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Current and Potential Use of New Technologies for Reminder Notifications

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Reminder notifications are used widely to prompt parents to schedule and attend appointments for clinic visits,^{1,2} as well as to encourage vaccinations among children that are due or overdue (recall).^{3,4} Traditionally, immunization reminder and recall has relied on mail and telephone notifications, but inaccurate parent contact information can be a substantial barrier among some groups of children.⁵⁻⁷ In the case of inaccurately addressed mailed reminder/recall notifications, letters may be forwarded or discarded; practices have virtually no way to determine whether they were successfully delivered. Even if the notification is successful, the timing can be variable since lag times for mail delivery are common and can be lengthy. In contrast, newer technologies such as email and text messaging offer the potential to expand options for sending low-cost, targeted immunization and appointment reminder notifications to parents, offering immediate contact with increased opportunity for verification of receipt. Household use of these technologies continues to grow as smart phones enable the widespread availability of integrated voice, text, and email. Although modalities such as text messaging and email are increasingly used across a broad spectrum of age groups, little is known regarding the acceptability or feasibility of these technologies by pediatrics practices. With that in mind, the objective of our study was to assess the technical capacity and perceived barriers among pediatric primary care providers to the use of newer technologies for sending immunization reminders to parents.

Methods

Study Setting

We conducted semistructured interviews (November 2009 to May 2010) among a convenience sample of pediatric primary care practices that indicated potential interest in a project about technology-enhanced immunization reminder/recall. Invited practices included primary care sites that were located in a 5-county area of south-central Michigan and had ≥ 500 children associated with their

practice in the Michigan Care Improvement Registry (MCIR). MCIR is a statewide immunization information system that has a high degree of participation by private and public providers; Michigan law requires that all vaccination doses administered to children <20 years be reported to MCIR. This study was approved by the University of Michigan Medical School Institutional Review Board.

Interview Administration and Analysis

Interviews were conducted either face to face or by telephone with clinical and/or administrative staff at each practice. The interview addressed each practice's current and anticipated use of electronic systems for billing, appointment scheduling, and electronic health records (EHRs), as well as methods currently employed for appointment and immunization reminder notices. The interview explored the current use and planned use of live telephone calls, telephone autodialer systems, mailed letters or postcards, emails, text messages, a practice Web site, and social networking tools such as Facebook or Twitter. Interview responses were coded and summarized in a form mirroring the interview's structure. Frequency distributions were determined for each survey item. Additional details regarding the technical capabilities of electronic systems used by participating practices for reminder notifications were summarized and de-identified based on information furnished by technical representatives from vendor systems to document the presence of system functionality not known to practice personnel.

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Results

Interviews were conducted with 19 primary care sites, including 11 pediatric, 7 family medicine, and 1 multi-specialty Federally Qualified Health Center. All 19 sites had electronic billing and appointment scheduling systems; 18 of these systems had the capacity to distinguish between landline numbers and cell phones although none of these systems could distinguish cell phones that were text-enabled. Nearly all the sites (18) reminded patients of upcoming appointments, using a variety of reminder mechanisms including live phone calls (11), autodialer phone calls (5), mail reminder (1), or a live phone call followed by a mail reminder (1). In contrast, only 8 sites conducted immunization-specific reminders, using either live phone calls (6) or mail (2).

None of the practices in our sample currently used text message or email reminders for appointments or immunizations; similarly, none were using Facebook, Twitter, or other social networking media. Practice personnel described several areas of concern about the use of text messaging and email notification, including uncertainty about initial and ongoing costs, parent preferences, patient privacy, legal requirements for patient opt-in, and potential liability for unanswered emails. Although none of the practices currently used email reminders, 6 sites had begun collecting parent email addresses in anticipation of possible future contacts; practices reported the ability to track and query this information in their practice management systems (4) as well as through ad hoc methods such as stand-alone spreadsheets (2).

The 4 autodialer systems used by the 5 practices all had existing voice, text, and email message capability, although practice personnel were generally unaware of these capabilities. These systems offered similar voice message capabilities, with some differences in terms of the recommended duration of the outbound message and the number of contact attempts in case of a busy line or an otherwise unsuccessful contact (Table 1). In contrast, the specific capabilities for text and email messaging varied substantially across vendors.

Discussion

Our findings provide important insights into primary care practice capabilities and plans to use newer technologies to remind parents of upcoming appointments or immunizations. We found that although practices typically provide some form of appointment reminder to parents, few practices send reminders specifically for upcoming immunizations. Importantly, none of the practices in our sample were currently using text messaging or email reminders for appointment or immunization reminders,

Table 1. Summary of Autodialer Vendor Technology Capabilities^a

Messaging Technology	Vendor System			
	A	B	C	D
Voice message (autodialer)				
Practice name and phone number identified	•	•	•	•
Patient can leave voicemail response	•	•	•	•
Delivery report	•	•	•	•
Recommended length of message (seconds)	60	15	120	60
Maximum number of contact attempts	3	10	8	15
Text message				
Patient opt-in not required	•	•	•	•
Patient can text an opt-out response	•			•
Patient can text other response				
Text comes from practice name/number				
Delivery report	•			•
Length of message (characters)	120	140	128	160
Maximum number of contact attempts				
Email				
Patient opt-in not required	•	•	•	•
Patient can email an opt-out response	•	•		•
Patient can send other email response	•	•		•
Practice name identified in email address	•	•	•	
Delivery report				•
Maximum number of contact attempts				

^aPresence or absence of key messaging functions among vendor systems used by sampled practices.

despite the fact that several practices used autodialer vendors that could support those capabilities.

The use of appointment reminders has been demonstrated to be an effective mechanism to reduce clinic no-shows in a variety of settings^{1,2} and enables practices to reallocate appointments cancelled in advance. Similarly, immunization reminder and recall notification has been shown to be effective at increasing childhood vaccination rates and is recommended by the US Task Force on Community Preventive Services.⁴ Traditional methods for appointment reminders have relied heavily on mail (letter or postcard) or live telephone reminders to parents. Although prior studies^{3,4} have found mail and telephone

notifications to be effective, recent reports suggest that reminders sent using newer technologies are feasible and potentially effective in a number of settings.^{1,8-10} Importantly, newer technologies such as text messages or email also have the potential to increase the timeliness of reminders and to improve the success of contact with parents. A recent national study found that although many parents prefer traditional reminder methods such as mail or landline telephones, one quarter preferred newer technologies such as email, cell phones, or text messaging; this was particularly true among younger age groups. Notably, parents' contact information for email and text messaging was as stable, or more so, than their home address or phone number.¹¹

Although new technologies hold much promise to improve reminder notifications to parents, barriers to potential implementation exist in several facets of pediatric practice operations. There is evidence suggesting that the mechanism by which parents are reminded for appointments can influence the effectiveness of reminders in a variety of settings that may, in part, reflect parental preferences for these notifications.^{1,2,12} Some practices in our study acknowledged the importance of tracking parent contact preferences such as email or cell phone (including texting) on patient intake forms. However, important gaps exist for some practices regarding the technical understanding of how such information should be stored electronically, the database linkages necessary to effectively use that information, and the mechanisms to retrieve this information for patient-specific communications. For example, in our discussions with practice personnel, wide variations were observed in the ability to query practice management systems to create email or text lists of patients meeting specific criteria, such as patients scheduled for a particular appointment date or those having an underlying chronic condition. Additional complexity exists for immunization reminders or recall messages, since these notifications entail not only patient demographic characteristics (eg, age, gender) but also immunization history from the patient's medical record. This information must also be applied to a set of rules for assessing age-appropriate vaccination, which in Michigan and some other states is available through a statewide immunization registry, but in other locales could require an assessment function within the practice EHR.

These findings have important implications for pediatric primary care practices. The Centers for Medicare and Medicaid Services (CMS) has implemented substantial incentives aimed at the adoption of EHRs throughout medical practices. Importantly, these incentives are tied to practices achieving "meaningful use" criteria, which include criteria for implementing reminders to patients, per their preference, for preventive or follow-up care.¹³ Our findings indicate that some pediatric practices will

have a steep learning curve to demonstrate the practical application of information such as patient-specific contact preferences. These observations are consistent with other reports that suggest pediatric practices lag behind other specialties for potential eligibility for CMS incentive payments.¹⁴ It is likely that parent-specific contact preferences will take on increasing importance to pediatric practices. Families continue to shift toward wireless-only households, which has tripled in the decade from 2000 to 2010;¹⁵ this trend is likely to continue with the increased adoption of "smart" cell phones, which offer integrated voice, text, and email messaging capabilities.

Conclusions

Current systems for patient reminders rely chiefly on telephone or mail, although some capacity exists for expansion to include text messaging or email notification. Such expansion can often be achieved using existing practice management systems and readily available vendor-supplied text and email services. Perceived barriers among practices to using text message or email reminders include uncertainty regarding parent preferences, cost implications, and legal or regulatory concerns. Guidance for immunization providers regarding these issues could facilitate use of these technologies for reminder messaging.

Authors' Note

The findings and conclusions are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (the funding agency).

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