

## Characterization of Provider Perspectives on Text Message Reminders for Immunizations

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### Abstract

**Objective:** The purpose of this study was to characterize immunization provider practices and perspectives on text message reminders.

**Methods:** This is a descriptive study of Pediatricians, Family Practice physicians and Health Departments in Kansas. Semi-structured telephone interviews were conducted. Fifteen health departments and 19 physician offices participated.

**Results:** Health departments were more likely than physicians to know their clinic immunization rate (80% vs. 37%), use reminder systems (93% vs. 32%) and utilize out-of-office reminders. In addition, health departments were more likely than physicians to consider text messaging an appropriate reminder method (100% vs. 63%) and be willing to try a text messaging system (93% vs. 79%). Perceived barriers to text messaging included low cell phone use among patients, need for consensus in group practices, and privacy concerns.

**Conclusions:** While few immunization providers are currently using text message reminders, support for such programs has increased. Perceived barriers can be overcome with education regarding legal issues, more research into implementation and effectiveness of text message reminder systems and development of a financially solvent program. Theoretical frameworks, such as the diffusion of innovation model, should be considered to enhance uptake and widespread implementation of text message reminders for immunization compliance.

**Keywords:** Immunization; Reminder systems; Text messaging; Qualitative research

### Introduction

Each year in the United States, 42,000 adults and 300 children die from vaccine-preventable diseases [1]. Vaccination of each birth cohort saves 33,000 lives, prevents 14 million cases of disease, reduces direct healthcare costs by \$9.9 billion, and reduces indirect costs by \$33.4 billion. The Healthy People 2020 goal is for 80% of children to receive the routine vaccination series by age 19-35 months [1]; in 2010, only 68.5% met this goal [2]. Increasing vaccination coverage requires a multifaceted approach, including enhanced parent reminder systems [3], which can increase rates by 5% to 20% [4].

Providers have traditionally used phone calls and mailed notices to remind parents of immunizations. While phone reminders have been the most effective [4], these methods have shown minimal effect in low-income populations, often due to inconsistent contact information [5]. Email reminders are an option, but low-income families have reduced access to computers [6]. Hence, text messaging is emerging as an effective and low-cost method for immunization reminders [5]. A 2012 study of text message reminders for influenza vaccination in 7,574 low-income children showed a significantly higher immunization rate for the intervention group (43.6%) compared to control group (39.9%) [7]. Parents have endorsed the

idea of text message immunization reminders for teens [8], young children [9-12] and Latino children [12]. However, minimal work has been done eliciting providers' perspectives and barriers to implementation.

A group conducted a survey of physicians in a single county and found varied interest in using text messaging [13]. Dombowski et al. found 19 clinics used electronic medical records (EMRs) with the capacity to send text messages [14]; however while nearly all clinics used phone reminders, none reported using text messaging. Concerns included financial cost, parent preferences, privacy and legal concerns. The purpose of our current study was to characterize immunization reminder practices in health departments and physician offices in Kansas, and to identify barriers to provider adoption of text message reminder systems.

### Materials and Methods

#### Research design

This descriptive study was approved by the University of Kansas, School of Medicine-Wichita Human Subjects Committee. Oral consent was given by all participants in the study.

## Research setting

Telephone calls were made from the Office of Research to health departments and private physician clinics in Kansas.

## Sample size and sampling methods

Lists of pediatric and family medicine physicians were obtained from the Kansas Department of Health and Environment. A list of health departments (HD) was obtained from the Kansas Public Health Directory. Twenty providers from each group (n=60) were randomly selected for this descriptive study using a random numbers table. This sample size was determined to be sufficient as a prior study suggested general themes have emerged by six interviews, and saturation of themes occurred by a dozen interviews [15]. Over-sampling was performed to account for providers choosing not to participate; based on previous experience surveying this population, a 50% response rate was anticipated.

A certified letter was sent regarding the study; 1 week later providers were contacted by telephone. Providers who did not offer immunizations were excluded and replaced by random selection within the appropriate group.

## Questionnaire parts and design

The 18-item questionnaire utilized a single screening question to determine whether child immunizations were currently offered. Current immunization practices were evaluated through questions regarding clinic immunization rates and reminder methods. Perceptions of need to improve clinic immunization rates were also addressed. Two questions addressed diffusion of innovations in terms of new ideas for immunization delivery and technology systems. Six questions addressed perceptions of e-mail and text message immunization reminders and willingness to implement such systems. For physicians, practice characteristics were collected in terms of percentage of children on Medicaid/SCHIP or with no insurance and group vs private practice. The final questions addressed provider demographics: comfort with technology, years in practice, sex and ethnicity.

## Validation of questions

Questions were reviewed for face validity by an interdisciplinary panel whose members had expertise in the following areas: health communication, pediatric medicine, vaccination and qualitative methods.

## Interview methods

Telephone interviews were conducted by trained study personnel from March through June 2012. The 15-minute interviews used open- and closed-ended questions to explore current immunization practices and perspectives on text messaging reminder systems. Interviews were recorded and transcribed; open-ended responses were reviewed for themes. Participants received a \$50 gift card.

## Statistical tests and analysis

Frequencies and percentages were compiled for closed ended questions. Provider responses to open ended questions were unitized into individual content statements. These statements were reviewed independently by two researchers and themes were compared and

differences reconciled. Chi square analysis was used to compare HD and physician office responses.

## Results

### Demographics

Thirty-four immunization providers (57%; 34/60) agreed to participate: 15 HDs (44%) and 19 (56%) physician offices. All HD respondents were nurses and female. Physician office respondents included pediatric (10), and family medicine offices (9: 5 physician completed surveys, 4 delegated to support staff). Most physician office respondents (68%; 13/19) were female. All pediatricians worked in a group practice (100%; 10/10), as did most family physicians (89%; 8/9). Those who chose not to take part stated they had no time to participate in the phone interview or could not be reached. The majority had been in practice <15 years (82%; 28/34). Most (88%; 30/34) described themselves as white, with the remaining 12% (4/34) Hispanic, Asian, or other.

### Current immunization practices of HD

Most HDs (80%; 12/15) reported knowing their clinic immunization rates, with a range of 60% to 94% (mean 83%, SD 10%). HD reported on average, the majority of their child patients were on Medicaid, SCHIP or uninsured (mean 59%, SD 31%). HDs generally recorded both their Medicaid and non-Medicaid immunizations in their own EMR; around half (47%; 7/15) of the HD EMRs automatically uploaded to the state immunization registry, while the other half (53%; 8/15) required manual entry of immunizations into the registry. Immunization rates reported by HDs were most often reported as calculated by these immunization information systems.

Sources of new ideas regarding immunizations	Health Departments (n=15)	Physicians (n=19)	Total (N=34)
Kansas Immunization Program	9 (60%)	5 (26%)	14 (41%)
Health Departments	11 (73%)	0 (0%)	11 (32%)
Centers for Disease Control	3 (20%)	6 (32%)	9 (27%)
American Academy of Pediatrics	0 (0%)	6 (32%)	6 (18%)
Conferences	3 (20%)	3 (16%)	6 (18%)
Clinic Staff	2 (13%)	1(5%)	3 (9%)
Physician Colleagues	0 (0%)	3 (16%)	3 (9%)

**Table 1:** Sources of Immunization and Technology Information Used by Providers

HD reported various methods for reminding parents of upcoming immunizations (Figure 1); most frequent methods included mailings (93%; 12/15) and phone calls (60%; 9/15). One HD used email immunization reminders (7%; 1/15) and one (7%; 1/15) used text message reminders. A few HDs mentioned using email and text messaging for purposes other than routine vaccinations, including

reminders for flu immunization clinics, follow-up HPV vaccinations, and clinic appointments. "We are offering WIC (Women, Infants, and Children) program reminders either by email or text," stated one HD nurse, "we haven't gotten anyone to sign up for the emails, they always want text." Another HD worked with the local school district, which sent parents mass emails and text alerts regarding upcoming immunization clinics. Some respondents reported currently collecting email and cell phone information for possible future use.

HDs predominately looked to other HDs for ideas for delivering immunizations (73%; 11/15) (Table 1). One HD met monthly with a coalition of seven counties, sharing ideas and working on projects together.

### Current immunization practices of Physicians' Offices

Fewer physician offices (37%; 7/19) reported knowing their clinics' immunization rates, and those who did generally estimated their rates. A typical physician response was, "I don't know (our immunization rate), probably 90%. Parents are very compliant, except for those that purposefully don't immunize." Most physicians' offices identifying an immunization rate (89%; 17/19) reported a rate above the Healthy People 2020 goal of 80%. Average reported immunization rates ranged from 85% to 95% (mean 91%, SD 10%) for physician offices. Roughly a third of their child patients were on Medicaid, SCHIP or uninsured (mean 36%, SD 0.35). Physician's offices reported various methods for reminding parents of upcoming immunizations (Figure 1) with the most frequently reported including verbal reminders (74%; 14/19) and handouts (42%; 8/19). "(We remind them) at their visit," said one physician, "we just implemented an EMR (electronic medical record) system, and we are hoping that it is going to generate a better process. But right now, you just basically tell them at their two month visit, or their four month visit, or their six month visit. And we give them something as a (appointment) reminder." Two physician offices used email immunization reminders (11%; 2/19).

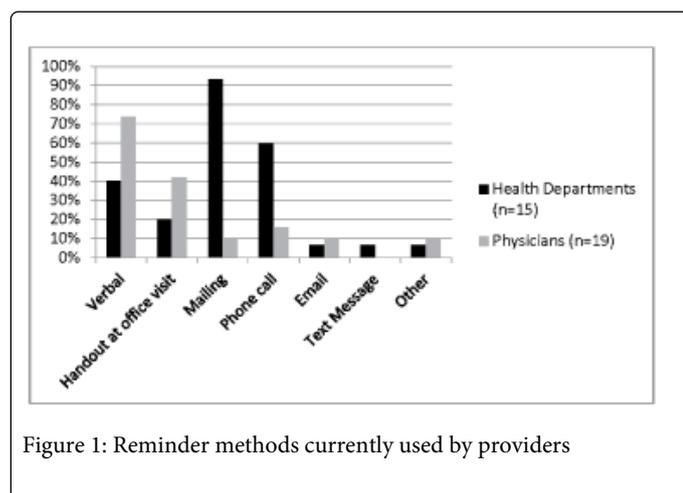


Figure 1: Reminder methods currently used by providers

Physicians' offices reported no prevailing information source for new ideas on delivering immunizations (73%; 11/15) (Table 1). Physicians cited a number of sources for new ideas, including the American Academy of Pediatrics and the Centers for Disease Control and Prevention, but there was no dominant source of information. One pediatrician commented, "I think something is needed to unify. Everyone seems to do their own thing their own way, whenever they have time to do it."

### Attitudes regarding reminder systems

All HDs (100%; 15/15) and most physician offices (84%; 16/19) wanted to increase their immunization rates. HDs (100%; 15/15) and many physicians (63%; 12/19) believed text messaging was an appropriate reminder method. "I think that it is a communication method that they [parents] are very used to and very comfortable with," said one HD nurse, "They are so used to checking their texts. We probably don't have one parent that doesn't have a phone, no matter what their income range might be." Another HD nurse stated, "Well, it seems like everyone who comes in our office has a cell phone glued to their ear, so that [texting reminders] seems like a good idea." Most respondents (85%; 29/34) were willing to implement a text message reminder system given the appropriate resources. "We would like to send out text reminders for immunizations, but don't have appropriate software," noted one HD nurse, "We send texts [for some services] individually, so it is time consuming." One physician recommended parents register for Text4Baby, a non-profit organization that sends text messages with health information, including immunization reminders.

Respondents identified barriers to text messaging, including privacy concerns (12%; 4/34), perceived low cell phone use among their patient population (35%; 12/34), and a need for group consensus in their practice before a new system could be implemented (24%; 8/34). One physician summarized a common concern, "Thirty percent of our patients have state-funded insurance...[there is] a huge turnover rate for those with disposable cell phones, and their phones get canceled and disconnected." One group had previously emailed laboratory results to patients, but stopped because of inconsistent email access. Another concern was the inability to confirm receipt of a text or email. In addition, one physician expressed concern, stating, "Parents are already confused by immunization opportunities from multiple sources, including WIC appointments, schools, and physician offices." Some physicians noted they would like text reminders to be more established before adopting their use, especially if their clinic were to fund the technology. Several physicians commented on difficulty when working in group practice. One stated, "it is hard to get things done when you have a group...Right now five partners have to agree for something to be implemented."

A majority of HDs (80%; 12/15) and physicians (68%; 13/19) reported they would enroll patients in a state-wide text message immunization reminder system if such a system were available; however, respondents were concerned over the logistics and lack of personalization of a centralized program, with nearly all supporting a clinic-based system over a county or statewide system (91%, 31/34). A physician noted, "With any kind of state or federal [program] it is a bureaucracy, and they don't necessarily have any attention to detail, because they don't have any personal stake in it. So I think probably a clinic based one would be better. You would have to have the manpower to then do that." One physician stated that private clinics generally do not share a database with the state, making centralization difficult.

When asked what features a text messaging reminder system would need, respondents stated it should be simple and give confirmation the text message had been received. Furthermore, respondents stated such a system should link to several existing programs, including immunization informatics systems (WebIZ, CoCASA), electronic health records (KIPHS), and WIC programs.

## Comparisons between HD and Physicians' Offices

HDs were significantly more likely than physician offices to report knowing their clinic immunization rate (80% vs 37%;  $p=0.0171$ ), to use reminder systems (93% vs 37%;  $p=0.011$ ), to believe text messaging was an appropriate reminder method (100% vs 63%;  $p=0.008$ ).

## Discussion

HDs and physicians' offices utilize varied strategies and systems regarding immunization reminders and reporting. To begin, HDs were significantly more likely to calculate overall immunization rates. This could be attributed, in part, to the fact that immunizations billed to the Kansas Medicaid Vaccines for Children (VFC) program were automatically uploaded to the state immunization registry [16]. However not all other immunizations were uploaded.

Most physicians did not track clinic immunization rates, although they utilized EMRs. However, not all EMRs have the ability to track immunizations. A 2012 study of 646 pediatricians found that of the 54% of responding pediatricians who used EMRs, only 28% had the ability to track immunizations [17]. As of now private insurers have no immunization reporting requirements. According to Mary Beth Chambers, the Corporate Communications Manager for Blue Cross and Blue Shield of Kansas, such reporting requirements are being considered (Personal communication March 28th, 2013). Accurate tracking is essential to improve rates, and a reporting requirement would assure that this occurs.

In terms of immunization reminders, HDs generally used out-of-office reminders, while physicians' offices relied on in-office reminders. Few used technological options. These results correspond with our and Dombkowski's study findings that traditional methods of reminders were often used, but no respondents reported e-mail or text messaging reminders [13,14].

Our respondents reported no leading resource for new immunization or technology ideas. The theory of diffusion of innovations described the gradual adoption of a new technology, starting with innovators, followed by early adopter opinion leaders, to the tipping point of adoption by general society [17]. This framework can be used to describe a potential path for adoption of text messaging for immunization reminders. Text message reminders in the healthcare field are currently in the innovator to early adopter state, being used by researchers, and to a very limited extent by healthcare providers. In order for the technology to become widely used, early adopters need to become opinion leaders. This is difficult when existing leaders in innovation have not been identified and clear avenues for dissemination and communication do not appear to exist.

However, support for the idea of text message immunization reminders appears to be increasing. In contrast to our previous findings, where only 27% of immunization providers were willing to try text message reminders [10], the majority of our respondents were willing to consider such a program. These results are similar to those of Hofstetter who found  $\geq 88\%$  of providers approved of text messaging communication with patients [18,19]. This increase is likely multifaceted. Fundamentally, the technology is becoming more mainstream. Populations at high risk for missed immunizations, including ethnic minorities and those of low socio-economic status, are more likely to have cellular/smart phones than regular computer access [20,21]. In addition, there is an increasing body of evidence to

support the effectiveness of text message reminders for increasing immunization rates [8,22].

Barriers to implementation, on the other hand, continue to exist. Paralleling findings by Dombowski [14] and Hofstetter we identified perceived barriers including the following: (1) Patient privacy concerns, as the Health Insurance Portability and Accountability Act (HIPAA) prohibits use of protected health information (PHI) in standard consumer-based messaging systems, which lack security measures [19,23]. However, patient privacy may be legally protected by a waiver for release of information for healthcare operations. Thus, with a patient's permission text message reminders may be sent without HIPAA violation. (2) Perceived low cellular phone use among patients - A 2012 Pew Research Center study found 86% of households earning less than \$30,000 a year had a cellular phone; 79% of cell phone owners use text messaging [24]. In addition, our studies regarding parent perceptions found the majority had unlimited text messaging plans, and, many on pay-per-text plans were still willing to receive text message immunization reminders [9,12], and (3) Lack of support from group practice members - These concerns are likely related to financial feasibility and effectiveness concerns. With more research into implementation and effectiveness of text message reminder systems [8,22], along with further development of EHRs, these concerns may diminish.

## Study Limitations

This study had several limitations. While the study was conducted state-wide, only a few participants were recruited from each specialization. Although we believe this small sample was enough to adequately address the research question, we acknowledge that additional information may have been gained from expanding our sample size and therefore, our generalizability. In addition, the self-report nature of the data may have been influenced by the respondent (e.g. nurses vs. physicians) and not necessarily have reflected the actual clinic practice. Finally, as with any self-report data, social desirability may have influenced respondents to appear more open to text messaging.

## Conclusions

While few immunization providers are currently using text message reminders, support for such programs has increased. However, several barriers have been identified that reduce the likelihood immunization providers will implement a text message reminder system. These perceived barriers can be overcome with education regarding legal issues and a financially solvent program. Creating or identifying clear channels to disseminate information regarding immunization promotion and technology information for novel communication strategies, such as text messaging, may increase the number of practices implementing such programs.

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