Health Information Technology As a Tool to Improve Care for Acute Respiratory Infections

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Managed care and health systems have invested heavily in improving care for such chronic diseases as diabetes mellitus and coronary artery disease. Chronic medical conditions are common, morbid, and expensive. Increased adherence to guidelines often improves patient outcomes and decreases costs of caring for these conditions. By their very nature, chronic conditions are ideal to address from a quality improvement or behavior change standpoint. Generally, the long time interval over which the diseases progress gives health systems months or years to "do the right thing" for individual patients. Actions take place at multiple points along the continuum of care—before, during, or after medical visits—and are carried out by various members of the healthcare team, any one of whom can be the focus of quality improvement efforts.

Care for acute conditions, on the other hand, is more difficult to affect. Acute illnesses tend to be brief and involve limited interactions between the patient and the healthcare system. Any successful attempt to change acute care must affect clinician and patient behavior at the time of the healthcare visit.

Despite this difficulty, acute conditions remain attractive targets for care improvement efforts, mainly because of their frequency and cost. Acute respiratory infections (ARIs), for example, are the most common reason patients seek care in the United States, representing about 7% of the 890 million ambulatory visits in 2002.[1] ARIs are also the number one reason physicians prescribe antibiotics in the United States. ARIs accounted for 47% to 56% of all adult and 75% to 80% of all pediatric antibiotic prescriptions between 1991 and 1999.[2] Much antibiotic prescribing for ARIs is inappropriate and exposes patients to potential adverse drug events, increases bacterial resistance, and increases cost. The total cost, direct and indirect, of ARIs is at least $40 billion annually in the United States.[3] If health systems are to improve care for acute conditions, then ARIs are a natural place to start.

Four articles in this issue of the *Journal* describe techniques used to affect care processes for ARIs. Brunton et al developed a clinical guideline for the treatment of patients with acute exacerbations of chronic bronchitis.[4] Hutt et al sought to improve the care of patients with nursing home-acquired pneumonia through organizational changes and provider education.[5] Ahmed et al aimed to increase influenza vaccination rates among high-risk patients through the use of postcard reminders to patients and an influenza "tool kit" for employers.[6] Finally, Greene et al sought to reduce inappropriate antibiotic prescribing for acute sinusitis by using physician education, physician profiling, and financial incentives.[7] As in the wider universe of studies on improving care processes, the results here are mixed and the magnitude of benefit was modest.

Other previously successful interventions to improve the quality of care for ARIs—specifically to reduce inappropriate antibiotic prescribing—have included academic detailing, formulary restrictions, and multidimensional interventions involving patients and clinicians. As previous studies have shown, and the present articles indicate, multifaceted interventions seem more likely to change behavior. However, many of these interventions have been expensive and time-limited; it is unclear how sustainable any improvements will be.

The Qualities of an Effective Health Information Technology Solution

Another solution, health information technology, has the potential to improve care for ARIs in a cost-effective, sustainable way if done right. For example, use of a template in an electronic medical record can capture clinical information in a standardized way, automatically import patient information (such as medication and problem lists), and potentially decrease inappropriate antibiotic prescribing by providing real-time clinical decision support. Such a template could also facilitate the printing of relevant patient handouts and provide easy access to relevant literature. At Partners HealthCare, of which Brigham and Women's Hospital is

a part, we are developing an ARI "Smart Form" for our electronic medical record that incorporates many of these features. However, significant barriers remain.

The most critical barrier is also the most obvious: for the majority of acute problems, decision support must be used during an office visit in order to be effective. In addition, clinicians will only accept real-time decision support if it is fast, simple, intuitive to use, anticipates clinicians' needs, and is integrated into clinicians' workflow.[8] Clinical decision support systems cannot take the clinician more time and should, in fact, be designed to save the clinician time. For example, clinicians should not have to interact with decision support, separately make an order, and then document that order. These three steps can and should be collapsed into one.

Furthermore, clinical decision support systems should not impair patient-physician communication or sap physician autonomy. Easy ways to override decision support software must be provided; if the software is too restrictive, it will be rejected. When clinical decision support identifies an error of commission (such as prescribing an inappropriate antibiotic), it needs to offer a useful alternative. Clinical decision support systems should be able to accommodate information from various practice members (eg, nurse with vital signs, physician with history and physical examination data) and accommodate the workflow of the entire office staff without turning clinicians into secretaries. Such systems should also provide something for the patient (handouts with detailed recommendations).

To encourage the use of clinical decision support systems, health information technology needs to provide the clinician with self-evident, immediate benefits. Such self-evident benefits could include automatically abstracting and organizing patient data; combining updating of the medical record, ordering, and documentation into one step; facilitating writing of customized patient letters and patient instructions; and identifying the preferred medication in a class for a patient's insurance coverage. In addition, providing information that a certain level of evaluation and management documentation has been met could result in increased reimbursement for clinicians, thus encouraging use. Finally, clinicians need adequate training to understand how to use any new information technologies, especially ones that impact their workflow.

An Even Larger Role for Health Information Technology

In the future, fully functioning, electronic medical record-based ARI-care templates have the potential to affect care on a broader scale by more seamlessly integrating the public health and the personal healthcare systems. Such templates can provide real-time surveillance data to public health officials related to naturally occurring disease clusters, novel respiratory pathogens, or bioterrorist attack. Information can also flow in the other direction, from the public health system to the clinician, so that information from disease surveillance projects could be fed in real time to clinicians, to let them know if there really is "something going around." Up-to-date information from a department of health about the local prevalence of influenza could be displayed within a patient's chart, and integrated with a patient's signs and symptoms, to show the probability of that patient having influenza.

Much of this may sound pie-in-the-sky at present. Indeed, all this is predicated on the use of sophisticated electronic medical records, and the adoption of health information technology in the ambulatory setting has been disappointingly slow. Resistance usually comes because health information technology is perceived as being too large an investment or as making the office or clinic more difficult for already busy clinicians. However, the potential gains to managed care organizations, health systems, clinicians, and patients are enormous in terms of improving safety, quality, and cost.

We have made significant strides in improving the quality of care for chronic conditions, and, of course, more needs to be done. However, while we continue to improve the quality of care for chronic diseases, we must nevertheless move forward to introduce systems of care that improve quality for acute conditions as well.

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