exclusively in a psychiatric treatment setting. Due to the special reliance on communication for psychiatric diagnosis and evaluation, and the emphasis on confidentiality of psychiatric records, the results of previous studies may not apply equally to psychiatric patients.

**Method:** We examined the association between EHR use and changes to the patient-psychiatrist relationship. A patient satisfaction survey was administered to psychiatric patient volunteers prior to and following implementation of an EHR. All subjects were adult outpatients with chronic mental illness.

**Results:** Survey responses were grouped into categories of "Overall," "Technical," "Interpersonal," "Communication & Education,," "Time," "Confidentiality," "Anxiety," and "Computer Use." Multiple, unpaired, two-tailed t-tests comparing pre- and post-implementation groups showed no significant differences (at the 0.05 level) to any questionnaire category for all subjects combined or when subjects were stratified by primary diagnosis category.

**Conclusions:** While many barriers to the adoption of electronic health records do exist, concerns about disruption to the patient-psychiatrist relationship need not be a prominent focus. Attention to communication style, interpersonal manner, and computer proficiency may help maintain the quality of the patient-psychiatrist relationship following EHR implementation.

Solomon GL, Dechter M. Journal of Family Practice. 1995;41:241–4. Are patients pleased with computer use in the examination room?

Sullivan F, Mitchell E. *British Medical Journal*. 1995;311:848–52. Has general practitioner computing made a difference to patient care? a systematic review of published reports.

Ventres W, Kooienga S, Marlin R, Vuckovic N, Stewart V. (Multnomah County Health Department, Mid-County Health Center, Portland, OR 97236, USA. [william.b.ventres@co.multnomah.or.us](mailto:william.b.ventres@co.multnomah.or.us)). *Fam Med*. 2005 Apr;37(4):276-81. Clinician style and examination room computers: a video ethnography.

**Background and objectives:** The use of computers in medical examination rooms is growing. Advocates of this technology suggest that all family physicians should have and use examination room computers (ERCs) within the near future. This study explored how family physicians incorporate the use of ERCs in their interactions with patients.

**Methods:** This qualitative study involved five family physicians, one family nurse practitioner, and a convenience sample of 29 patients. Data included videotaped visits, clinician interviews, and videotape reviews. The setting was an urban family practice with a 7-year history of viewing electronic medical records. The main outcome measures were themes emergent from videotaped data.

**Results:** We identified three distinct practice styles that shaped the use of the ERC: informational, interpersonal, and managerial styles. Clinicians with an informational style are guided by their attention to gathering data as prompted by the computer screen. Clinicians with an interpersonal style focus their attention and body language on patients. Clinicians with a managerial style bridge informational and interpersonal styles by alternating their attention in defined intervals between patients and the computer.

**Conclusions:** Family physicians have varying practice styles that affect the way they use examination room computers during visits with patients.

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