

P E R S P E C T I V E

Hope And Hype: Predicting The Impact Of Electronic Medical Records

RAND's vision of "gold in them thar hills" owes more to Merlin than to metallurgy.

by **David U. Himmelstein and Steffie Woolhandler**

ABSTRACT: The current fascination with electronic medical records (EMRs) is not new. For decades, vendors have capitalized on this enthusiasm. But hospitals and clinics have ended up with little to show for their large outlays. Indeed, computing at a typical hospital has not gotten much beyond what was available twenty-five years ago. The RAND analysis continues the tradition of hope and hype. Unfortunately, behind their impressive predictions of savings lie a disturbing array of unproven assumptions, wishful thinking, and special effects.

MACHINES OFTEN PROVOKE both unreasoned fear and extravagant expectations. Where some see 1984, others perceive *Star Trek*. Lately the Trekkies predominate. Across the political spectrum—from Hillary Clinton to Newt Gingrich—computer fans perceive the electronic medical record (EMR) as a painless solution to the most vexing health policy questions, allowing expansions in coverage, quality improvement, and cost control.

■ **Hope.** Such optimism is not new. In the 1960s innovators such as Lawrence Weed implemented clinical computing systems that aimed to revolutionize practice.¹ Soon after, the COSTAR system replaced paper records at a Boston health maintenance organization.²

The enthusiasm of innovators was mirrored in the hopes of vendors. By the late 1960s Lockheed Corporation was marketing its system, first installed at the Mayo Clinic and later at the El Camino Hospital, with much fanfare.

A 1970s 16mm film touted El Camino's system for reducing paperwork, eliminating lost and misfiled reports, ensuring accuracy, and improving patient care. In time, however, the system proved a disappointment and was abandoned at both hospitals, although it lived on in modified form. Marketed by Technicon, TDS, and eventually Eclipsys, its descendent was recently criticized for causing medication errors.³

The pattern of vendors capitalizing on great expectations was oft repeated. Many hospitals bought "total hospital information systems that were at best partial and contained remarkably little information. When the dust settled, in part on expensive, unused computer terminals, hospitals...found that they had spent a great deal of money and received little in return."⁴

Repeatedly, opinion leaders have announced the imminent dawning of the cybermedicine age. In 1990, an Institute of Medicine (IOM) committee declared itself "convinced

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that proper coordination and appropriate resources will lead to achievement of the goal of widespread CPR [computerized patient record] utilization within a decade.”⁵ In 1993 a working group convened by the secretary of health and human services foresaw by 2008 a “network linking all participants in the U.S. health care system. Each health care facility and practitioner would connect to the network via its own computer-based patient record system...to create, store, retrieve, transmit and manipulate patients’ health data.”⁶

Yet even now, few hospitals have computer capabilities much more sophisticated than those available twenty-five years ago at Boston’s Beth Israel Hospital. Subsequently also installed at Brigham and Women’s Hospital, that system—whose processing speed and disk storage were similar to those of an iPod—provided computing for virtually all departments: access to lab, radiology, pharmacy, pathology, demographic, and patient visit data; bibliographic retrieval; support with medical decisions; and e-mail.⁷

This is not to say that progress has halted. Many clinicians now enjoy the capabilities previously available only at a few flagship institutions. But most hospitals still lack even rudimentary error-prevention capabilities in their pharmacy systems; only a handful routinely use clinical reminders and alarm systems; and even supposedly sophisticated systems do not always work as advertised.⁸

■ **Hype.** The RAND analysis in this volume of *Health Affairs* (and a similar recent estimate) continues the tradition of EMR hope and hype.⁹ These researchers supply numbers—big numbers with lots of trailing zeros—to back politicians’ (and vendors’) promises, leaving the reader impressed that the case for massive investment in EMR is compelling. But even a cursory glance behind the numbers reveals a disturbing array of unproven assumptions, wishful thinking, and special effects.

Their Exhibit 1 invites us to dream of efficiency savings like those in retail (1.5 percent annually), or even in telecom (4 percent). But what if the efficiency change is more akin to retail banking, where information technology

(IT) may have actually worsened efficiency?

While the promises are big, the computing system RAND posits is but vaguely described. A few of the needed components exist, but nowhere is the proposed system, especially the required “interoperability,” in use. An EMR that communicates with the outside world is not as trivial as the RAND researchers imply. Computing systems often fail because of problems with data capture, not because their designers did not understand the required computations. How, for example, will the authors make data entry for doctors and nurses faster with the computer than it is now? How will they capture the data needed for “interoperability,” data now stored in myriad legacy systems? How will they get hospitals, clinics, practices, insurance companies, and government agencies to agree on the definitions and units in which thousands of data elements are measured—from where will they get all those evenings?

Unproven assumptions. The RAND researchers assume that computers can be programmed to influence medical practice in ways so positive that costs will be reduced without any detrimental effect on outcomes. They assume that once the proposed system is built, doctors and nurses will use it and that confidence in it will be so high that compliance with its recommendations will approach 100 percent.

Would they be so sanguine about similar assumptions closer to home? Let us assume that computers could be programmed to critique and write RAND reports, reducing costs in the same percentages as those proposed for medical practice. “Predictive-modeling algorithms” could identify manuscripts in need of revision, connect our proposed system to a national database of similar manuscripts, and compare the performance of each RAND scientist with that of his or her peers. RAND scientists might question such extrapolation, or even whether such algorithms would be helpful in generating RAND reports. Yet they seem comfortable asserting that efficiencies achieved in telecom can be transferred to medicine and that their monetary implications can be accurately estimated.

Wishful thinking. Rosy assumptions color the forecasting effort. By what magic will EMRs double patients' compliance with advice to quit smoking and lose weight, or assure 100 percent participation in disease management programs, or make such programs save money?¹⁰ The authors foresee 14–15 percent reductions in drug and radiology costs, based solely on experts' opinions. Savings of \$106.4 billion on nursing are extrapolated from observations in one U.S. intensive care unit and a single hospital in Norway. Projected savings of \$289.6 billion from shortened hospital stays are based on two anecdotes and one controlled trial from the era of seven-day stays (today's are five).

Even the few projections based on real data—for example, savings on lab testing—overstretch the data. The successes at Indianapolis's Regenstrief Institute (reported in 1993) are assumed to be typical; the thousands of hospital systems installed since then that do not save a nickel are dismissed.¹¹

Special effects. RAND's vision of “gold in them thar hills” owes more to Merlin than to metallurgy. For believers, we offer the following investment opportunity. We have invented a floppy disc with a screen saver that says “Don't Smoke.” Since 450,000 Americans die each year of smoking, with each life worth \$2 million, if we assume 100 percent compliance by eligible participants, such an invention is worth \$9 trillion. And since we are willing sell the invention for only \$800 billion—less than a tenth of its value—even minimalist assumptions for packaging, distribution, installation, and the like imply a return on investment (ROI) even better than that forecast in the RAND estimates.

THE RAND RESEARCHERS offer an attractive hypothesis; it should be tested first in one hospital (with its surrounding practices) and then in several hospitals. As Woody Allen might say, “At the moment it's just a notion, but with a bit of backing I think I could turn it into a concept, and then an idea.” To mount a national program to do in every hospital what has yet to

be done in any hospital might benefit the computer vendors who paid for the RAND research, but it risks failure on a colossal scale.

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NOTES

1. L.L. Weed, “Medical Records That Guide and Teach,” *New England Journal of Medicine* 278, no. 11 (1968): 593–600.
2. J.H. Grossman, “An Ambulatory Medical Record System for Patient Care and Health Care Management,” *Methods of Information in Medicine* 6 (1972): 375–382.
3. R. Koppel et al., “Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors,” *Journal of the American Medical Association* 293, no. 10 (2005): 1197–1203.
4. H.L. Bleich et al., “Clinical Computing in a Teaching Hospital,” *New England Journal of Medicine* 312, no. 12 (1985): 756–764.
5. IOM, *The Computer-based Patient Record* (Washington: National Academies Press, 1991).
6. *Toward a National Health Information Infrastructure: Report of the Work Group on Computerization of Patient Records to the Secretary of the U.S. Department of Health and Human Services* (Washington: HHS, April 1993).
7. Bleich et al., “Clinical Computing.”
8. J.R. Nebeker et al., “High Rates of Adverse Drug Events at a Highly Computerized Hospital,” *Archives of Internal Medicine* 165, no. 10 (2005): 1111–1115.
9. R. Hillestad et al., “Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, and Costs,” *Health Affairs* 24, no. 5 (2005): 1103–1117; and J. Walker et al., “The Value of Health Care Information Exchange and Interoperability,” *Health Affairs*, 19 January 2005, content.healthaffairs.org/cgi/content/abstract/hlthaff.w5.10 (2 June 2005).
10. The Congressional Budget Office found “insufficient evidence...that disease management programs can generally reduce the overall cost of health care services.” CBO, *An Analysis of the Literature on Disease Management Programs*, 13 October 2004, www.cbo.gov/showdoc.cfm?index=5909&sequence=0 (7 June 2005).
11. W.M. Tierney et al., “Physician Inpatient Order Writing on Microcomputer Workstations: Effects on Resource Utilization,” *Journal of the American Medical Association* 269, no. 3 (1993): 379–383.