ISSUE BRIEF

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TRENDS IN HEALTH CARE QUALITY

New Hospital Information Technology: Is It Helping to Improve Quality?

by Suzanne Felt-Lisk

This brief is based on Mathematica's study for the Centers for Medicare & Medicaid Services (CMS) of how public reporting of quality information has influenced quality improvement efforts within hospitals. The study included a nationally representative survey of hospitals in summer 2005 that asked senior hospital executives whether clinicians use six specific types of information technology (IT). The survey also assessed whether IT had advanced quality of care, and if so, the most important ways in which it had done so. The executives we interviewed felt that IT has improved care, primarily through more timely diagnosis and intervention, reduction of medical errors, and better communication within the care team.

Addressing Causes of Reduced Quality

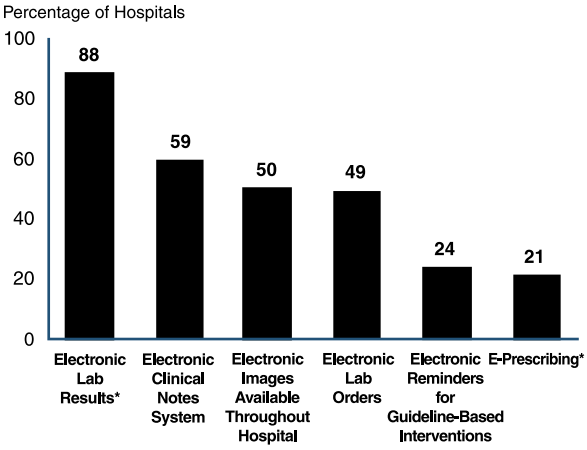
Health IT holds enormous potential to propel the health care system to higher quality. Specifically, IT may help close the quality gap, brought to national attention in 2001 by the Institute of Medicine in *Crossing the Quality Chasm*, by promoting care that is safe, effective, patient-centered, timely, efficient, and equitable.

Health care payers and providers alike are looking at IT not only to improve quality, but also to reduce costs, with efforts well under way to integrate it into the health care system. For example, the American Hospital Association reports that the typical hospital spent $700,000 last year to implement IT. Hospitals' investments are largely based on faith in IT's potential, as little evidence exists to link IT to quality improvements and efficiency gains.

Use of Six Types of IT

We assessed hospitals' use of six types of health IT—used to collect, store, retrieve, and transfer clinical information electronically—in our study (see box on page 2). Almost 90 percent of hospitals reported that their clinicians use at least one of the listed technologies. The number of hospitals using specific types of IT varied widely, with electronic lab results most common (88 percent of hospitals). Conversely, e-prescribing (also known as computerized physician order entry, or CPOE) was least common (21 percent) (Figure 1).

Figure 1: Hospitals with Clinicians Using Selected IT Capabilities



*If decision support is included, these percentages drop to 83 percent for electronic lab results (first bar) and 17 percent for e-prescribing (last bar).

Electronic lab results and e-prescribing usually incorporate decision support functions, such as flagging drug interactions or providing allergy information. Of hospitals using these tools, 95 and 85 percent, respectively, said they were also using related decision support functions. Nearly 60 percent of hospitals also used electronic clinical notes systems. About half of the hospitals surveyed could order lab tests electronically and make electronically stored images available throughout their facility.

Electronic reminders for guideline-based interventions and/or screenings were not common, with only 24 percent of hospitals reporting this capability. The finding is roughly similar to the American Hospital Association's 2005 survey on IT, which found that 35 percent of hospitals had partially or fully implemented technology that prompts clinicians to follow clinical guidelines and pathways.

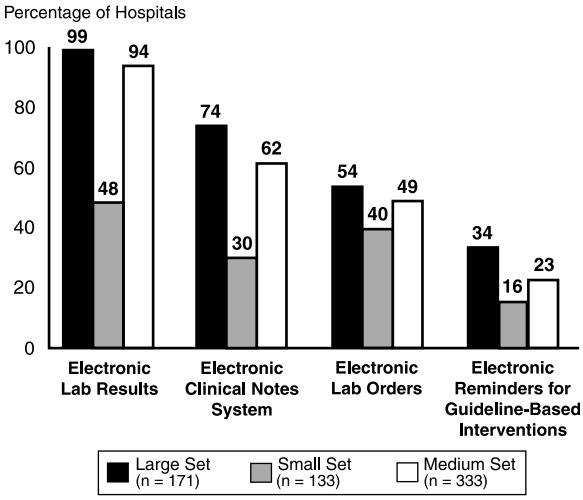
INFORMATION TECHNOLOGY COVERED IN THE SURVEY

- **E-prescribing** involves prescription orders that clinicians input electronically, which are then transmitted to the pharmacy. Decision support to the clinician, such as drug interaction flags and allergy-related information, is usually included. E-prescribing eliminates hard-to-read handwritten prescriptions, as well as errors in dispensing (such as wrong drug or contraindicated drug) that sometimes result.
- **Electronic clinical notes systems** include information on a patient's demographics, medical history, physician/nurse notes, and/or follow-up orders.
- **Electronic lab orders** computerize ordering of lab tests.
- **Electronic lab results** may allow quicker receipt and review of results by clinicians; this process usually includes decision support, such as highlighting results out of the normal range.
- **Electronic images available throughout a hospital** make electronically stored images (CT, MRI, PET scans) available to the medical team beyond the doors of the radiology department.
- **Electronic reminders for guideline-based interventions** and/or screenings assist physicians by proactively suggesting care that appears needed based on evidence-based knowledge and patient-specific data.

Gaps by Size and Accreditation

Gaps in hospitals' use of IT vary by institutional size and accreditation status. For some technologies, small hospitals not accredited by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) ("small set hospitals") use IT at half the rate or less of large, JCAHO-accredited hospitals ("large set hospitals") (Figure 2). The gap is sizable for electronic viewing of lab results—with fewer than half the small set hospitals using it, compared with 99 percent of the large set hospitals—and for electronic clinical notes systems—with 30 percent of the small set hospitals using it, compared with 74 percent of the large set institutions. Similarly, larger hospitals were much more likely than the small set hospitals to use electronic reminders for guideline-based interventions

Figure 2: Use of Selected IT Capabilities by Hospital Size and JCAHO Accreditation*



*JCAHO is by far the largest accreditor of hospitals; the American Osteopathic Association also accredits hospitals.

(34 versus 16 percent) and e-prescribing (34 versus 12 percent).

Has IT Improved Quality?

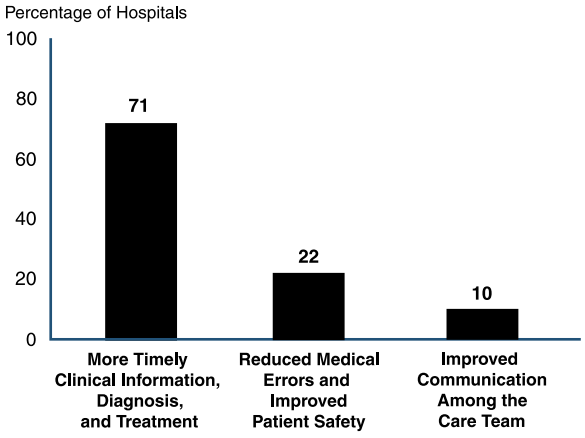
More than 80 percent of the hospital executives interviewed reported that IT had been an important factor in improving quality in their hospitals, a notable degree of consensus given the range of IT functions covered by the survey. In hospitals that were using some type of IT, only 17 percent felt it had not been an important contributor to higher quality.

In terms of what was viewed as most helpful in enhancing quality, more timely clinical information, diagnosis, and treatment was the greatest benefit reported (Figure 3). Seventy-one percent of hospitals that responded to the question and used at least one of the IT functions in the survey cited this as the most important benefit to date. Many of these hospitals had implemented several IT functions; over half (55 to 63 percent) had implemented each type.

Another important quality improvement was reduction of medical errors and improvement in patient safety. Twenty-two percent of hospitals cited enhanced patient safety as the most important benefit they had observed to date. This category included effects related to error reduction, such as providing more accurate information, flagging abnormal lab results "so they no longer get lost in the shuffle," and improving legibility of information. Hospitals reporting greater patient safety as the most important benefit had typically implemented fewer IT initiatives than hospitals citing more timely information as the most important benefit. E-prescribing with decision support stood out as relatively common among hospitals that viewed better patient safety as the most important benefit of IT (36 percent). Only between 19 and 22 percent of these hospitals had implemented the other five types of IT. About 10 percent of hospitals felt that improved communication among the care team was the most important quality benefit of their IT initiatives.

Although the survey asked about the most important quality benefit of IT, 11 percent cited greater efficiency in managing patients or more efficient decision processes as a benefit. This finding supports the idea that many hospital executives view quality and efficiency as complementary and linked.

Figure 3: Most Important Quality Benefits from IT*



*Cited by senior executives reporting an important quality benefit.

Note: Eighty-three percent of hospitals with at least one type of IT in the survey reported an important quality benefit. This figure shows the percentage of that group citing each of the three most common quality benefits.

The survey also explored whether hospitals with certain types of IT had reduced the amount of labor required to abstract chart data for quality measures submitted to CMS for Hospital Compare, a web-based tool for reporting quality information to the public. Four in 10 said that it had, with the majority (69 percent) saying that IT reduced the labor associated with chart abstraction by 20 to 80 percent.

Looking Ahead

The health care system is in the midst of a major transformation in its use of IT. The good news from Mathematica's survey is that most hospitals report improved quality from the initiatives they have implemented to date. The study results also suggest the following implications for policymakers, providers, and the research community to consider:

- Timeliness of care measures are needed. The top quality benefit reported in the survey was improved timeliness of clinical information, diagnosis, and treatment. Timeliness measures will help document the benefits accruing from IT.

- The IT gap may have serious implications. The major gap in implementation between large, JCAHO-accredited and small, nonaccredited hospitals is a major concern, given IT's potential quality benefits. More research is needed to understand the relationship between types of IT and quality benefits produced, particularly in small versus large hospitals.
- IT is not making quality reporting easy. Work remains to be done to maximize the usefulness of IT for reporting purposes, since only 4 in 10 hospitals with relevant IT components in place found that it reduced the labor required to abstract data for quality reporting.
- Electronic reminders and e-prescribing lag behind other types of IT. Electronic reminders for guideline-based interventions and e-prescribing may be on a slower track than other types of IT because of implementation difficulties. Working through implementation barriers will be important, given the potential of these IT functions to improve patient care and safety.

IT is at the center of the federal strategy to enhance the nation's health care system by improving patient safety and reducing inefficiencies. Much remains to be learned about its effects on quality; at the same time, Mathematica's survey shows that many hospital executives feel that it has already advanced quality in important ways, primarily through more timely diagnosis and intervention, reduction of medical errors, and better communication within the care team.

For more information about this study, funded by CMS through the DelMarva Foundation, please contact Myles Maxfield, senior fellow and associate director of health research, at mmaxfield@mathematica-mpr.com, (202) 484-4682. To read more about Mathematica's quality of care research, go to www.mathematica-mpr.com/health/qualityofcare.asp.

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ABOUT THE SURVEY

In summer 2005, Mathematica conducted telephone interviews with hospital quality improvement directors and senior executives involved in quality improvement (typically the chief medical officer or vice president of medical affairs). The target population was short-term acute care general and critical-access hospitals in the 50 states and the District of Columbia that submitted hospital quality data for Hospital Compare, a major CMS quality initiative, in 2005. Mathematica selected a stratified random sample based on hospital size (1 to 99 beds was considered small, 100 to 299 beds was medium, and 300 or more beds was large), participation in CMS's Premier Hospital Quality Incentive Demonstration, and accreditation by the JCAHO. The sample size for the groups discussed in this issue brief was 375 large JCAHO-accredited hospitals; 133 small, non-JCAHO-accredited hospitals; and 129 other hospitals. All differences discussed are statistically significant at the .05 level. To identify hospitals using various types of IT, we asked the senior executives a "yes/no" question: "Do clinicians at your hospital use any of the following electronic health record capabilities?" and then listed the six types of IT described in the brief. To capture the most important quality-related benefits of IT, we asked senior executives that reported having one or more types of IT in place whether any of the initiatives had been an important factor in improving quality to date. If they answered "yes," we asked an open-ended question: "What is the single most important way that any of these electronic health record capabilities has affected quality in the hospital?" Completed surveys from 650 senior executives resulted in a weighted response rate of 89 percent and an unweighted response rate of 96 percent. The statistics in this issue brief are based on weighted results.

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