Clinician Style and Examination Room Computers: A Video Ethnography

William Ventres, MD, MA; Sarah Kooienga, FNP; Ryan Marlin; Nancy Vuckovic, PhD; Valerie Stewart, PhD

Background and Objectives: The use of computers in medical examination rooms is growing. Advocates of this technology suggest that all family physicians should have and use examination room computers (ERCs) within the near future. This study explored how family physicians incorporate the use of ERCs in their interactions with patients. Methods: This qualitative study involved five family physicians, one family nurse practitioner, and a convenience sample of 29 patients. Data included videotaped visits, clinician interviews, and videotape reviews. The setting was an urban family practice with a 7-year history of viewing electronic medical records. The main outcome measures were themes emergent from videotaped data. Results: We identified three distinct practice styles that shaped the use of the ERC: informational, interpersonal, and managerial styles. Clinicians with an informational style are guided by their attention to gathering data as prompted by the computer screen. Clinicians with an interpersonal style focus their attention and body language on patients. Clinicians with a managerial style bridge informational and interpersonal styles by alternating their attention in defined intervals between patients and the computer. Conclusions: Family physicians have varying practice styles that affect the way they use examination room computers during visits with patients.

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The use of computers in medical examination rooms is growing. This technology has rapidly become a standard of care for general practitioners in many countries, especially in Europe.\(^1\)\(^2\) In the United States, while examination room computers (ERCs) still remain relatively uncommon,\(^3\) their use is being promoted as a way to reinvigorate primary care practice and reduce medical errors.\(^4\)\(^5\) Institutional advocates of this technology suggest that all family physicians should have and use ERCs within the near future as evidenced by the Future of Family Medicine Project’s recent recommendations.\(^6\)

The easily quantifiable advantages and disadvantages of computerized medical records have already been well established and summarized elsewhere.\(^7\)\(^8\) Few studies, however, have examined how ERCs affect the real-time progress of the clinical visit.\(^9\)\(^13\) These few studies note that physicians using ERCs preferentially structure interviews around data-gathering demands rather than patients’ own narratives.\(^14\) Physicians using ERCs actively clarify clinical information, encourage medically related questions, and ensure completeness at the end of visits. At the same time, they also neglect outlining patients’ agendas, exploring psychosocial and emotional issues, and discussing how health problems affect patients’ lives.\(^13\) As well, physicians using ERCs engage in a variety of computer-related behaviors that patients find confusing.\(^9\)\(^11\) The influence ERCs have on the physician-patient relationship remains unclear.

Our study was initiated following discussions by family physicians in one office setting about how they used ERCs in their visits with patients and what they might learn from studying the practice habits of others. Thus, our descriptive study explored how family physicians incorporated ERCs in their interactions with patients. We used ethnography to study the meaning of physician and patient interactions in relation to the use of ERCs.\(^15\)\(^16\)
Methods

Ethnography is a research process by which investigators observe what people do; investigate what people say they think, believe, and do; and then interpret what people actually think and believe, relative to what they do.17 To explore the real-time effect of ERCs and the visual cues and expressions that form the subtext for physician-patient communication, videotaping was the core component of this study.18

Setting

We conducted our study in an urban family practice in a large city in the Northwest United States. The practice opened in 1997 with a mixed system of electronic and paper medical records. This system became fully electronic in 2000. Three examination rooms were equipped with ceiling-mounted videotape cameras that captured all visual and audio aspects of clinician-patient interactions.

Each examination room had a flat-screen computer monitor mounted to a metal articulated arm, allowing clinicians the ability to easily turn the screen, adjust its height, and move it around a 270° arc within a radius of 1 meter. From any such ERC, clinicians had access to an electronic medical record system, handouts for patient education, and Internet reference databases. Notes were entered using both free-text typing and guided point-and-click forms. Printers were located at nurses’ desks within 10 meters of every examination room.

Data Collection

We videotaped a total of 29 clinical visits, four to five per clinician studied, over a 6-week period in the fall of 2003. These visits were chosen by convenience sampling, based on three factors: SK’s presence as a researcher in the office 2 to 3 days a week; the availability of videotaping equipment, located in three of the office’s 15 examination rooms; and the medical assistants’ random selection of individual patients based on clinic flow. Informed consent was obtained from clinicians prior to beginning the study. Patients gave written consent prior to clinicians entering examination rooms. Foreign language-speaking patients (comprising approximately 30% of the practice’s patient base) were excluded from participation to eliminate the confounding influences of language barriers and the presence of interpreters.

From a remote screen viewed contemporaneously with each videotaped visit, SK logged clinician-patient interactions using a simple assessment instrument (Appendix 1).

This instrument divided visits into distinct functional sections (introduction, orientation, subjective, diagnostic thinking, presentation/plan, conclusions/wrap-up). The instrument guided researchers to note whether clinicians were using the ERC during each of those sections. It prompted both qualitative and quantitative comments about clinician and patient behavior over the course of the visit and summary impressions of ERC use. Following each series of videotaped visits, SK conducted open-ended interviews lasting from 30 minutes to 1 hour in duration with every clinician. The interview questions were designed to inquire about the general advantages and disadvantages of ERCs, the influence of ERCs on clinician-patient behavior, and the role that clinician style played on ERC use. Four example questions are listed in Appendix 2.

After completion of all videotaping, clinicians each reviewed the one videotaped visit deemed by SK and RM to be most representative of their style. They were asked to free write, reflecting on what they liked about their observed interaction with the patient, what they would have changed, and whether they were surprised by anything in the interaction. They also marked their self-perceived skill level using ERCs on a Likert scale.

Each of these data collection steps was conducted as part of a larger ethnographic study.

Data Analysis

The researchers below, all with at least Master’s-level training in qualitative research, conducted the following analysis of data. First, RM independently reviewed each of the 29 videotaped clinician-patient visits using the same assessment form that tracked behaviors across the flow of the visit. Second, SK and RM independently noted characteristic practice behaviors and recorded themes emergent from the data. They used no predefined model or specific set of characteristics to guide their interpretations.

Subsequently, WV, SK, and RM jointly reviewed six videotaped visits, one for each clinician studied, mutually chosen by SK and RM as most representative of each clinician’s behavior. WV, SK, and RM also reviewed and discussed the themes together to reach consensus about interpretations. Disagreements about interpretations were settled by group consensus, with the shared understanding that in such a study there needed to be some flexibility in categorizing clinicians’ behaviors.

WV and SK reviewed notes and transcripts of the interviews with clinicians, as well as the answers to the video review questionnaire, identifying and recording information that would either confirm or refute the above data and interpretations. Finally, a medical anthropologist (NV) reviewed the results of the investigation in serial meetings with the above researchers. The purpose of these meetings was to examine the consensus decision making about data interpretations, further probe into layers of meaning about the data obtained, and explore outlying interpretations.

A variety of qualitative techniques were used to enhance both the trustworthiness and rigor of the results.19-22 These techniques are described in Table 1.
Ethical Approval

This project was reviewed by and received human subjects approval from the Institutional Review Board of the Providence Health System of Oregon.

Results

Analysis of these 29 encounters revealed that clinicians’ individual practice styles shaped how they used the computer. We identified three distinct types of clinician practice styles related to ERC use: informational, interpersonal, and managerial. All clinicians studied exhibited elements of each style but tended toward a pattern most indicative of one of the three. Thus, the styles described are generalizations of patterns rather than complete pictures of any one individual practice behavior. The characteristics of participants are summarized in Table 2.

Informational Style

Clinicians with an informational style were guided by their attention to gathering information as prompted by the computer screen. Even their patient-focused interactions concentrated on information gathering or relaying information. The major part of these visits occurred with the clinicians positioned at the computer, taking patients’ histories, reviewing records, or prescribing medications. The clinicians rarely turned the screen to show it to patients but rather asked verification questions of patients about information read from the screen. There were frequent periods of silence during which the clinicians reviewed patient records on the screen or asked questions without averting their gaze from the ERC.

Clinicians with an informational style used a problem-oriented focus toward the reasons for visits. There

<table>
<thead>
<tr>
<th>Technique</th>
<th>Brief Description of Purpose</th>
<th>Applications in This Study</th>
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<tbody>
<tr>
<td>Triangulation</td>
<td>Data is analyzed from multiple perspectives.</td>
<td>• The researchers analyzed videotaped data independently.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clinician interviews were used to confirm or refute interpretations.</td>
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<tr>
<td></td>
<td></td>
<td>• A medical anthropologist reviewed results.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The clinicians studied each analyzed one videotaped visit exemplifying his/her practice style.</td>
</tr>
<tr>
<td>Data concurrence</td>
<td>Researchers reach a collective understanding of data and analysis.</td>
<td>• The researchers engaged in intensive analysis of videotaped data in group sessions.</td>
</tr>
<tr>
<td>Data saturation</td>
<td>Information is collected until themes are clarified and no new significant themes are elicited.</td>
<td>• The videotaped visits were determined through sufficient repetition to define clinician style adequately.</td>
</tr>
<tr>
<td>Thick description</td>
<td>Thematic results are developed through intense scrutiny of data from a natural environment. These results are communicated richly to involve the reader.</td>
<td>• A small number of clinician-patient visits were analyzed intensively.</td>
</tr>
<tr>
<td></td>
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<td>• The results described narrative accounts of varying practice styles.</td>
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</table>
the screen to review records in collaboration with patients. Overall, these clinician followed a more seamless flow directed by patients’ needs with few discreet intervals of task-oriented activities.

**Managerial Style**

A managerial style bridged informational and interpersonal styles. Clinicians with this style alternated their attention in defined intervals between patients and the computer to balance the needs for information gathering and establishing rapport with the patient. At some times, these dueling foci interrupted the flow of visits; at other moments, they helped clinicians focus on pertinent issues and summarize particular care issues efficiently.

The distinct intervals included brief personal greetings, computer-focused documentation of patients’ recent histories, patient-focused physical examinations, face-to-face discussions of care, post-physical examination documentation, and, finally, brief summaries punctuated by clinicians leaving the room to retrieve educational handouts or prescriptions. Throughout these stages, clinicians used the computer to document histories, review records, change topics, and bring visits to a close. In essence, these clinicians managed the temporal, informational, and interpersonal aspects of the visit around the ERC.

When managerially oriented clinicians focused on patients, they used a conversational tone. However, while at the computer, these clinicians were guided by information they typed into the ERC. Their gaze and body language then focused on the computer, and they delayed responses to patients’ questions until finished typing or looking at the screen. Managerial clinicians usually turned away from the computer if their patients began discussions that appeared important. Often the end of these interludes was signaled by clinicians’ returning to the ERC to enter data.

Clinicians with a managerial style generally did not use the mobility of the computer unless it facilitated computer use (rather than to orient themselves or the screen to face patients). They faced away from or perpendicular to patients while in front of the computer. They focused their gaze on the screen while making frequent brief glances at patients.

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<tr>
<td><strong>Summary of Clinician and Patient Characteristics</strong></td>
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</table>

**Clinicians**

- Professional status: Five family physicians, one family nurse practitioner
- Age range (years): 36–48
- Years post training: 6–18
- Years experience with ERCs: 2–6
- Self-reported ERC skill level: All average, above average, or excellent

**Patients (all established)**

- Age range (years): 9–94
- Gender: 11 male (38%), 18 female (62%)
- Presenting problem: 16 urgent (56%), 13 chronic (44%)

**Electronic medical record system**

- Logician®—Windows based

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<th>Table 3</th>
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<tr>
<td><strong>Clinician Styles and ERC-related Behaviors</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Clinician Style</th>
<th>Utilizes ERC Mobility</th>
<th>Faces Patient While at ERC</th>
<th>Frequently Talks While Gazing at ERC</th>
<th>ERC Guides Topic Changes</th>
<th>ERC Guides Questions</th>
<th>Documents During Visit</th>
<th>ERC Reviews Screen While ERC Guides Topics</th>
<th>ERC Reviews During Screen With Patient</th>
<th>ERC Reviews Records at ERC</th>
<th>Time Spent Looking at ERC*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<td>42.9</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>36.9</td>
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<tr>
<td>Managerial</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>30.5</td>
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<tr>
<td>Interpersonal</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>28.9**</td>
</tr>
<tr>
<td>Interpersonal</td>
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<td>+</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>24.4</td>
</tr>
<tr>
<td>Interpersonal</td>
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<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>23.1**</td>
</tr>
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</table>

Legend: +—yes, blank—no

* Percentage of visit, averaged over each clinician’s four–five studied visits. Includes time conducting physical examination; excludes time retrieving prescriptions from printer.

** Includes time viewing ERC with patient

ERC—examination room computer
They conducted a patient-centered interview. That clinicians focused on the computer the more attended to strict medical data gathering; the less that clinicians used the computer, the more they between clinicians and patients. First, the more or environmental obstacles in relationships been specific ways in which ERCs can be useful tools visits.

Determining involvement of the ERC in patient clinicians’ practice styles. Clinician styles deter- mined to their practice style. They were often surprised by the time they spend looking at the ERC and how little they engaged the patient while viewing the ERC. Last, the ERC in general was viewed as a tool for enhanc- ing patient management first and for developing the physician-patient relationship a distant second.

**Clinic Review**

Three statements can be made based on clinicians’ interviews and comments on their videotape review. The clinicians confirmed that their behaviors with pa- tients and their corresponding use of the ERC con-formed to their practice style. They were often surprised by the time they spend looking at the ERC and how little they engaged the patient while viewing the ERC. Last, the ERC in general was viewed as a tool for enhancing patient management first and for developing the physician-patient relationship a distant second.

**Discussion**

Multiple factors influence the ways in which clinicians use ERCs. Our observations revealed, however, that ERC use had less of an effect on clinician-patient interactions than did clinicians’ practice styles. Clinician styles determined involvement of the ERC in patient visits.

Our observations elicited and confirmed specific ways in which ERCs can be useful tools or environmental obstacles in relationships between clinicians and patients. First, the more that clinicians used the computer, the more they attended to strict medical data gathering; the less that clinicians focused on the computer the more they conducted a patient-centered interview. Second, most clinicians adopted patterns of behaviors in which their computer use delineated the visit into distinct stages. All but one of our studied clinicians focused on the computer for the first half of their visits with patients. Third, body language and computer positioning strongly reflected the clinician’s practice style.

These results, in one sense, are not unexpected. The extant literature on physician-patient communication shows that office visits without ERC use commonly fall into one of several characteristic patterns, from high physician control to person focused (Table 4). Our study supports these models. We were, however, sur- prised by the extent to which clinician style determined ERC use over a wide variety of behaviors, including time spent looking at the patient, collaborative use of the ERC screen, and types of questions posed.

**Limitations**

Our study was conducted in one family practice office. While the clinicians working there showed a significant diversity of behaviors related to ERC use, these behaviors do not represent all possible practice styles. Further, our setting might not be representative of all generalist offices, and key factors (such as the mobil- ity of the ERC) might not be relevant elsewhere. We believe that further exploration of patient perspectives on these videotaped visits might have enriched our inter- pretations. Further research on clinician thought processes and patient attitudes would also be helpful in understanding and interpreting the data of this study.

**Conclusions**

Family physicians have varying practice styles, and the way they use the ERC conforms to their own style. ERC use may emphasize skills or deficits in ways that affect their communication with patients.

Given that examination room computers are a reality of current medical practice, we propose that more attention be paid to reflecting on how we integrate our styles of practice with the use of this technology. To

### Table 4

<table>
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<tr>
<th>Spectrum of Clinician-Patient Communication Styles and ERC Use</th>
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<tr>
<td><strong>Previous Literature</strong></td>
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<tr>
<td><strong>ERC Related</strong></td>
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<td><strong>ERC</strong></td>
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ensure that computers are used in ways that best fit the social, emotional, and medical needs of patients, we should further attend to understanding and refining use of ERCs in context of physician-patient communication.

Acknowledgments: Financial support was received from the Joint American Academy of Family Physicians (AAFP) Foundation/AAFP Grant Awards Program and the Center for Outcomes Research and Education, Providence Health System of Oregon.

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REFERENCES


Appendix 1

Assessment Instrument for Videotaped Encounters

<table>
<thead>
<tr>
<th>Computer/No computer</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Section 1: Introduction</td>
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<tr>
<td>Orientation</td>
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<td>Subjective</td>
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<td>Diagnostic thinking</td>
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<td>Prescriptions/plans</td>
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<tr>
<td>Conclusion/wrap-up</td>
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<td>Impressions</td>
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Appendix 2

Clinician Interviews—Example Questions

- What seems to “work” or “not work” about ERCs?
- How does the ERC affect your communication with your patients?
- In what ways does it enhance communication?
- In what ways does it restrict communication?
- What advice do you have for other clinicians implementing ERCs in their practices?
- Can you offer some illustrative examples related to the above?