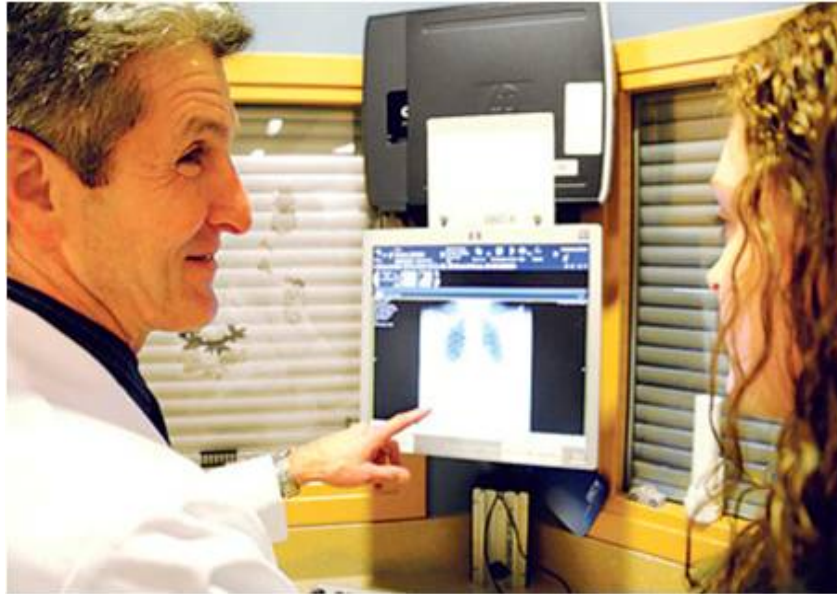


Annotated Bibliography

Connected: Communicating and Computing in the Exam Room



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Note: Since “Connected” was first introduced more than ten years ago, the research literature has grown significantly. Much of the data and resulting discussion concerning use of new communication technologies in healthcare are now online 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.

** Citations of note/highly recommended reading*

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

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. Computers in the examining room: the patient's perspective. *Proc. Annu. Symp. Comput. Appl. Med. Care*. 1995;824–8.

CompuHx* is an Interactive Health Appraisal System (IHAPS) used in the examining room at Kaiser-Permanente's San Diego Department of Preventive Medicine to record patient information, assist in diagnosis, and provide a legible summary of findings. The purpose of the present project was to examine the impact of computer use in the examining room on patient satisfaction with the Health Appraisal experience. Survey results showed no significant differences in patient satisfaction between patients whose examiners used CompuHx and those whose examiners did not. These findings indicate that, in the eyes of the patients surveyed, clinician use of a computer in the examining room did not depersonalize their relationship with the clinician, nor did it enhance satisfaction with the thoroughness of the exam or confidence in the examiner's findings.

Baker LH, Reifsteck SW, & Mann WR. Connected: communication skills for nurses using the electronic medical record. *Nursing Economic*, 2003,21(2):85-88.

The electronic medical record (EMR) offers new avenues for inviting patients to become active partners in their health care. It also can become a barrier to effective communication.

Connected is a 3-hour on-site program designed to provide nurses and other clinicians with tools to help them communicate effectively with patients while using exam room computers.

With effective communication, patients will experience the EMR as a valuable tool that enhances their confidence in care, encourages adherence to treatment regimens, and invites their active participation in their health care.

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

The current literature does not provide an answer to the question, "What prompts patients to sue doctors or hospitals?" Not all adverse outcomes result in suits, and threatened suits do not always involve adverse outcomes. The exploration of other factors has been hampered by the lack of a methodology to contact plaintiffs and elicit their views about their experience in delivered health care. This study employed the transcripts of discovery depositions of plaintiffs as a source of insight into the issues that prompted individuals to file a malpractice claim.

METHODS: This study is a descriptive series review of a convenience sample of 45 plaintiffs' depositions selected randomly from 67 depositions made available from settled malpractice suits filed between 1985 and 1987 against a large metropolitan medical center. Information extracted from each deposition included the alleged injury; the presence of the question, "Why are you suing?" and, if present, the answer; the presence of problematic relationship issues between providers and patients and/or families and, if present, the discourse supporting it; the presence of the question, "Did a health professional suggest maloccurrence?" and, if yes, who. Using a process of consensual validation, relationship issues were organized into groups of more generalized categories suggested by the data. Answers to the questions, "Why are you suing?" and "Who suggested maloccurrence?" are described.

RESULTS: Problematic relationship issues were identified in 71% of the depositions with an interrater reliability of 93.3%. Four themes emerged from the descriptive review of the 3787 pages of transcript: deserting the patient (32%), devaluing patient and/or family views (29%), delivering information poorly (26%), and failing to understand the patient and/or family perspective (13%). Thirty-one plaintiffs were asked if health professionals suggested maloccurrence. Fifty-four percent (n = 17) responded affirmatively. The postoutcome-consulting specialist was named in 71% (n = 12) of the depositions in which maloccurrence was allegedly suggested.

CONCLUSIONS: In our sample, the decision to litigate was often associated with a perceived lack of caring and/or collaboration in the delivery of health care. The issues identified included perceived unavailability, discounting patient and/or family concerns, poor delivery of information, and lack of understanding the patient and/or family perspective. Particular attention should be paid to the postadverse-event consultant-patient interaction.

Bernat JL: Ethical and quality pitfalls in electronic health records. *Neurology*. 2013;80:1057-1061.

Hospitals and physicians' practices are rapidly implementing the electronic health record (EHR) because it offers many demonstrated advantages over paper records. Issues of misuse of the HER previously identified include breaches in confidentiality and privacy and inappropriate record sharing. I describe a separate set of ethical and quality problems of the EHR that result from its otherwise beneficial timesaving features that inadvertently enable carelessness and harmful shortcuts. These problems include copying and pasting data obtained from other clinicians, authorship ambiguities, inadvertent inclusion of unobtained data in templated notes, misleading history and physical examinations ("pseudohistory" and "pseudoexamination"), failure to review prepopulated data, inadequate discharge summaries, impairments to patient-physician communication, and the transformation of the purpose of the medical record to billing documentation. I offer a brief analysis and recommendations to mitigate these problems.

Bloom MV, Huntington MK: Faculty, resident, and clinic staff's evaluation of the effects of EHR implementation. *Family Medicine*. 2010;42(8):562-566.

BACKGROUND AND OBJECTIVES: There have been few reports on the effect of electronic health record (EHR) implementation as seen by those most responsible for using the system in a residency program. Our objective was to investigate how faculty, residents, and both clinical and nonclinical staff view the effects of EHR implementation on a broad range of issues.

METHODS: All 72 personnel were surveyed at 8 months (response rate 75%) and 12 months (response rate 57%) following full implementation of the EHR. The survey inquired into subjective perceptions of amount of time spent documenting and occurrence of documentation, effect on patient care, interference with other activities, effect on communication and relationships, coding/billing process, and overall efficiency.

RESULTS: Since EHR implementation, faculty and residents perceived documentation as taking 13 minutes per patient. It was seen as interfering with personal and educational time. Perception of all personnel was

that the EHR was having a negative effect on patient care. There was no detectable statistically significant change between the 8- and 12-month surveys.

CONCLUSION: A perception of the promised improvement in patient care, provider communications, and billing efficiency due to EHR implementation was not realized in this population.

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). Patients' perceptions of general practitioners using computers during the patient-doctor consultation. *HIMJ*, 2005;34(1):8-12.

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.

Chumley HS, Dobbie AE & Delzell JE: Case-based Exercises Fail to Improve Medical Students' Information Management Skills: A Controlled Trial. *BMC Medical Education*, 2006;6:14.

BACKGROUND: Tomorrow's physicians must learn to access, retrieve, integrate and apply current information into ambulatory patient encounters, yet few medical schools teach 'real time' information management.

METHODS: We compared two groups of clerkship students' information management skills using a standardized patient case. The intervention group participated in case-based discussions including exercises that required them to manage new information. The control group completed the same case discussions without information management exercises.

RESULTS: After five weeks, there was no significant difference between the control and intervention groups' scores on the standardized patient case. However, third rotation students significantly outperformed first rotation students.

CONCLUSION: Case-based exercises to teach information management failed to improve students' performance on a standardized patient case. Increased number of clinical rotations was associated with improved performance.

Canadian Medical Protective Association: Electronic Records Handbook: Implementing and using electronic medical records (EMRs) and electronic health records (EHRs). 2009. Available at <http://www.pito.bc.ca/wp-content/uploads/downloads/2011/09/Electronic-Records-Handbook.pdf>. Accessed February 6 2014. (The document may load slowly. Be patient.)

DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, Kaushal R, Levy DE, Rosenbaum S, Shields AE, & Blumenthal D. Electronic health records in ambulatory care--a national survey of physicians. 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. <http://www.nejm.org/doi/full/10.1056/NEJMsa0802005>

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.

See also letters to the editor responding to this article at *New England Journal of Medicine*. October 23 2008;359(17):1848-1849.

*Computer Skills for the Calgary-Cambridge Observation Guide. Based on: Silverman J, Kurtz S, Draper J: Skills for Communicating with Patients. Abingdon, Oxon: Radcliffe Medical Press, 2005. Available at http://www.gp-training.net/training/communication_skills/iicr/calcam.htm Accessed February 6 2014.

Denomme LB, Terry AL, Brown JB, Thind A, Stewart M: **Primary health care teams' experience of electronic medical record use after adoption.** *Family Medicine*. 2011;43(9):638-642.

BACKGROUND AND OBJECTIVES: This study explored the views and perspectives of primary health care providers participating in the DELPHI (Deliver Primary Healthcare Information) project regarding their experiences using electronic medical records (EMRs) in their practices 2 years after adoption. This research was conducted in follow up to a previous qualitative study looking at early EMR implementation experiences.

METHODS: This descriptive qualitative study explored the experiences of 19 participants. Semi-structured interviews were conducted. Both individual and team analyses were performed.

RESULTS: Emergent from the data were five interwoven elements of team behavior when using the EMR. Consistent data entry was imperative to successful EMR utilization. The EMR software was utilized differently depending on the role of the team member. Team members continued to seek out a team champion/problem solver to help overcome obstacles. Communication was enhanced by using the common messaging system within the EMR. Finally, success with certain functions such as communication, champion enthusiasm, and recognition of the value of the EMR encouraged others to learn additional features and advanced the adoption process.

CONCLUSIONS: These findings illuminate important elements of team behavior that promoted EMR adoption and provide insight for primary health care providers moving through the continuum of initial to advanced EMR adoption.

Delbanco T, Walker J, Bell SK, Darer JD, et al: Inviting patients to read their doctors' notes: a quasi-experimental study and a look ahead. *Annals of Internal Medicine*. 2012;157:461-470.
See also Walker.

BACKGROUND: Little information exists about what primary care physicians (PCPs) and patients experience if patients are invited to read their doctors' office notes.

OBJECTIVE: To evaluate the effect on doctors and patients of facilitating patient access to visit notes over secure Internet portals.

DESIGN: Quasi-experimental trial of PCPs and patient volunteers in a year-long program that provided patients with electronic links to their doctors' notes.

SETTING: Primary care practices at Beth Israel Deaconess Medical Center (BIDMC) in Massachusetts, Geisinger Health System (GHS) in Pennsylvania, and Harborview Medical Center (HMC) in Washington.

PARTICIPANTS: 105 PCPs and 13 564 of their patients who had at least 1 completed note available during the intervention period.

MEASUREMENTS: Portal use and electronic messaging by patients and surveys focusing on participants' perceptions of behaviors, benefits, and negative consequences.

RESULTS: 11 797 of 13 564 patients with visit notes available opened at least 1 note (84% at BIDMC, 92% at GHS, and 47% at HMC). Of 5391 patients who opened at least 1 note and completed a postintervention survey, 77% to 87% across the 3 sites reported that open notes helped them feel more in control of their care; 60% to 78% of those taking medications reported increased medication adherence; 26% to 36% had privacy concerns; 1% to 8% reported that the notes caused confusion, worry, or offense; and 20% to 42% reported sharing notes with others. The volume of electronic messages from patients did not change. After

the intervention, few doctors reported longer visits (0% to 5%) or more time addressing patients' questions outside of visits (0% to 8%), with practice size having little effect; 3% to 36% of doctors reported changing documentation content; and 0% to 21% reported taking more time writing notes. Looking ahead, 59% to 62% of patients believed that they should be able to add comments to a doctor's note. One out of 3 patients believed that they should be able to approve the notes' contents, but 85% to 96% of doctors did not agree. At the end of the experimental period, 99% of patients wanted open notes to continue and no doctor elected to stop.

LIMITATIONS: Only 3 geographic areas were represented, and most participants were experienced in using portals. Doctors volunteering to participate and patients using portals and completing surveys may tend to offer favorable feedback, and the response rate of the patient surveys (41%) may further limit generalizability.

CONCLUSION: Patients accessed visit notes frequently, a large majority reported clinically relevant benefits and minimal concerns, and virtually all patients wanted the practice to continue. With doctors experiencing no more than a modest effect on their work lives, open notes seem worthy of widespread adoption.

Dowel A, Stubbe M, Scott-Dowell K, Macdonald L, Dew K: Talking with an alien: interaction with computers in the GP consultation. *Australian Journal of Primary Health*. 2013;19(4):275-282.

This study examines New Zealand GPs' interaction with computers in routine consultations. Twenty-eight video-recorded consultations from 10 GPs were analysed in micro-detail to explore: (i) how doctors divide their time and attention between computer and patient; (ii) the different roles ascribed to the computer; and (iii) how computer use influences the interactional flow of the consultation. All GPs engaged with the computer in some way for at least 20% of each consultation, and on average spent 12% of time totally focussed on the computer. Patterns of use varied; most GPs inputted all or most notes during the consultation, but a few set aside dedicated time afterwards. The computer acted as an additional participant enacting roles like information repository and legitimiser of decisions. Computer use also altered some of the normal 'rules of engagement' between doctor and patient. Long silences and turning away interrupted the smooth flow of conversation, but various 'multitasking' strategies allowed GPs to remain engaged with patients during episodes of computer use (e.g. signposting, online commentary, verbalising while typing, social chat). Conclusions were that use of computers has many benefits but also significantly influences the fine detail of the GP consultation. Doctors must consciously develop strategies to manage this impact.

Doyle RJ, Wang N, Anthony D, Borkan J, Shield RR, & Goldman RE. Computers in the examination room and the electronic health record: physicians' perceived impact on clinical encounters before and after full installation and implementation. *Family Practice*, 2012;29(5):601-608.

PURPOSE: We compared physicians' self-reported attitudes and behaviours regarding electronic health record (EHR) use before and after installation of computers in patient examination rooms and transition to full implementation of an EHR in a family medicine training practice to identify anticipated and observed effects these changes would have on physicians' practices and clinical encounters.

METHODS: We conducted two individual qualitative interviews with family physicians. The first interview was before and second interview was 8 months later after full implementation of an EHR and computer installation in the examination rooms. Data were analysed through project team discussions and subsequent coding with qualitative analysis software.

RESULTS: At the first interviews, physicians frequently expressed concerns about the potential negative effect of the EHR on quality of care and physician-patient interaction, adequacy of their skills in EHR use and privacy and confidentiality concerns. Nevertheless, most physicians also anticipated multiple benefits, including improved accessibility of patient data and online health information. In the second interviews, physicians reported that their concerns did not persist. Many anticipated benefits were realized, appearing to facilitate collaborative physician-patient relationships. Physicians reported a greater teaching role with patients and sharing online medical information and treatment plan decisions.

CONCLUSIONS: Before computer installation and full EHR implementation, physicians expressed concerns about the impact of computer use on patient care. After installation and implementation, however, many concerns were mitigated. Using computers in the examination rooms to document and access patients' records along with online medical information and decision-making tools appears to contribute to improved physician-patient communication and collaboration.

*Duke P, Frankel RM, Reis S: How to integrate the Electronic Health Record and Patient-Centered Communication into the medical visit: a skills-based approach. *Teaching and Learning in Medicine*. 2013;25(4):358-365.

BACKGROUND: Implementation of the electronic health record (EHR) has changed the dynamics of doctor–patient communication. Physicians train to use EHRs from a technical standpoint, giving only minimal attention to integrating the human dimensions of the doctor–patient relationship into the computer-accompanied medical visit. **Description:** This article reviews the literature and proposes a model to help clinicians, residents, and students improve physician–patient communication while using the EHR.

EVALUATION: We conducted a literature search on use of communication skills when interfacing with the EHR. We observed an instructional gap and developed a model using evidence-based communication skills.

CONCLUSION: This model integrates patient-centered interview skills and aims to empower physicians to remain patient centered while effectively using EHRs. It may also serve as a template for future educational and practice interventions for use of the EHR in the examination room.

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

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.

Frankel R, Altschuler A, George S, Kinsman J, Jimison H, Robertson NR, & Hsu J. (Center on Implementing Evidence-Based Practice, Roudebush, VAMC, Indianapolis, IN. Frankel@IUPUI.Edu). Effects of exam-room computing on clinician-patient communication: a longitudinal qualitative study. *J Gen Intern Med*, 2005 Aug; 20(8):677-82.

OBJECTIVE: To evaluate 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 intro. 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.

Frankel RM, Saleem JJ: "Attention on the flight deck": What ambulatory care providers can learn from pilots about complex coordinated actions. *Patient Education and Counseling*. 2013;93:367-372.

OBJECTIVE: Technical and interpersonal challenges of using electronic health records (EHRs) in ambulatory care persist. We use cockpit communication as an example of highly coordinated complex activity during flight and compare it with providers' communication when computers are used in the exam room.

METHODS: Maximum variation sampling was used to identify two videotapes from a parent study of primary care physicians' exam room computer demonstrating the greatest variation. We then produced and analyzed visualizations of the time providers spent looking at the computer and looking at the patient.

RESULTS: Unlike the cockpit which is engineered to optimize joint attention on complex coordinated activities, we found polar extremes in the use of joint focus of attention to manage the medical encounter.

CONCLUSION: We conclude that there is a great deal of room for improving the balance of interpersonal and technical attention that occurs in routine ambulatory visits in which computers are present in the exam room. Practice implications: Using well-known aviation practices can help primary care providers become more aware of the opportunities and challenges for enhancing the physician patient relationship in an era of exam room computing.

Garcia-Sanchez R. (Departamento Medico GlaxoSmithKline, Parque Tecnologico de Madrid, Calle Severo Ochoa 2, Tres Cantos, Spain. ricardo.rgs@telefonica.net). The patient's perspective of computerised records: a questionnaire survey in primary care. *Inform Prim Care*, 2008;16(2):93-9.

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.

Garrison GM, Bernard ME, & Rasmussen NH. (Dept. Family Medicine, Mayo Clinic, Rochester, MN 55905.). *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.

Greatbatch D, Heath C, Campion P, Luff P: How do desk-top computers affect the doctor-patient interaction? *Family Practice*. 1995;12(1):32-36.

General practice consultations were video-recorded before and after the introduction of a desk-top computer system into the practice. The recordings were analysed by detailed qualitative scrutiny of tape and transcripts (conversation analysis) to discover regular patterns of interaction. This analysis confirmed that the introduction of computers into the consultation had a significant impact on the communication between patient and doctor. In particular, we found that computer technology has had an impact on the practitioners' conduct and on the disclosure of information by the patient. The analysis also points to some recommendations both for training general practitioners in the use of computerized systems in the consultation, and for the (re)design of the technologies themselves.

Greenfield S, Kaplan S, et al.: Patients' participation in medical care: effects of blood sugar control and quality of life in diabetes. *Journal of General Internal Medicine*, 1988;3:448-457.

To maximize disease control, patients must participate effectively in their medical care. The authors developed an intervention designed to increase the involvement of patients in medical decision making. In a 20-minute session just before the regular visit to a physician, a clinic assistant reviewed the medical record of each experimental patient with him/her, guided by a diabetes algorithm. Using systematic prompts, the assistant encouraged patients to use the information gained to negotiate medical decisions with the doctor. A randomized trial was conducted in two university hospital clinics to compare this intervention with standard educational materials in sessions of equal length. The mean pre-intervention glycosylated hemoglobin (HbA_{1c}) values were 10.6 +/- 2.1% for 33 experimental patients and 10.3 +/- 2.0% for 26 controls. After the intervention the mean levels were 9.1 +/- 1.9% in the experimental group (p 0.01) and 10.6 +/- 2.22% for controls. Analysis of audiotapes of the visits to the physician showed the experimental patients were twice as effective as controls in eliciting information from the physician. Experimental patients reported significantly fewer function limitations. The authors conclude that the intervention is feasible and that it changes patient behavior, improves blood sugar control, and decreases functional limitations.

Haidet P, Paterniti DA: "Building" a history rather than "taking" one – a perspective on information sharing during the medical interview. *Archives of Internal Medicine*. 2003;163:1134-1140. See also Platt.

Patients and physicians enter the medical encounter with unique perspectives on the illness experience. These perspectives influence the way that information is shared during the initial phase of the interview. Previous research has demonstrated that patients who are able to fully share their perspective often achieve better outcomes. However, studies of patient-physician communication have shown that the patients' perspective is often lost. Researchers and educators have responded with calls for practitioners to adopt a "narrative-based medicine" approach to the medical interview. In this article, we review the literature on narrative-based medicine with an emphasis on information sharing during the medical interview. We suggest a framework of skills and attitudes that can act as a foundation for future work in educating practitioners and researching the medical interview.

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

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.

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 ≤ 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-clinician 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.: Assessing the effects of physician-patient interactions on the outcomes of chronic disease. *Medical Care*, 1989;27 (Suppl 3):S110-27.

Growing interest in the doctor-patient relationship focuses attention on the specific elements of that relationship that affect patients' health outcomes. Data are presented for four clinical trials conducted in

varied practice settings among chronically ill patients differing markedly in sociodemographic characteristics. These trials demonstrated that "better health" measured physiologically (blood pressure or blood sugar), behaviorally (functional status), or more subjectively (evaluations of overall health status) was consistently related to specific aspects of physician-patient communication. We conclude that the physician-patient relationship may be an important influence on patients' health outcomes and must be taken into account in light of current changes in the health care delivery system that may place this relationship at risk. Key words: physician, interaction with patient; patient, interaction with physician; chronic disease; health outcomes; satisfaction, patient; compliance, patient.

Lau F, Price M, Boyd J, Partridge C, Bell H, Raworth R: Impact of electronic medical record on physician practice in office settings: a systematic review. *BMC Medical Informatics and Decision Making*, 2012;12:10. Available at <http://www.biomedcentral.com/1472-6947/12/10>

BACKGROUND: Increased investments are being made for electronic medical records (EMRs) in Canada. There is a need to learn from earlier EMR studies on their impact on physician practice in office settings. To address this need, we conducted a systematic review to examine the impact of EMRs in the physician office, factors that influenced their success, and the lessons learned.

RESULTS: For this review we included publications cited in Medline and CINAHL between 2000 and 2009 on physician office EMRs. Studies were included if they evaluated the impact of EMR on physician practice in office settings. The Clinical Adoption Framework provided a conceptual scheme to make sense of the findings and allow for future comparison/alignment to other Canadian eHealth initiatives. In the final selection, we included 27 controlled and 16 descriptive studies. We examined six areas: prescribing support, disease management, clinical documentation, work practice, preventive care, and patient-physician interaction. Overall, 22/43 studies (51.2%) and 50/109 individual measures (45.9%) showed positive impacts, 18.6% studies and 18.3% measures had negative impacts, while the remaining had no effect. Forty-eight distinct factors were identified that influenced EMR success. Several lessons learned were repeated across studies: (a) having robust EMR features that support clinical use; (b) redesigning EMR-supported work practices for optimal fit; (c) demonstrating value for money; (d) having realistic expectations on implementation; and (e) engaging patients in the process.

CONCLUSIONS: Currently there is limited positive EMR impact in the physician office.

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

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.

Linder JA, Schnipper JL, Tsurikova R, Melnikas AJ, Volk LA, & Middleton B: Barriers to Electronic Health Record Use during Patient Visits. (a Division of General Medicine, Brigham and Women's Hospital, Boston). *AMIA Annu Symp Proc*, 2006:499-503.

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.

Linder JA, Ma J, Bates DW, Middleton B, & Stafford RS: Electronic Health Record Use and the Quality of Ambulatory Care in the United States. *Archives of Internal Medicine*, 2007 July 9;167(13)1400-1405.

BACKGROUND: Electronic health records (EHRs) have been proposed as a sustainable solution for improving the quality of medical care. We assessed the association between EHR use, as implemented, and the quality of ambulatory care in a nationally representative survey.

METHODS: We performed a retrospective, cross-sectional analysis of visits in the 2003 and 2004 National Ambulatory Medical Care Survey. We examined EHR use throughout the United States and the association of EHR use with 17 ambulatory quality indicators. Performance on quality indicators was defined as the percentage of applicable visits in which patients received recommended care.

RESULTS: Electronic health records were used in 18% (95% confidence interval [CI], 15%-22%) of the estimated 1.8 billion ambulatory visits (95% CI, 1.7-2.0 billion) in the United States in 2003 and 2004. For 14 of the 17 quality indicators, there was no significant difference in performance between visits with vs without EHR use. Categories of these indicators included medical management of common diseases, recommended antibiotic prescribing, preventive counseling, screening tests, and avoiding potentially inappropriate medication prescribing in elderly patients. For 2 quality indicators, visits to medical practices using EHRs had significantly better performance: avoiding benzodiazepine use for patients with depression (91% vs 84%; $P = .01$) and avoiding routine urinalysis during general medical examinations (94% vs 91%; $P = .003$). For 1 quality indicator, visits to practices using EHRs had significantly worse quality: statin prescribing to pts. with hypercholesterolemia (33% vs 47%; $P = .01$).

CONCLUSION: As implemented, EHRs were not associated with better quality ambulatory care. Patients in the United States receive about half of recommended medical care, and there have been widespread calls to improve health care quality. Health information technology (HIT) and, in particular, electronic health records (EHRs) have been touted as cost-effective, sustainable solutions for improving quality in medical care. Although some computer- and EHR-based decision support efforts to improve quality have been successful, others have not. A recent systematic review conducted for the Agency for Healthcare Research and Quality found that HIT systems, including EHRs, can increase the delivery of guideline-adherent care, improve quality of care through clinical monitoring, and reduce rates of medical errors. However, much of the research supporting these findings in the United States comes from 4 "benchmark" institutions with largely internally developed EHR systems. Other settings using other systems may not have achieved these quality improvement benefits. We sought to determine whether the use of EHRs, as presently implemented, was associated with higher quality ambulatory care throughout the United States.

Lovis C, Baud RH, Planche P: Power of expression in the electronic patient record: structured data or narrative text. *International Journal of Medical Informatics*. 2000;58-59:101-110.

This paper presents the authors' experience with the development and use of a document-centered electronic patient record (EPR) in a large teaching hospital. The development of the document-centered EPR began with the formulation of a set of critical hypotheses to facilitate both the continuation of the best medical practice and the implementation and use of the EPR. An alternate and more conventional approach—the data-centered EPR—is compared with the document-centered EPR. Various benefits and

pitfalls are discussed. Finally, the choice was to offer both solutions in a tightly linked system. The need for an EPR which combines the document and data centered approaches is a reflection of the more general discussion of what the medical record will be in the future. All too often, the need for structured data conflicts with the need for free texts and the power of expression. It is not easy to evaluate the consequences of this initial decision. However, changing the foundations of the EPR after its implementation is difficult and expensive. Therefore, the selection of the correct orientation in a given hospital requires a broad-based discussion.

Lowes R. Fear of Data Theft Blunts Public Acceptance of EHRs. *Medscape Medical News*, Aug 24, 2012. <http://www.medscape.com/viewarticle/769778>

ABSTRACT: Worries about the security of personal information continue to blunt public acceptance of electronic health record (EHR) systems now used by more than half of the nation's office-based physicians, according to a survey conducted by Harris Interactive for Xerox.

Sixty-three percent of Americans fear that a computer hacker will steal their personal data, down just 1 percentage point from 2010. Not much else in public opinion has changed over the last 2 years. Roughly half of Americans still say that they are concerned that their digitized health data could be lost, damaged, or corrupted. And one half continue to worry that a power outage or computer crash could prevent a physician from accessing their chart.

Overall, the percentage of Americans with some kind of EHR anxiety rose from 83% to 85% over this time frame, according to the survey, which was published last month.

Americans also have some positive things to say about EHRs. Sixty-eight percent expect the technology to improve the quality of the treatment they receive, and 60% believe EHRs will reduce the overall cost of care. However, when it comes to the rubber-meets-the-road question of "I want my medical records to be digital," only 26% of Americans say "yes," down a percentage point from 2010. In terms of a global assessment, only 40% agree that digital records mean better, more efficient care. That was the same response in 2010.

The survey conducted by Harris Interactive for Xerox is just one snapshot of public opinion, and other surveys suggest that patients view EHRs with more enthusiasm. A Harris Poll published in February — this one for the National Partnership for Women & Families — found that 75% of Americans whose medical records are paper ones want their physicians to digitize. Among those Americans whose physicians use EHRs, 73% say the software enhances the overall quality of service.

However, even this otherwise positive survey uncovered a deep strain of EHR-phobia. Almost 60% of Americans with digital charts predict that widespread adoption of the technology will lead to more personal information being stolen or lost, according to the survey conducted for the National Partnership for Women & Families. This belief also was held by 66% of Americans still in the paper-chart world.

Lown BA, & Rodriguez D: Lost in translation? How electronic health records structure communication, relationships and meaning. *Academic Medicine*, 2012;87:392-394.

The media through which we communicate shape how we think, how we act, and who we are. Electronic health records (EHRs) may promote more effective, efficient, coordinated, safer care. Research is emerging, but more is needed to assess the effect of EHRs on communication, relationships, patients' trust, adherence, and health outcomes. The authors posit that EHRs introduce a "third party" into exam room interactions that competes with the patient for clinicians' attention, affects clinicians' capacity to be fully present, and alters the nature of communication, relationships, and physicians' sense of professional role. Screen-driven communication inhibits patients' narratives and diminishes clinicians' responses to patients' cues about psychosocial issues and emotional concerns. Students, trainees, and clinicians can, however, learn to integrate EHRs into triadic exam room interactions to facilitate information sharing and shared decision making. Student exposure to EHRs is currently limited. Educators and researchers should implement curricula and assessment tools to help learners integrate EHRs into clinical interactions in ways that foster, rather than diminish, communication and relationships. Further, educators must prioritize the teaching and modeling of self-awareness and self-calibration, mindful presence, and compassion within such curricula to prevent these important qualities and skills from being lost in translation in the digital era.

Mador RL, Shaw NT, Cheetham S, & Reid RJ: Whose record is it anyway? Putting patients' interests at the heart of the implementation and use of electronic medical records. *Healthcare Quart*, 2008;11(4):90-92.

With the dawn of electronic medical records (EMRs) and patient portals, there is an unprecedented opportunity to provide truly collaborative patient-centred care. These tools can promote communication between healthcare providers and patients, improve chronic disease management and enable patients to become active members in the healthcare delivery system, but only if the tools work for everyone involved—including patients. Without patient consultation and input, there will be limitations in the ways in which physicians and patients are able to capitalize on these tools. Decision-makers must begin to enact their commitment to collaborative patient-centred care by engaging patients in discussions related to EMR design, implementation and use.

Makoul G, Curry RH, & Tang PC: The Use of Electronic Medical Records: Communication Patterns in Outpatient Encounters. *J Am Med Inform Assoc*, 2001;8:610–615.

OBJECTIVE: To assess physician–patient communication patterns associated with use of an electronic medical record (EMR) system in an outpatient setting and provide an empirical foundation for larger studies.

DESIGN: An exploratory, observational study involving analysis of videotaped physician–patient encounters, questionnaires, and medical-record reviews.

SETTING: General internal medicine practice at an academic medical center.

PARTICIPANTS: Three physicians who used an EMR system (EMR physicians) and three who used solely a paper record (control physicians). A total of 204 patient visits were included in the analysis (mean, 34 for each physician).

MAIN OUTCOME MEASURES: Content analysis of whether physicians accomplished communication tasks during encounters; qualitative analysis of how EMR physicians used the EMR and how control physicians used the paper chart.

RESULTS: Compared with the control physicians, EMR physicians adopted a more active role in clarifying information, encouraging questions, and ensuring completeness at the end of a visit. A trend suggested that EMR physicians might be less active than control physicians in three somewhat more patient-centered areas (outlining the patient's agenda, exploring psychosocial/emotional issues, discussing how health problems affect a patient's life). Physicians in both groups tended to direct their attention to the patient record during the initial portion of the encounter. The relatively fixed position of the computer limited the extent to which EMR physicians could physically orient themselves toward the patient. Although there was no statistically significant difference between the EMR and control physicians in terms of mean time across all visits, a difference did emerge for initial visits: Initial visits with EMR physicians took an average of 37.5 percent longer than those with control physicians.

SUMMARY: An EMR system may enhance the ability of physicians to complete information intensive tasks but can make it more difficult to focus attention on other aspects of patient communication. Further study involving a controlled, pre-/post-intervention design is justified.

Margalit RS, Roter D, Dunevant MA, Larson S, & Reis S: Electronic medical record use and physician-patient communication: An observational study of Israeli primary care encounters. *Patient Education and Counseling*, 2006;61:134-141.

OBJECTIVES: Within the context of medical care there is no greater reflection of the information revolution than the electronic medical record (EMR). Current estimates suggest that EMR use by Israeli physicians is now so high as to represent an almost fully immersed environment. This study examines the relationships between the extent of electronic medical record use and physician–patient communication within the context of Israeli primary care.

METHODS: Based on videotapes of 3 Israeli primary care physicians and 30 of their patients, the extent of computer use was measured as number of seconds gazing at the computer screen and 3 levels of active keyboarding. Communication dynamics were analyzed through the application of a new Hebrew translation and adaptation of the Roter Interaction Analysis System (RIAS).

RESULTS: Physicians spent close to one-quarter of visit time gazing at the computer screen, and in some cases as much as 42%; heavy keyboarding throughout the visit was evident in 24% of studied visits. Screen gaze and levels of keyboarding were both positively correlated with length of visit ($r = .51$, $p < .001$ and $F(2,27) = 2.83$, $p < .08$, respectively); however, keyboarding was inversely related to the amount of visit

dialogue contributed by the physician ($F(2,27) = 4.22, p < .02$) or the patient ($F(2,27) = 3.85, p < .05$). Specific effects of screen gaze were inhibition of physician engagement in psychosocial question asking ($r = -.39, p < .02$) and emotional responsiveness ($r = -.30, p < .10$), while keyboarding increased biomedical exchange, including more questions about therapeutic regimen ($F(2,27) = 4.78, p < .02$) and more patient education and counseling ($F(2,27) = 10.38, p < .001$), as well as increased patient disclosure of medical information to the physician ($F(2,27) = 3.40, p < .05$). A summary score reflecting overall patient-centered communication during the visit was negatively correlated with both screen gaze and keyboarding ($r = -.33, p < .08$ and $F(2,27) = 3.19, p < .06$, respectively).

DISCUSSION: The computer has become a 'third party' in the visit that demanded a significant portion of visit time. Gazing at the monitor was inversely related to physician engagement in psychosocial questioning and emotional responsiveness and to patient limited socio-emotional and psychosocial exchange during the visit. Keyboarding activity was inversely related to both physician and patient contribution to the medical dialogue. Patients may regard physicians' engrossment in the tasks of computing as disinterested or disengaged. Increase in visit length associated with EMR use may be attributed to keyboarding and computer gazing.

CONCLUSIONS: This study suggests that the way in which physicians use computers in the examination room can negatively affect patient centered practice by diminishing dialogue, particularly in the psychosocial and emotional realm. Screen gaze appears particularly disruptive to psychosocial inquiry and emotional responsiveness, suggesting that visual attentiveness to the monitor rather than eye contact with the patient may inhibit sensitive or full patient disclosure.

PRACTICAL IMPLICATIONS: We believe that training can help physicians optimize interpersonal and educationally effective use of the EMR. This training can assist physicians in overcoming the interpersonal distancing, both verbally and non-verbally, with which computer use is associated. Collaborative reading of the EMR can contribute to improved quality of care, enhance the decision-making process, and empower patients to participate in their own care.

McGrath JM, Arar NH, & Pugh JA. Health (Department of Communication, Trinity University, One Trinity Place San Antonio, TX 78212, USA. jmcgrath@trinity.edu). The influence of electronic medical record usage on nonverbal communication in the medical interview. *Informatics J*, 2007 Jun;13(2):105-18.

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.

Mishuris RG, Linder JA: Electronic health records and the increasing complexity of medical practice: "It never gets easier, you just go faster". *Journal of General Internal Medicine*. 2012;28(4):490-492.

Electronic health records (EHRs) continue to make physicians' lives more complicated. Through the EHR, physicians are being asked to take on ever more tasks that were previously done by office staff or are totally new to medical practice. Physicians maintain coded lists of diagnoses, medications, and allergies; enter orders; initiate referrals; fill out billing forms; fulfill quality reporting requirements; and do population management. With the Medicare and Medicaid EHR Incentive Program, better known as "meaningful use," physicians are required to do even more. Stage 2 of meaningful use requires physicians to maintain searchable notes, use clinical decision support, generate lists of patients for quality improvement and reporting, communicate electronically with other providers, exchange summary care records, and perform surveillance or public health reporting. ... Whether easier or not, EHRs will enable physicians to do more for their patients. Changes in EHRs, healthcare financing, and medical culture are going to continue interacting in complex ways. We will endure—perhaps even welcome—this complexity, and continually demand the best from our technology, financing, and culture by staying focused on delivering patient care that is of increasing value, safety, and quality.

Montague E, Asan O: Dynamic modeling of patient and physician eye gaze to understand the effects of electronic health records on doctor-patient communication and attention. *International Journal of Medical Informatics*. 2014;83:225-234.

OBJECTIVE: The aim of this study was to examine eye gaze patterns between patients and physicians while electronic health records were used to support patient care.

BACKGROUND: Eye gaze provides an indication of physician attention to patient, patient/physician interaction, and physician behaviors such as searching for information and documenting information.

METHODS: A field study was conducted where 100 patient visits were observed and video recorded in a primary care clinic. Videos were then coded for gaze behaviors where patients' and physicians' gaze at each other and artifacts such as electronic health records were coded using a pre-established objective coding scheme. Gaze data were then analyzed using lag sequential methods.

RESULTS: Results showed that there are several eye gaze patterns significantly dependent to each other. All doctor-initiated gaze patterns were followed by patient gaze patterns. Some patient-initiated gaze patterns were also followed by doctor gaze patterns significantly unlike the findings in previous studies. Health information technology appears to contribute to some of the new significant patterns that have emerged. Differences were also found in gaze patterns related to technology that differ from patterns identified in studies with paper charts. Several sequences related to patient-doctor-technology were also significant. Electronic health records affect the patient-physician eye contact dynamic differently than paper charts.

CONCLUSION: This study identified several patterns of patient-physician interaction with electronic health record systems. Consistent with previous studies, physician initiated gaze is an important driver of the interactions between patient and physician and patient and technology.

Morrow JB, Dobbie AE, Jenkins C, Long R, Mihalic A, & Wagner J: First-year Medical Students Can Demonstrate EHR-specific Communication Skills: A Control-group Study. *Family Medicine*, Jan 2009;41(1):28-33.

BACKGROUND AND OBJECTIVES: Graduating medical students will universally use electronic health records (EHRs), yet a June 2007 literature search revealed no descriptions of EHR-specific communication skills curricula in US medical schools. We designed and tested methods to teach first-year medical students to optimally integrate EHRs into physician-patient communication in ambulatory encounters.

METHODS: We randomly assigned 17 volunteer students to control (n=8) and intervention (n=9) groups. Both groups learned the mechanics of documenting patient histories using the EHR. Additionally, we taught the intervention group EHR-specific communications skills using guided discovery, brief didactics, and practice role plays. We compared both groups' general and EHR-specific communications skills using a standardized patient (SP) case.

RESULTS: Students receiving EHR communication skills training performed significantly better than controls in six of 10 EHR communication skills. In 10 of 11 general communication skills, there were no significant differences between groups.

CONCLUSIONS: First-year medical students can demonstrate EHR communication skills early in their medical training. However, in our setting, students did not spontaneously demonstrate EHR skills without instruction, and such skills did not correlate with general communication skills.

Noordman J, Verhaak P, van Beljouw I, & van Dulmen S: Consulting room computers and their effect on general practitioners-patient communication. *Family Practice*, July 2010;(27):644-651.

BACKGROUND: In the western medical world, computers form part of the standard equipment in the consulting rooms of most GPs. As the use of a computer requires time and attention from GPs, this may well interfere with the communication process. Yet, the information accessed on the computer may also enhance communication.

OBJECTIVES: The present study affords insight into the relationship between computer use and GP-patient communication recorded by the same GPs over two periods.

METHOD: Videotaped GP consultations collected in 2001 and 2008 were used to observe computer use and GP-patient communication. In addition, patients questionnaires about their experiences with communication by the GP were analysed using multilevel models with patients (Level 1) nested within GPs (Level 2).

RESULTS: Both in 2008 and in 2001, GPs used their computer in almost every consultation. Still, our study showed a change in computer use by the GPs over time. In addition, the results indicate that computer use is negatively related to some communication aspects: the patient-directed gaze of the GP and the amount of information given by GPs. There is also a negative association between computer use and the body posture of the GP. Computer use by GPs is not associated with other (analysed) non-verbal and verbal behaviour of GPs and patients. Moreover, computer use is scarcely related to patients' experiences with the communication behaviour of the GP.

CONCLUSIONS: GPs show greater reluctance to use computers in 2008 compared to 2001. Computer use can indeed affect the communication between GPs and patients. Therefore, GPs ought to remain aware of their computer use during consultations and at the same time keep the interaction with the patient alive.

O'Connor PJ, Sperl-Hillen JM, Johnson PE, Amundson GH, Asche SE, Ekstrom HL, Gilmer TP: Impact of electronic health record clinical decision support on diabetes care: a randomized trial. *Annals of Family Medicine*. 2011;9:12-21.

PURPOSE: We wanted to assess the impact of an electronic health record–based diabetes clinical decision support system on control of hemoglobin A1c (glycated hemoglobin), blood pressure, and low-density lipoprotein (LDL) cholesterol levels in adults with diabetes.

METHODS: We conducted a clinic-randomized trial conducted from October 2006 to May 2007 in Minnesota. Included were 11 clinics with 41 consenting primary care physicians and the physicians' 2,556 patients with diabetes. Patients were randomized either to receive or not to receive an electronic health record (EHR)–based clinical decision support system designed to improve care for those patients whose hemoglobin A1c, blood pressure, or LDL cholesterol levels were higher than goal at any office visit. Analysis used general and generalized linear mixed models with repeated time measurements to accommodate the nested data structure.

RESULTS: The intervention group physicians used the EHR-based decision support system at 62.6% of all office visits made by adults with diabetes. The intervention group diabetes patients had significantly better hemoglobin A1c (intervention effect -0.26% ; 95% confidence interval, -0.06% to -0.47% ; $P = .01$), and better maintenance of systolic blood pressure control (80.2% vs 75.1% , $P = .03$) and borderline better maintenance of diastolic blood pressure control (85.6% vs 81.7% , $P = .07$), but not improved low-density lipoprotein cholesterol levels ($P = .62$) than patients of physicians randomized to the control arm of the study. Among intervention group physicians, 94% were satisfied or very satisfied with the intervention, and moderate use of the support system persisted for more than 1 year after feedback and incentives to encourage its use were discontinued.

CONCLUSIONS: EHR-based diabetes clinical decision support significantly improved glucose control and some aspects of blood pressure control in adults with type 2 diabetes.

Patel VL, Arocha JF, & Kushniruk AW: Patients' and Physicians' Understanding of Health and Biomedical Concepts: Relationship to the Design of EMR Systems. *Journal of Biomedical Informatics*, Jan 2002,35:8-16.

OBJECTIVE: The aim of this paper is to examine knowledge organization and reasoning strategies involved in physician–patient communication and to consider how these are affected by the use of computer tools, in particular, electronic medical record (EMR) systems.

DESIGN: In the first part of the paper, we summarize results from a study in which patients were interviewed before their interactions with physicians and where physician–patient interactions were recorded and analyzed to evaluate patients' and physicians' understanding of the patient problem. We give a detailed presentation of one of such interaction, with characterizations of physician and patient models. In a second set of studies, the contents of both paper and EMRs were compared and in addition, physician–patient interactions (involving the use of EMR technology) were video recorded and analyzed to assess physicians' information gathering and knowledge organization for medical decision-making.

RESULTS: Physicians explained the patient problems in terms of causal pathophysiological knowledge underlying the disease (disease model), whereas patients explained them in terms of narrative structures of illness (illness model). The data-driven nature of the traditional physician–patient interaction allows physicians to capture the temporal flow of events and to document key aspects of the patients' narratives. Use of electronic medical records was found to influence the way patient data were gathered, resulting in information loss and disruption of temporal sequence of events in assessing patient problem.

CONCLUSIONS: The physician–patient interview allows physicians to capture crucial aspects of the patient's illness model, which are necessary for understanding the problem from the patients' perspective.

Use of computer-based patient record technology may lead to a loss of this relevant information. As a consequence, designers of such systems should take into account information relevant to the patient comprehension of medical problems, which will influence their compliance.

Peled JU, Sagher O, Morrow JB, & Dobbie AE. (2009) PLoS Med 6(5):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 online 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.

Medical schools and teaching hospitals sit today at an important crossroads. In the United States, the federal government and many third-party payors are demanding that we modernize medical-information systems and have given us an ambitious schedule to do so. Eager to comply with these mandates and anxious to avoid financial penalties, hospitals are implementing EHR systems on a large scale. The effects of this implementation on patient care have not been uniformly positive, and a number of reports of risk have already been published. Our experiences have led us to believe that the potential risk of EHRs to medical teaching may be just as significant and, if not addressed, could erode the education of an entire generation of physicians. On the other hand, if the EHR is used as a *tool* rather than an end unto itself, it will improve our education of young physicians as well as the care of our patients.

Pierce C, Trumble S, Arnold M, Dwan K, & Phillips C. Computers in the new consultation: within the first minute. *Family Practice*, 2008;25:202-208.

BACKGROUND: Computers are now commonplace in the general practice consultation in many countries and literature is beginning to appear that describes the effects of this presence on the doctor–patient relationship. Concepts such as patient centredness emphasize the importance of this relationship to patient outcomes, yet the presence of the computer has introduced another partner to that relationship.

OBJECTIVE: To describe the patient–doctor–computer relationship during the opening period of the consultation.

METHODS: Twenty GPs provided 141 consultations for direct observation, using digital video. Consultations were analysed according to Goffman’s dramaturgical methodology.

RESULTS: Openings could be described as doctor, patient or computer openings, according to the source of initial influence on the consultation. Specific behaviours can be described within those three categories.

CONCLUSIONS: The presence of the computer has changed the beginning of the consultation. Where once only two actors needed to perform their roles, now three interact in differing ways. Information comes from many sources, and behaviour responds accordingly. Future studies of the consultation need to take into account the impact of the computer in shaping how the consultation flows and the information needs of all participants.

Platt FW: Two collaborating artists produce a work of art – the medical interview. *Archives of Internal Medicine*. 2003;163:1131-1132. See also Haidet and Paterniti.

An implication of the phrase “taking a history” is that the doctor is performing an act of extraction similar to a dentist’s removing a tooth. Indeed, the process is often as brutal as it sounds, an assault of closed-ended questions punctuated briefly by faint yes and no answers from the patient, who becomes alienated, uncooperative, and dissatisfied as the process continues... While “taking a history” implies an aggressor acting on a victim, a taker, and a taken-from, “building” one allows for a joint effort between the doctor and the patient.

Reed M, Huang J, Graetz I, Brand R, Hsu J, Fireman B, Jaffe M. Outpatient Electronic Health Records and the Clinical Care and Outcomes of Patients with Diabetes Mellitus. *Ann Intern Med*, 2012;157(7):482-489.

The use of an outpatient electronic health record (EHR) system, rolled out across 17 medical centers, was associated with improvements in clinical outcomes and health care utilization in a study population of nearly 170,000 people with diabetes. Mary Reed, DrPH, a researcher at Kaiser Permanente Northern California in Oakland, and her colleagues found improvements in multiple clinical measures after EHR implementation, particularly among patients with less well-controlled glucose and lipid levels.

"[W]e found that EHR use was associated with improved rates of medication treatment intensification, follow-up monitoring, and glycemic and lipid control in patients with diabetes," the authors write in the October 2 issue of *Annals of Internal Medicine*.

This is the first study of a large outpatient diabetic population to assess the effect of a complete and certified EHR system. The federal government has established financial incentives, totaling \$29 billion, to encourage EHR uptake and "meaningful use," yet little longitudinal data are available regarding the clinical value of EHRs, according to the authors.

The researchers identified 169,711 patients in the Kaiser Permanente diabetes registry at the end of 2003. As Kaiser rolled out a commercially available EHR system (EpicCare, Epic Systems) between 2004 and 2009, 129,433 patients had 972,115 hemoglobin A1c (HbA1c) tests and another 151,838 had 1,095,991 low-density lipoprotein (LDL) cholesterol assays.

The EHR system was associated with treatment intensification among patients with elevated HbA1c levels. Participants with levels of 9% or greater experienced an increase in treatment intensification associated with EHR use (odds ratio [OR], 1.10 [95% confidence interval (CI), 1.05 to 1.15]), as did those with values of 7% to 8.9% (OR, 1.12 [CI, 1.06 to 1.18]). Both findings were statistically significant ($P < .001$) in a multivariate analysis adjusting for calendar month and year, medical center, and patient characteristics. In contrast, the researchers saw no change among patients with HbA1c values below 7% (OR, 0.98 [CI, 0.94 to 1.02]; $P = .29$).

EHR implementation was also associated with statistically significant treatment intensification for patients with LDL cholesterol values between 100 and 129 mg/dL (OR, 1.06 [CI, 1.00 to 1.12]; $P = .036$). However, there was no statistically significant change associated with EHR implementation among patients with LDL cholesterol values of 130 mg/dL or greater (OR, 0.97 [CI, 0.91 to 1.04]; $P = .46$). There was a statistically significant reduced likelihood of treatment intensification in patients with cholesterol values of 100 mg/dL or lower (OR, 0.88 [CI, 0.82 to 0.94]).

Three additional clinical benefits were associated with EHR implementation in multivariate analyses. A statistically increased likelihood of patients having a follow-up test within 1 year was observed for all patients ($P < .050$). At the same time, patients with an index test indicating good control were less likely to undergo retesting within 90 days ($P < .005$), potentially signaling more appropriate use of resources. In contrast, for patients with elevated HbA1c or LDL cholesterol levels, the EHR was associated with a faster rate of retesting overall ($P < .001$), compared with a period before EHR adoption.

"Overall, our study suggests that the EHR may be a powerful tool to help clinicians deliver well-targeted, high-quality chronic disease care and improve patient outcomes," the authors write.

The National Institute of Diabetes and Digestive and Kidney Diseases funded the study. One coauthor reports having served as a consultant for a project sponsored by the Agency for Healthcare Research and Quality. Another coauthor reports receiving consulting fees, honoraria, or other nongrant funds from the National Institute of Diabetes and Digestive and Kidney Diseases.

Reis S, Sagi D, Eisenberg O, et al: The impact of residents' training in Electronic Medical Record (EMR) use on their competence. *Patient Education and Counseling*. 2013;93:515-521.

OBJECTIVES: Even though Electronic Medical Records (EMRs) are increasingly used in healthcare organizations there is surprisingly little theoretical work or educational programs in this field. This study is aimed at comparing two training programs for doctor-patient-computer communication (DPCC).

METHODS: 36 Family Medicine Residents (FMRs) participated in this study. All FMRs went through twelve identical simulated encounters, six pre and six post training. The experiment group received simulation based training (SBT) while the control group received traditional lecture based training.

RESULTS: Performance, attitude and sense of competence of all FMRs improved, but no difference was found between the experiment and control groups. FMRs from the experiment group evaluated the contribution of the training phase higher than control group, and showed higher satisfaction.

CONCLUSION: We assume that the mere exposure to simulation served as a learning experience and enabled deliberate practice that was more powerful than training. Because DPCC is a new field, all participants in such studies, including instructors and raters, should receive basic training of DPCC skills.

Practice implication: Simulation enhances DPCC skills. Future studies of this kind should control the exposure to simulation prior to the training phase. Training and assessment of clinical communication should include EMR related skills.

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

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.

Rouf E, Chumley HS, & Dobbie AE. *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.

Rouf E, Whittle J, Lu N, & Schwartz MD: Computers in the Exam Room: Differences in Physician-Patient Interaction May Be Due to Physician Experience. *J Gen Int Med*, 22:1, January 9, 2007 (print and on-line).

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.

Ruusuvuori J: Looking means listening: coordinating displays of engagement in doctor-patient interaction. *Social Science and Medicine*. 2001;52:1093-1108.

This article studies the coordination of patients' production of their primary complaint and doctors' orientation to the patient on the one hand and to medical records on the other. In specific environments the doctor's shift of focus from interaction with the patient towards reading or writing the medical records is received by the patients as problematic. It is suggested that disengaging from interaction and engaging in studying the medical records may leave the patient puzzled about whether the doctor is listening or not. Thus, paying attention to the coordination and timing of these shifts in orientation may help the doctors to develop more patient-centered ways of interacting with the patient. Furthermore, studying the coordination of verbal and non-verbal aspects in medical interaction may complement the current ideas on the constituents of the ideal model of 'patient-centeredness' in medical interaction.

Shachak A, Hadas-Dayagi M, Ziv A, Reis S: Primary care physicians' use of electronic medical record system: a cognitive task analysis. *Journal of General Internal Medicine*. 2009;24(3):341-348.

OBJECTIVE: To describe physicians' patterns of using an Electronic Medical Record (EMR) system; to reveal the underlying cognitive elements involved in EMR use, possible resulting errors, and influences on patient-doctor communication; to gain insight into the role of expertise in incorporating EMRs into clinical practice in general and communicative behavior in particular.

DESIGN: Cognitive task analysis using semi-structured interviews and field observations.

PARTICIPANTS: Twenty-five primary care physicians from the northern district of the largest health maintenance organization (HMO) in Israel.

RESULTS: The comprehensiveness, organization, and readability of data in the EMR system reduced physicians' need to recall information from memory and the difficulty of reading handwriting. Physicians perceived EMR use as reducing the cognitive load associated with clinical tasks. Automaticity of EMR use contributed to efficiency, but sometimes resulted in errors, such as the selection of incorrect medication or the input of data into the wrong patient's chart. EMR use interfered with patient-doctor communication. The main strategy for overcoming this problem involved separating EMR use from time spent communicating with patients. Computer mastery and enhanced physicians' communication skills also helped.

CONCLUSIONS: There is a fine balance between the benefits and risks of EMR use. Automaticity, especially in combination with interruptions, emerged as the main cognitive factor contributing to errors. EMR use had a negative influence on communication, a problem that can be partially addressed by improving the spatial organization of physicians' offices and by enhancing physicians' computer and communication skills.

*Shachak A, & Reis S: The impact of electronic medical records on patient-doctor communication during consultation: a narrative literature review. *Journal of Evaluation in Clinical Practice*, 2009;15:641-649.

This paper provides an excellent review of several of the other papers in this bibliography.

RATIONALE, AIMS AND OBJECTIVE: The effect of Electronic Medical Record (EMR) use on Patient–Doctor Communication (PDC) has rarely been studied. As data accumulate, the purpose of this article is to review the literature on EMR effect on PDC, to identify recurring themes and to offer preliminary guidelines and future directions for medical education and research.

METHOD: A database search was conducted and 14 articles that met inclusion criteria (published in the past 10 years, empirical investigations, direct assessment of the EMR impact on patient–doctor communication) were selected for review. A qualitative, grounded theory-like approach was employed to analyze the data.

RESULTS: EMR use often has a positive impact on information exchange, but exerts a negative influence on patient centeredness. Some physician characteristics such as their computer skills and behavioural style assist in overcoming this negative influence.

CONCLUSION: The use of EMR exerts both positive and negative impacts on physician–patient relationships. The negative impacts can be overcome by some simple means as well as better designs of EMR systems and medical education interventions. Physicians’ everyday practices of integrating EMR use into the clinical encounter as well as better design of EMR systems and EMR and communication training may facilitate PDC in computerized settings.

Shield RR, Goldman RE, Anthony DA, Wang N, Doyle RJ, Borkan J: Gradual electronic health record implementation: new insights on physician and patient adaptation. *Ann Fam Med*, 2010;8:316-326.

PURPOSE: Although there is significant interest in implementation of electronic health records (EHRs), limited data have been published in the United States about how physicians, staff, and patients adapt to this implementation process. The purpose of this research was to examine the effects of EHR implementation, especially regarding physician–patient communication and behaviors and patients’ responses.

METHODS: We undertook a 22-month, triangulation design, mixed methods study of gradual EHR implementation in a residency-based family medicine outpatient center. Data collection included participant observation and time measurements of 170 clinical encounters, patient exit interviews, focus groups with nurses, nurse’s aides, and office staff, and unstructured observations and interviews with nursing staff and physicians. Analysis involved iterative immersion–crystallization discussion and searches for alternate hypotheses.

RESULTS: Patient trust in the physician and security in the physician–patient relationship appeared to override most patients’ concerns about information technology. Overall, staff concerns about potential deleterious consequences of HER implementation were dispelled, positive anticipated outcomes were realized, and unexpected benefits were found. Physicians appeared to become comfortable with the “third actor” in the room, and nursing and office staff resistance to HER implementation was ameliorated with improved work efficiencies. Unexpected advantages included just-in-time improvements and decreased physician time out of the examination room.

CONCLUSIONS: Strong patient trust in the physician–patient relationship was maintained and work flow improved with EHR implementation. Gradual HER implementation may help support the development of beneficial physician and staff adaptations, while maintaining positive patient–physician relationships and fostering the sharing of medical information.

Silverman J, Kinnersley P: Doctors’ non-verbal behaviour in consultations: look at the patient before you look at the computer. *British Journal of General Practice*. 2010;60(571):76-78.

Verbal communication in medical consultations is well recognised as being important to the delivery of medical care and is usually easy to interpret and analyse. It is discrete with clear endpoints, it occurs in a single mode, it is mostly under voluntary control, and communicates our cognitive thoughts more than our emotions. In contrast, nonverbal communication is less easy to interpret: it is continuous even in silence, can occur in several modes at once, operates at a less conscious level, leaks spontaneous cues, and is the channel most responsible for communicating attitudes, emotions, and affect. We should not be surprised, therefore, that non-verbal communication plays a significant role throughout the medical interview and is an important variable in doctor–patient interactions. Non-verbal communication helps to build the relationship, provides cues to underlying unspoken concerns and emotions, and helps to reinforce or contradict our verbal comments. Non-verbal communication is at its most significant in the medical interview if it contradicts the message from verbal communication. When the two are inconsistent or contradictory, non-verbal messages tend to override verbal messages.³ This explains why a closed question accompanied by effective nonverbal communication will often lead to an open answer, and why patients do

not necessarily believe a reassuring verbal comment if accompanied by contradictory facial expressions and vocal hesitancy. Two intimately related aspects of nonverbal communication in the interview require consideration: the non-verbal behaviour of patients and the non-verbal behaviour of doctors. As doctors, we need to recognise and explore patients' non-verbal cues in their speech patterns, facial expressions, and body posture. But we need to be equally aware of our own non-verbal behaviour: how the doctor's use of eye contact, body position and posture, movement, facial expression, and use of voice can all influence the success of the consultation.

Sinsky CA, Beasley JW: Texting while doctoring: a patient safety hazard. *Annals of Internal Medicine*. 2013;159:782-783.

Texting while driving is associated with a 23-fold increased risk for crashing and is illegal in most states. Using a cell phone while driving reduces the amount of brain activity devoted to driving by 37%. Multitasking is dangerous—cognitive scientists have shown that engaging in a secondary task disrupts primary task performance. Might physician typing into electronic health records pose similar risks? As when driving, physicians also need to be alert to environmental cues and unexpected turns. Multitasking can undermine the core activities of observation, communication, problem solving, and developing trusting relationships. Although it can be argued that texting is unrelated to the task of driving and that typing may be part of the patient care process, we believe the issue of distraction is nonetheless relevant, especially given the realities of information chaos during the encounter.

Stewart RF, Kroth PJ, Schuyler M, & Bailey R. *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: Are patients pleased with computer use in the examination room? *Journal of Family Practice*, 1995;41:241–4.

As computer hardware becomes less expensive and computer software more sophisticated and easy to use, more physicians are using computers to take notes and keep records. Although computer use offers many benefits, there is concern about whether the use of computers in the examination room will interfere with the patient-physician relationship. This experiment surveyed patient satisfaction following examination by either of two physicians, one using pen-and-pencil note-taking, the other taking notes on a computer.

METHODS: Sixty patients consented to participate in this prospective, randomized, crossover study. In the first phase, 15 randomly selected patients were examined by Physician A, who made a written record, and 15 by Physician B, who made a computer record. In the second phase, the physicians switched roles. After the

examination, patients completed a questionnaire to assess their degree of satisfaction.

RESULTS: There were no significant differences in satisfaction between the group whose physician made a handwritten record as compared with those whose physician used a computer, nor was there an interaction between type of note-taking and physician. There was also no correlation between patient satisfaction and previous patient exposure to and use of computers.

CONCLUSIONS: This study demonstrated no decrease in patient satisfaction when a computerized patient record was introduced.

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

OBJECTIVE: To review findings from studies of the influence of desktop computers on primary care consultations.

DESIGN: Systematic review of world reports from 1984 to 1994.

SETTING: The computerised catalogues of Medline, BIDS, and GPlit were searched, as well as conference proceedings, books, bibliographies, and references in books and journal articles.

SUBJECTS: 30 papers met the inclusion criteria and were included for detailed review.

INTERVENTIONS: A validated scheme for assessing methodological adequacy was used to score each paper.

MAIN OUTCOME MEASURES: Papers were rated on sample formation, baseline differences, unit of allocation, outcome measures, and follow up. Differences in outcomes were also recorded.

RESULTS: Four of the six papers dealing with the consultation process showed that consultations took longer. Doctor initiated and “medical” content of consultations increased at the expense of a reduction in patient initiated and “social” content. Each of the 21 studies which looked at clinician performance showed an improvement when a computer was used (from 8% to 50%, with better results for single preventive measures). Only one of the three studies looking at patient outcomes showed an improvement (diastolic blood pressure control 5 mm Hg better after one year, with fewer doctor-patient consultations).

CONCLUSIONS: Using a computer in the consultation may help improve clinician performance but may increase the length of the consultation. More studies are needed to assess the effects on patient outcomes of using a computer in consultations.

Thornton TH: The Exploration of the Patient-Family Doctor Relationship in the Context of EMR Use. Thesis submitted in partial fulfillment of the requirements for the degree of Master of Clinical Science in Family Medicine (MClSc). London, Ontario: Faculty of Graduate Studies, The University of Western Ontario, 2006.

AIMS: This thesis aimed to explore family physicians’ and patients’ perspectives and experiences of the patient-family doctor relationship when the Electronic Medical Record (EMR) was used during clinical encounters.

METHODS: Using qualitative methodologies, in-depth interviews of family physicians and focus group interviews of their patients were audio-taped and transcribed verbatim prior to independent and team coding. Iterative and interpretive analysis was conducted.

FINDINGS: The patient-family doctor relationship can be preserved in the presence of an EMR. Both patients and family physicians felt the EMR was external to their relationship, but essential to enhancing patient care and augmenting patient education. Physicians spoke of the EMR’s capacity to facilitate finding common ground, which promoted effective communication. Physicians employed behavioural strategies to overcome EMR barriers in order to maintain their relationship with patients.

CONCLUSIONS: Patients and family physicians endorsed EMR use. The EMR was external to the patient-family doctor relationship, and its value resided in its capacity to improve patient care and augment patient education. In essence, the EMR enhanced the patient-doctor relationship through these means.

Toll E: The cost of technology. *JAMA*. 2012;307(23):2497-2498.

The article begins with a colorful drawing by a 7-year-old girl of her visit to the doctor. It shows her sitting on the exam table and her mom holding her baby sister and her older sister sitting on a chair. In the corner is the physician, back to all of them, busy typing on the EMR. The article describes how unskilled use of the EMR and inappropriate placement of the monitor will interfere with effective communication between patient and physician.

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). Clinician style and examination room computers: a video ethnography. *Fam Med*, 2005 Apr;37(4):276-81.

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.

Ventres W, Kooienga S, Vuckovic N, Marlin R, Nygren P, & Stewart V: Physicians, Patients and Electronic Health Record: An Ethnographic Analysis. *Annals of Family Medicine*, 2006 Mar-Apr; 4(2):124-131.

PURPOSE: Little is known about the effects of the electronic health record (EHR) on physician-patient encounters. The objectives of this study were to identify the factors that influence the manner by which physicians use the EHR with patients.

METHODS: This ethnographic study included 4 qualitative components: 80 hours of participant observation in 4 primary care offices in the Pacific Northwest; individual interviews with 52 patients, 12 office staff members, 23 physicians, and 1 nurse-practitioner; videotaped reviews of 29 clinical encounters; and 5 focus-group interviews with physicians and computer advocates. The main outcome measures were factors that influence how physicians use the EHR. Researchers qualitatively derived these factors through serial reviews of data.

RESULTS: This study identified 14 factors that influence how EHRs are used and perceived in medical practice today. These factors were categorized into 4 thematic domains: (1) spatial—effect of the physical presence and location of EHRs on interactions between physicians and patients; (2) relational—perceptions of physicians and patients about the EHR and how those perceptions affected its use; (3) educational—issues of developing physicians' proficiency with and improving patients' understandings about EHR use; and (4) structural—institutional and technological forces that influence how physicians perceived their use of EHR.

CONCLUSIONS: This study found that the introduction of EHRs into practice influences multiple cognitive and social dimensions of the clinical encounter. It brings into focus important questions that through further inquiry can determine how to make best use of the EHR to enhance therapeutic relationships.

Ventres WB, Frankel RM: Patient-centered care and electronic health records: it's still about the relationship. *Family Medicine*. 2010;42(5):364-366.

Two of the most important developments in ambulatory practice over the past 20 years are the advent of patient and relationship-centered care (PRCC) and electronic health records (EHRs). However, there is a large gap in knowledge and practice between PRCC and EHR use. We believe the integration of PRCC with EHRs has the potential to personalize care, improve population-based care, and increase patient involvement. To accomplish this, advanced practitioners from both computer- and communication-centric disciplines must work together to establish systems that work synergistically. Research examining how outstanding clinicians use EHRs is essential to establish best practice models of use. As well, clinicians must examine how they use EHRs in their communication with patients, become aware of when the EHR hinders the human connection and when it enhances it, and develop a repertoire for using it simultaneously with PRCC.

Ventres W: Electronic health records: upsides, downsides, and inside-outsides on the way toward their use in clinical practice. *Teaching and Learning in Medicine*. 2013;25(4):366-368.

BACKGROUND: The author reviews his personal history learning to use Electronic Health Records (EHRs) and examination room computers. He asks key questions that pertain to the use of EHRs in practice and discusses the current state of knowledge regarding EHRs and doctor–patient communication.

SUMMARY: He notes that—regardless of the ubiquity of computers in our society and the recognition that they are a part of current medical practice—one cannot just plop down a computer in the examination room, click “on,” and anticipate that communication between doctors and patients will flow smoothly.

CONCLUSIONS: He recommends the accompanying article by Duke, Frankel, and Reis (see p. 358 in this issue) as an excellent step-by-step guide for framing how to teach the basics of EHR use in clinical practice.

Wald HS, George P, Reis SP, Taylor JS: Electronic health record training in undergraduate medical education: bridging theory to practice with curricula for empowering patient- and relationship- centered care in the computerized setting. *Academic Medicine*. 2014;89(3):first published online.

While electronic health record (EHR) use is becoming state-of-the-art, deliberate teaching of health care information technology (HCIT) competencies is not keeping pace with burgeoning use. Medical students require training to become skilled users of HCIT, but formal pedagogy within undergraduate medical education (UME) is sparse. How can medical educators best meet the needs of learners while integrating EHRs into medical education and practice? How can they help learners preserve and foster effective communication skills within the computerized setting? In general, how can UME curricula be devised for skilled use of EHRs to enhance rather than hinder provision of effective, humanistic health care? Within this Perspective, the authors build on recent publications that “set the stage” for next steps: EHR curricula innovation and implementation as concrete embodiments of theoretical underpinnings. They elaborate on previous calls for maximizing benefits and minimizing risks of EHR use with sufficient focus on physician–patient communication skills and for developing core competencies within medical education. The authors describe bridging theory into practice with systematic longitudinal curriculum development for EHR training in UME at their institution, informed by Kern and colleagues’ curriculum development framework, narrative medicine, and reflective practice. They consider this innovation within a broader perspective—the overarching goal of empowering undergraduate medical students’ patient and relationship-centered skills while effectively demonstrating HCIT-related skills.

Walker J, Leveille SG, Ngo L, Vodicka E, Darer JD, Dhanireddy S, et al: Inviting patients to read their doctors’ notes: patients and doctors look ahead. Patient and Physician Surveys. *Annals of Internal Medicine*. 2011;155:811-819. See also Delbanco.

BACKGROUND: Little is known about what primary care physicians (PCPs) and patients would expect if patients were invited to read their doctors’ office notes.

OBJECTIVE: To explore attitudes toward potential benefits or harms if PCPs offered patients ready access to visit notes.

DESIGN: The PCPs and patients completed surveys before joining a voluntary program that provided electronic links to doctors’ notes.

SETTING: Primary care practices in 3 U.S. states.

PARTICIPANTS: Participating and nonparticipating PCPs and adult patients at primary care practices in Massachusetts, Pennsylvania, and Washington.

MEASUREMENTS: Doctors’ and patients’ attitudes toward and expectations of open visit notes, their ideas about the potential benefits and risks, and demographic characteristics.

RESULTS: 110 of 114 participating PCPs (96%), 63 of 140 nonparticipating PCPs (45%), and 37 856 of 90 203 patients (42%) completed surveys. Overall, 69% to 81% of participating PCPs across the 3 sites and 92% to 97% of patients thought open visit notes were a good idea, compared with 16% to 33% of nonparticipating PCPs. Similarly, participating PCPs and patients generally agreed with statements about potential benefits of open visit notes, whereas nonparticipating PCPs were less likely to agree. Among participating PCPs, 74% to 92% anticipated improved communication and patient education, in contrast to 45% to 67% of nonparticipating PCPs. More than one half of participating PCPs (50% to 58%) and most nonparticipating PCPs (88% to 92%) expected that open visit notes would result in greater worry among patients; far fewer patients concurred (12% to 16%). Thirty-six percent to 50% of participating PCPs and 83% to 84% of nonparticipating PCPs anticipated more patient questions between visits. Few PCPs (0% to

33%) anticipated increased risk for lawsuits. Patient enthusiasm extended across age, education, and health status, and 22% anticipated sharing visit notes with others, including other doctors.

LIMITATIONS: Access to electronic patient portals is not widespread, and participation was limited to patients using such portals. Response rates were higher among participating PCPs than nonparticipating PCPs; many participating PCPs had small patient panels.

CONCLUSION: Among PCPs, opinions about open visit notes varied widely in terms of predicting the effect on their practices and benefits for patients. In contrast, patients expressed considerable enthusiasm and few fears, anticipating both improved understanding and more involvement in care. Sharing visit notes has broad implications for quality of care, privacy, and shared accountability.

Walker J, Ahern DK, Le LX, Delbanco T: Insights for internists: “I want the computer to know who I am”. *Journal of General Internal Medicine*. 2009;24(6):727-732.

BACKGROUND: In designing electronic personal health records (PHRs) and related health technologies, lay perspectives are rarely solicited, and we know little about what individuals want and need.

OBJECTIVE: To learn how diverse, primarily lay individuals envision how PHRs and other emerging and future electronic technologies could enhance their care.

DESIGN: Qualitative study of eight focus groups with adult consumers, patients, and health professionals.

PARTICIPANTS: Eighty-two adult frequent Internet users who expressed interest in health-related matters and represented diverse populations and a broad demographic range.

MEASUREMENTS: Focus group transcripts were analyzed qualitatively, using behavioral and grounded theory, employing an immersion/crystallization approach.

MAIN RESULTS: Individuals expect technology to transform their interactions with the health-care system. Participants want computers to bring them customized health information and advice: “I want the computer to know who I am.” They desire unfettered access to their health record: “I don’t know if I want to read [my entire record], but I want to have it.” They expect home monitors and other technologies will communicate with clinicians, increasing efficiency and quality of life for patients and providers. Finally, especially for the chronically and acutely ill, privacy is of far less concern to patients than to health professionals.

CONCLUSIONS: Focus group participants have dynamic ideas about how information and related technologies could improve personal health management. Their perspectives, largely absent from the medical literature, provide insights that health professionals may lack. Including a diverse array of individuals throughout the process of designing new technologies will strengthen and shape their evolution.

White A, Danis M: Enhancing patient-centered communication and collaboration by using the electronic health record in the examination room. *JAMA*. 2013;309(22):2327-2328.

The authors describe how sharing the EHR between patient and physician can enhance the patient’s involvement in decisions regarding their care as well as improving the relationship between them. “Introducing the EHR with a verbal explanation and patient-centered body language, by positioning the screen as a bridge rather than a divider, could enhance the relationship and jumpstart the process of activation. Dialogue is an important component of this process: “If you don’t mind, I am going to be typing as you speak. I’m happy to show you what I’m writing”; “I’m going to look up your test results, would you like to look at them together?”; “Let’s look at the trends in your blood pressure readings”; “Now that we’ve seen how you’re doing, let’s talk about how you can continue to improve . . .” These verbal and nonverbal cues could potentiate collaboration by facilitating a joint assessment of the patient’s current health status and highlighting opportunities for active patient involvement.”