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President Bush identified electronic medical records (EMRs), also known as electronic health records (EHRs), as one of the 4 cornerstones in his value driven health care initiative.[1] EMRs represent a "disruptive technology" insofar as they change the way we capture, store, retrieve, share, and use health information. Because they have the ability to transform and enhance virtually all communications, transactions, and analyses involving healthcare information, implementation of EMRs will have a profound effect on patients, providers, and payers. The transformation likely will parallel the one which occurred as information technology enhanced knowledge and productivity in the non-healthcare segments of the U.S. economy. As such, the ***potential*** of EMRs to have a significant and positive impact on quality and value in healthcare is great.

That being said, it is well known that the information generated by a system is only as good as the data entered into it (ie, "garbage in-garbage out"). Whether captured in electronic format or on paper, much of the information contained in medical records that relates to quality and value is entered by physicians. For a physician to enter "appropriate" information, he or she must be aware of the type of information being sought. After all, it is the knowledge base and thought processes of physicians that interact to result in the decisions and behaviors that are documented in a medical record. If physicians lack the knowledge or education in quality metrics, the concept of value in healthcare, and the mechanics of EMR use, they are unlikely to capture the required data.

In what now is a classic paper on the quality of healthcare delivered to patients in the United States, researchers at the Rand Corporation found that recommended care that adhered to widely agreed upon evidence-based guidelines was delivered just 54.9% of the time.[2] Logically, if nothing were to change other than records being kept electronically instead of on paper, and such a study of quality were repeated, there is no reason to assume that quality performance would improve. A major study recently published in the Archives of Internal Medicine supported this premise. The study comparing quality measures pre and post EMR implementation showed no difference in 14 measures, improvement in 2 measures, and worse performance on 1 measure.[3] It is with caution then that we proceed further with this discussion of the role of EMRs and what they mean to quality and value.

What is an EMR?

Currently, there is no standard definition. In simple and practical terms however, whether used in the hospital (inpatient) or ambulatory (outpatient) setting, an EMR is a medical record that has been captured in a digital format. It may include data relating to patient demographics, medical history, physical examination and progress reports of health and illnesses, medication and allergy lists, immunization status, laboratory test results, radiology images, clinical photographs, a record of appointments and other reminders, billing records, advanced directives, living wills, and health powers of attorney.

Some important "value added" features of EMRs (i.e., unavailable in paper based records) include:

- Computerized provider order entry systems (CPOE), which include computerized orders for prescriptions ("e-prescribing"),
- Computerized reporting of test results,
- Clinical decision support systems, which may facilitate medical decision-making and provide evidence-based recommendations for specific medical conditions, and
- Computer generated prompts and reminders.

In my opinion, these additional features hold the key to unlocking the capabilities of EMRs to improve quality and value in the American healthcare system through their ability to help change and augment physician decision making.

What will it take for EMRs to impact quality and value on a national scale?

First, EMRs must become more widely utilized. In the most comprehensive study to date that reliably measures the state of EMR use by doctors and hospitals, researchers from Massachusetts General Hospital (MGH) and George Washington University (GWU) estimate that 1 in 4 doctors (24.9 percent) use EMRs to improve how they deliver care to patients. However, less than 1 in 10 are using what experts define as a "fully operational" system that collects patient information, displays test results, allows providers to enter medical orders and prescriptions, and helps doctors make treatment decisions.[4] The same study found that "hospital adoption trends are unknown. Assertions to the contrary, there are not enough high-quality, reliable surveys of hospital use of EHRs. The research team reliably estimates, however, that about 5 percent of America's 6,000 hospitals have adopted computerized physician order entry (CPOE) systems, a component of EHRs, to help reduce medical errors and ease care delivery."[5]

I don't think EMRs will impact quality and value on a national scale until a critical mass of physicians is using "fully operational" systems. In Donabedian parlance, once the

"structure" is in place, physicians can and need to be educated on the "processes" of quality and value which can result in the desired "outcomes" of enhanced quality and value.

To achieve these outcomes, everyone involved with EMR implementation must appreciate that "implementation of health information technology (health IT) is one-third technology and two-thirds organizational culture and work process." [6] Physicians and the whole care team must embrace this process if the potential of EMRs to enhance quality and value in healthcare is to be realized.

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