Text Messaging
A New Tool for Improving Preventive Services

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PREVENTION OF INFLUENZA DISEASE THROUGH VACCINATION is a public health challenge. Influenza disease causes substantial morbidity and mortality in children, adolescents, and adults; vaccination is the best method to prevent this disease. In light of the increasing understanding of the burden of influenza among children and adolescents and its spread from children to adults, the Advisory Committee on Immunization Practices expanded its influenza vaccination recommendations in 2008 to include all children and adolescents between 6 months and 18 years of age.[1] More than 65 million children and adolescents should be vaccinated annually, usually within a short timeframe of several months when the vaccine is available. While influenza vaccination coverage nationwide has increased, it remains low—only about half of all children and adolescents are vaccinated.

In the United States, primary care practices bear the major burden of vaccinating children and adolescents, and because most do not have health care visits during the influenza vaccination season, experts have recommended patient reminder/recall to remind families to bring their child or adolescent in for vaccination.[2,3] Patient reminder/recall has traditionally consisted of mailed letters or postcards or telephone calls made by office staff or by autodialer machines that can call hundreds of families per hour. Yet practice-based reminder/recall is easier to suggest than implement. Many primary care practices do not use reminder/recall because of the logistical challenges in setting up and maintaining these systems.[4] Furthermore, although initial studies suggested a positive effect of reminder/recall on influenza vaccination rates,[2,3] recent studies of patient reminder/recall targeting low-income populations have found minimal or no effect, in large part because of changing or inaccurate patient telephone numbers and addresses.[5,6] Thus new strategies are needed for patient reminder/recall, particularly for low-income populations.

In this issue of *JAMA*, Stockwell and colleagues[7] leverage a rapidly expanding application—text messaging, within a ubiquitous technology—the cellular telephone. They present findings from a randomized controlled trial of text message reminders to low-income families about influenza vaccination. The study was a pragmatic trial located in 4 primary care clinics in New York, New York. These practices are part of a network with a common electronic health record (EHR) that has an institutional immunization information system that links with the EHR and the New York Citywide Immunization Registry, and that was customized to send text messages. The investigators randomized 9213 children and adolescents to receive either a set of text message reminders about influenza vaccination (intervention group) or a single telephone reminder call (usual care group). The first 3 text messages informed parents about influenza and vaccine safety and effectiveness; subsequent text messages provided specific information about Saturday vaccination clinics. The clinical trial noted a modest increase in vaccination rates. Among the 7574 children and adolescents, 43.6% of the intervention group and 39.9% of the usual care group were vaccinated. Ultimately, vaccination rates remained low, but the cost of the intervention also was minimal.

The strengths of this clinical trial include its study design, incorporation of a new patient-physician communication technology (text messaging), a focus on a vulnerable urban population, and its application to time-critical vaccination because the vaccine must be administered prior to influenza season. The text message intervention served to both educate and remind parents and was rather aggressive with an average of 5 reminders sent to families. Furthermore, the study was conducted in a setting with integrated information systems that are not yet replicable in many primary care practices. Nevertheless, several methodological features probably diminished the potential effect of the intervention. The control group received 1 automated telephone reminder. While the reminders mentioned Saturday vaccination clinics, they did not mention regular weekday hours, which is when most children and adolescents received their immunizations. Thus, refinements might increase the effect of the intervention.

This study highlights the potential for patient reminder/recall but also its challenges. The potential is substantial, and in the right setting with automated, integrated information systems, text message reminders can target large numbers of patients at relatively low cost. They can be sent from centralized clinical information systems (as in this study), or from state-based immunization registries so that individual practices may not need to create their own patient reminder systems. In fact, immunization experts are currently debating the relative merit of individual practice-based vs system-based pa-

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tient reminders. Immunization rates depend on multiple factors in addition to a parent being reminded that it is important. Parent-centered factors such as willingness to immunize a child or adolescent, understanding of the disease and the vaccine, and competing family factors as well as system-based factors such as ease of making an appointment and access to appropriate transportation all play an important role in determining the ultimate immunization coverage rate. It is quite likely that some or all of these factors were responsible for the relatively low immunization coverage rate in both study groups.

Optimal use of text messaging still faces several challenges. Text message reminders require patients to have cellular telephones capable of receiving text messages; fortunately this now includes most people in the United States. Different institutions interpret Federal Communications Commission regulations about the need for patient consent for text message communication in varying ways. Text messages are limited to 160 characters, and the optimal message and optimal number of text messages that are helpful are unknown. In addition, the messages in this study did not appear to be actionable (ie, 2-way communication) in that patients were reminded and educated, but could not immediately use their telephones to act on the message. Future studies might examine the incremental benefit of including a telephone number that could be called immediately to schedule an appointment or perhaps one that could scan an online calendar to propose a few available times for vaccination. Research is needed to better understand how best to use new data systems and technologies (such as EHRs) to communicate directly with patients.

The study by Stockwell et al[7] also highlights the issue of what is a significant effect of an intervention. In this study, a rather aggressive reminder system only reaped a benefit of 4 percentage points in vaccination rates. Is this significant? Many immunization interventions that target large numbers of patients (such as patient reminders) will only raise coverage by a small percentage. More aggressive interventions that include outreach appear to increase vaccination rates higher, but at a greater cost.[8-11] The search for that sweet spot in improving immunization rates, in which interventions are low-cost but effective is ongoing. At a population level, an increase of even 4 percentage points is important; if applied across the United States, it could represent an additional 2.5 million children and adolescents who receive influenza vaccination. For interventions targeting an entire population, the effect must be balanced with cost, but small gains are acceptable.

The study by Stockwell et al[7] also highlights the benefits and complexities of emerging health information technologies designed to improve patient-physician communication. Text messaging can now be added to a list of potential communication channels to support positive health behaviors related to influenza immunization. While parent-clinician communication during office visits will continue to be a critical component and office staff will likely continue making traditional recall telephone calls in many practices, the use of automated telephone calls, e-mail, and text messaging need to be added as feasible and effective alternatives. These newer modalities could be linked to personal health records as well. At the heart of all of these systems will need to be a reliable, accurate, and centralized immunization record with advanced decision support functionality such as the one used in this study. The systems will require enhanced EHRs with high-quality immunization data capture, information exchange, and population-based immunization registries. Additional research to assess effect, costs, relative benefits, harms, and patient desires is needed. Randomized controlled trials of health information technological interventions, while rare, are especially important to accurately assess the value of strategies based on health information technology. Otherwise, the findings can be obscured or exaggerated.

The study by Stockwell et al[7] is a modest step forward in an important area of public health. Modest steps are the norm when complex behaviors and systems are targeted such as receipt of preventive services. Nonetheless, these systems have substantial potential, particularly when the technologies are tailored to individual patients and families, delivered in an actionable way, and driven toward important health behaviors. There can be little doubt that in the next decade there will be an increasing use of such systems and their application to additional services. As recently as 10 years ago, e-mailing patients[12] was considered novel and text messaging did not exist. Within the next few years, the novel findings presented in this study will also become a routine component of the complex system of health care delivery.

Conflict of Interest Disclosures: The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

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