

Viewpoint Paper ■

e-Prescribing, Efficiency, Quality: Lessons from the Computerization of UK Family Practice

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Abstract Nearly all general practice physicians (GPs) in the United Kingdom (UK) have electronic health record (EHR) systems in their practices compared with perhaps 15% of primary care physicians in the United States (U.S.). Based on interviews of 13 general GPs and review of current literature, the authors argue that the historical experience of widespread electronic health record uptake in the UK provides insight into features that might motivate broad adoption in the United States. These features include electronic prescribing, improved quality and consistency of care, practice efficiencies that have both timesaving and revenue generating effects, and potential shielding from malpractice claims.

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Introduction

The health care systems in the United States (U.S.) and the United Kingdom (UK) differ markedly in organization and financing. Yet similarities in primary care practice, clinical information needs, and physicians' personal and professional requirements might outweigh the larger-scale differences in organization and payment for care between the two countries, when physicians make choices about which tools they need to improve practice efficiency and effectiveness. In this viewpoint, we report a small qualitative investigation

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into electronic health record (EHR) use in general practitioners' (GP) offices in the United Kingdom in 2005, addressing the question of why nearly all GPs there use EHRs routinely. These observations suggested features and advantages which might be highly valued by primary care doctors in the United States as part of a broader effort to encourage EHR uptake in this country.

EHRs have existed in the United States since the 1970s, but actual use in primary care remains low. Thompson and Brailer report that EHR use in 2002 may have been between 14% and 28%.¹ Kaushal and colleagues estimated that 9% of primary care offices with one to four physicians used EHRs.² Burt and Sisk found that 17.6% of U.S. ambulatory practices had EHRs in the period between 2001 and 2003.³

Recent articles have discussed barriers to widespread adoption in this country, including misaligned incentives, lack of standards and uncertainty over the viability of commercial EHR products, resistance to change (especially physician resistance to data entry), lack of governmental policy leadership, and the decentralization and fragmentation of much of the health care system into "mom and pop" shops.^{4,5} A key unanswered question is: "which of the barriers to adoption are likely to be important to primary care physicians," or, alternatively, what will motivate such doctors to adopt EHRs?

Other countries have widespread to nearly universal EHR adoption in the ambulatory setting.⁶ The United Kingdom (UK) reportedly has close to 100% EHR use in primary care. (Granger R. A Global View: The Experiences of Other Nations in Implementing an Electronic Health Record and Developing a National Health Information Infrastructure. Presented at the HIT Summit, 21 October 2004; Washington, DC). The U.S.'s lag in EHR implementation presents an opportunity to learn from the UK. Of course, the UK and the United States have different high-level health care system organization and financing.⁷⁻¹⁰ However, at the primary care level, many physicians and groups in both countries are independent businesses, treating patients, making referrals,

Table 1 ■ Theoretical and Practice-perceived Benefits of Electronic Records

<i>Practice development: Developing and motivating practice staff, increasing job satisfaction</i>	
Theoretical Benefits*	Benefits Cited by Study Practices
Stimulates discussion Supports practice development, appraisal, and continuous professional development	Satisfaction—perception of doing the best job for the patient. Control—perception that necessary information is actually available at the time of patient encounter.
Motivates and encourages practice staff Encourages the practice to work as a team—can be used as a communication tool	Staff communication cited as reason for adopting twice.
<i>Practice operation: Improving practice operation and management capability</i>	
Theoretical Benefits*	Benefits Cited by Study Practices
Audit of better data gives a more accurate reflection of the care provided and feedback of the data will be more meaningful	Statistical reports can be discussed at staff meetings—but can be overwhelmed with data. Financial rewards mentioned very frequently—capturing billable items and pay for performance.
Gives confidence to move away from duplicate systems (e.g., paper and computer) Support for the legal requirement to have an accurate historical record of care	Legibility of records and ability to locate records were emphasized many times. Documentation as protection against negligence claims. Most commonly cited benefit, specifically prescription management.
Reduces duplication of work and increases efficiency within the practice Gives supporting evidence when bidding for funds/services	“Physicians are competitive.” Shows physicians where their practices stand among similar practices.
<i>Patient care: Improving patient care, particularly chronic disease care</i>	
Theoretical Benefits*	Benefits Cited by Study Practices
Supports the decision-making process and can offer automated decision support Makes it easier to identify groups to target for particular interventions and packages of care (e.g., chronic disease register) Helps to improve patient care, for the individual patient and for groups of patients Raises awareness of the needs of the practice population as a whole—allowing the practice to look at the needs of specific groups of patients as well as the individual Facilitates proactive (rather than reactive) work by practices	Most practitioners were too busy to use these features when available, but did use timely, concise information resources. Better chronic disease care and more health promotion. Reduces risk of errors. Reduces variation in chronic disease care. Better chronic disease care and more health promotion. Most practices routinely used these features. “Power of the computer to identify individuals needing intervention.”

*Benefits are those cited by the Royal College of General Practitioners in the *Good Practice Guidelines for Electronic Medical Records*.¹³

and maintaining records in a small office.¹¹ Family doctors in the United States and GPs in the UK share a desire to provide high quality safe medical care as efficiently as possible; professional leaders in both countries increasingly view EHRs as essential for this purpose. Moreover, although there is some documented resistance by GPs in the UK to the national electronic infrastructure,¹² that resistance is more rooted in the GPs' desire to continue using the EHR systems they have already adopted, rather than being swept into a centralized model. Widespread connectivity has not yet arrived in the UK, any more than in the United States, yet physicians apparently believe that EHRs help them practice better medicine.

During the summer of 2005, one author (CPS) visited 13 smaller GP sites in England and Scotland to ask physicians and office staff about EHR usage and observe their use of EHRs in patient care. Practices were identified by the UK investigators and varied in location (urban vs. rural), num-

ber of physicians (solo to small group), degree of practitioner involvement with electronic record keeping, and duration of EHR use. They used EHR products from the four major UK vendors.

The purpose of the visits was to identify features of EHR systems that were perceived as having high value to busy practitioners who could choose to use the features or not. The interviews were informed by knowledge of issues affecting practitioners in West Virginia, and had the goal of identifying components that might have the best potential for improving physicians' lives and patients' health when fully deployed.

In the interviews, the GPs frequently mentioned three features they thought particularly valuable: electronic prescribing, the overall impact of EHR usage on practice efficiency, and the ability of EHRs to help manage and improve quality. A fourth that emerged less commonly potentially addressed

a large concern in the United States: the medicolegal benefits of improved documentation. Table 1 summarizes findings from the discussions with practitioners arrayed against a list of theoretical benefits developed by expert practitioners in the UK.¹³ In this article, we present evidence that the experience of English and Scottish physicians might provide direction to efforts to encourage EHR adoption in the United States.

e-Prescribing

When fully implemented, e-prescribing offers substantial savings in physician and office staff time.¹⁴⁻¹⁶ Even versions that merely replace handwritten prescriptions with computer printed ones, achieve these improvements, according to the UK physicians we visited. Miller and colleagues noted heavy use of e-prescribing in small U.S. practices implementing EHRs.¹⁷

These positive reports might appear to conflict with parts of the systematic review conducted by Poissant and his co-workers.¹⁸ However, the studies in the systematic review were not specific to e-prescribing; many were not recent, e.g., the paper most descriptive of UK experience was over 20 years old and was not included in findings.¹⁹ Failure to demonstrate consistent time savings in the review may be due to the observation of multiple features of EHR use at once, rather than simply assessing the specific impact due to e-prescribing. For example, a point of care electronic system (EpicCare) for recording, displaying results, prescription and order entry, decision support, and reminders required more time for physician documentation than a paper record, but the time savings or cost for e-prescribing could not be separated.²⁰

Gottschalk and Flock measured the time physicians actually spend in writing prescriptions to be 0.14 hours or about 1.4% of the work day.²¹ The direct time reported may not have included time spent writing prescriptions while face-to-face with a patient, reviewing a patient's chart prior to issuing a renewal prescription, or updating the medication list in the paper record. It clearly didn't include the practice cost of pulling and refiling a patient's record for a prescription renewal. In a survey of 1,104 physician users of an online information service, Pizzi and her co-workers found that physicians who used electronic prescribing were significantly more likely to view it as saving time than those who have not adopted the technology.²² In the same study, nonusers perceived cost, lack of acceptance by pharmacies, and time investment to change systems as barriers to adoption significantly more frequently than physicians who were using e-prescribing systems.

The potential of e-prescribing to reduce medical errors due to illegible or misspecified prescriptions is part of the reason for the current enthusiasm for computerized physician order entry (CPOE) systems. More powerful features of e-prescribing driven by a complete EHR and supported by a knowledge base could reduce drug-drug interactions, improve patient-specific dosing, and avert toxic and allergic reactions.²³ The UK physicians we visited noted improved legibility as a positive feature of electronic prescribing, but rarely paid much attention to the warnings generated by their systems because of their frequency and lack of relevance, consistent with research findings.²⁴ Physicians are

unlikely to trade the time saved by more efficient prescription processes for time lost interacting with intrusive decision support systems even though they have potential for improving patient care.

Physicians in the UK who installed EHR systems early told us they paid for all or part of the installation themselves, though more recently EHRs have been funded by the National Health Service. A little-noted feature of the Medicare Modernization Act authorizes the Department of Health and Human Services to provide grants to physician practices for electronic prescribing; if funded, it could help reduce the initial cost of at least the e-prescribing component of EHRs while focusing on an important short-term benefit.²⁵ Some insurers in the United States are also interested in funding this technology.²⁶

Efficiency

The UK physicians uniformly stated that EHRs had improved efficiency, by which they meant both improved practice operations and better use of time. They did not all agree that EHRs actually saved physician time. Observations of computer use by Scottish GPs in fact showed their consultations required more time when they used EHRs than when they did not.²⁷

Practice operational efficiencies from EHR use have been documented both in the United States and UK.²⁸⁻³⁰ In the UK, EHRs may have contributed to increased physician incomes through better documentation of chronic care and/or improved chronic care quality.^{31,32} The extent of detailed clinical information that must be reported in the UK to qualify for pay for performance under the most recent contract makes submitting it from a source other than an EHR virtually impossible.³³ In the United States, EHR use already has been shown to increase practice revenue through better coding.¹⁵ The further impact of pay-for-performance systems based on computerized records on physician practice incomes in the United States remains to be determined.

A third component of efficiency in a practice setting is elimination of down time, duplication, and waste because information is not available when needed. Smith and colleagues demonstrated the extent of the problem in the United States, confirming that it is less than half as likely to affect practitioners in settings with EHRs as those without them.³⁴ These investigators showed that missing information adversely impacted on 13.6% of the clinic visits in their study population of 32 primary care clinics, resulting in substantial wasted time searching for information. Access to information is important to U.S. physicians. Gans and his co-investigators found that the highest rated benefit of EHR was access to information in a survey of a random sample of U.S. group practices.³⁵ Interestingly, three of the top four benefits of EHRs cited by respondents to Gans' survey related to practice efficiency (information access, workflow, and coding).

Quality of Care

EHRs have a great potential to assure consistency of care and to prevent medical error, but considerably less research shows improved patient outcomes from EHR use than improved health care system performance.^{28,36} Nonetheless,

Table 2 ■ Barriers to Electronic Health Record Adoption in Primary Care in the United States and the UK

Barrier*	UK (1990s)	UK Now	US Now
Misaligned incentives	Some funding for systems was available, but no pay for performance	Pay for performance and subsidy of technology	Improving
Lack of standards	++	–	Improving
Nonviable EHR products	++	Driven from marketplace	++
Physician resistance to data entry	Unknown	–	Unknown, but addressed by various products
Lack of governmental policy leadership	Actual resistance	–	Improving
"Mom and pop" shops	++	++	++

*Barriers after Berner et al.⁴ and Middleton et al.⁵

most of the UK physicians we visited believed their record systems improved quality of care. One physician attributed a reduction in acute myocardial infarction incidence to better lipid management because of attention to the Quality Outcome Framework (UK pay for performance) goals. Another noted reduced variation in chronic disease care because "the system does not miss patients."

Quality of care in UK primary care practices appears to have improved in recent years.³⁷ Concern about lack of consistency in U.S. health care has led experts to recommend universal adoption of electronic records as a key step to delivering reliable health care.³⁸ The belief that better record systems will improve quality lies behind Medicare's effort to get primary care physicians to adopt EHRs.³⁹ The UK physicians thought that *their patients* believed that EHRs contributed to quality. Gans' survey respondents with EHRs did not list quality of care among their top benefits of EHR adoption, but they did include reduction of medical errors.³⁵

Documentation

Record legibility and good documentation were popular reasons for adopting EHRs among UK physicians; one physician's intention to adopt crystallized after he was cross-examined in court and was unable to read *his own* writing. Another said he had a quality of care complaint dismissed because he produced the patient's thoroughly documented electronic file. Not only was the complaint dismissed, the physician received compliments for his documentation. Such stories may resonate in the United States.

Electronic prescribing, the most frequently cited benefit of EHR use in the UK, takes a backseat to malpractice and payment issues in discussions at physician meetings in the United States. American physicians are chronically anxious about malpractice suits⁴⁰ and may well have changed practice behavior in an attempt to prevent them.⁴¹

Malpractice insurers are interested in improved documentation and legibility of records to protect against losses and have supported EHR adoption in principle.⁴² Recently the West Virginia Physicians Mutual Insurance Company indicated it was considering a rate reduction for physicians who use EHRs (Moore J, Personal communication, Feb 10, 2006).

Discussion

We observed that GPs in the UK value their EHR systems highly. They have arrived at this position over a number of years, initially with little financial backing from the National

Health Service. They told us their practices evolved with their EHR systems and they placed the highest value on electronic prescription writing, which was often the first EHR component they adopted.

There are numerous features of EHRs that might be important to physicians, for example, the improved communication within practices, sense of improved control, and better targeting of population needs, are among the benefits identified by the Royal College of General Practitioners. However, achieving these benefits requires overcoming major barriers. Some systemic barriers in the United States are now improving (Table 2) and are in all likelihood less severe than those facing UK physicians who adopted EHRs ten to twenty years ago.

Are the differences in health systems between the United States and the UK so large that evolution of EHR use is destined to take a different direction? A first reading of Detmer and Steens' comparative assessment might suggest this is the case, because of the decentralization of the U.S. system and centralization of authority in the UK.¹² However, these researchers were describing the national health information infrastructure model in the UK. Primary care HIT in the UK is currently decentralized and the government appears to be committed to connecting existing GP systems, rather than replacing them.^{43,44} The "resistance" Detmer and Steens saw was more to the threat of forced centralization than outright opposition to electronic personal health records or electronic data exchange. In fact, private vendors and physicians are already testing these functionalities outside of the national infrastructure, exactly as is happening with some early adopters in the United States.^{45,46} While it is true that the Primary Care Trusts fund EHR systems in the UK, this was not the case early in the history of EHR use by GPs there.

For individual physicians in the United States, the barriers to adoption may be perceptual. Pizzi's survey about e-prescribing showed that physicians without e-prescribing systems *think* there are major legal barriers and that such systems are expensive, hard to learn, and error prone.²² Subsidies that are in the winds can address the perceived high costs, while targeted physician education following the conclusion of interoperability projects sponsored by the Office of the National Coordinator for Health Information Technology (ONCHIT)⁴⁷ can address legal concerns. Effective detailing can demonstrate ease of use and freedom from error.

Gans' survey revealed more diffuse barriers to adoption of EHRs in general.³⁵ Funding, return on investment, time loss during installation, ease of physician data input, and conversion of historical records were greater concerns to EHR non-users than to EHR users. Easing physicians the small step from a paper prescription pad to an electronic entry device, while overcoming very specific concerns along the way, is likely to go faster than a transition to paperless practice.

One barrier not mentioned in the surveys is fear of making the wrong decision, or "buying the Betamax." Given the bewildering number of vendors in the United States, that might appear to be a rational fear. Although most of the physicians we talked to in the UK had been through multiple versions of EHRs and many had changed vendors, this information is not likely to be reassuring to a U.S. physician contemplating installing his or her first e-health application. As a standalone application, e-prescribing might address these concerns because the operation of writing a prescription is reasonably consistent across practices reducing the potential for variation in input formats across vendors and versions. The information content of prescription processing systems is already becoming standardized, reducing the risk of data loss on conversion to a new product.^{48,49}

In spite of knowledge of best practices, physicians in the United States can be quite slow adopting innovations in care.⁵⁰ On the other hand, a new pharmaceutical agent that is heavily promoted can achieve impressive sales in short order. This admittedly imperfect analogy may apply to the uptake of EHRs in this country. While it may be difficult for a busy physician to redesign his entire practice to make most effective use of a full EHR, the small step of beginning to use e-prescribing may be relatively easy, because it would be a discrete substitution of a better technology. It could also be widely promoted. The tangible benefits of e-prescribing (reduced time, reduced hassle, income from subsidies, and pay for performance schemes) along with intangibles like reduced risk of error and malpractice litigation could encourage adoption of other HIT solutions. The UK's historical example could be a valuable model for the next few years.

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