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Effectiveness of Centralized Text Message Reminders on Human Papillomavirus Immunization Coverage for Publicly Insured Adolescents



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A B S T R A C T

Purpose: We evaluated a managed care organization (MCO)–generated text message reminder–recall system designed to improve human papillomavirus (HPV) vaccination coverage.

Methods: We conducted a randomized controlled trial of text reminder–recall for parents of 3,812 publicly insured adolescents aged 11–16 years with no prior HPV vaccinations who were enrolled in a single MCO and were patients at one of 39 primary care practices. We determined the rate of HPV receipt for intervention versus control with the Kaplan–Meier failure function and determined hazard ratios using a clustered stratified Cox model, clustering on primary care provider and stratified on practice. We examined results for all subjects, and for those with a valid phone number, stratified by age group (11–13 years and 14–16 years) and gender. A post hoc analysis included all subjects and controlled for age and gender.

Results: HPV dose 1 vaccination rates were not significantly different when all participants were included, but for the subset of parents (54%) able to receive messages, HPV dose 1 rates were 13% for the control group and 16% for the intervention group; hazard ratio, 1.3 (95% confidence interval, 1.0–1.6; $p = .04$), when controlling for age and gender. There were no significant findings in the analysis stratified by age and gender.

Conclusions: MCO-based text reminders are feasible and have a modest effect on HPV dose 1 vaccination rates for those parents able to receive text messages with valid phone numbers in the MCO database. Future studies should examine a similar intervention for those parents who already accepted the first HPV vaccine dose.

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IMPLICATIONS AND CONTRIBUTION

Centralized text message reminders from a public insurance managed care organization have a small but significant effect on increasing rates of the first dose of human papillomavirus vaccine for parents with working phones capable of receiving text messages.

Conflicts of Interest: S.G.H. is a consultant to the not-for-profit, Immunization Action Coalition. None of the other authors reports any conflicts of interest.

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Human papillomavirus (HPV) vaccine has been recommended for adolescent females and males since 2007 and 2011, respectively [1,2]. However, only 57.3% of female adolescents aged 13–17 years and 34.6% of male adolescents aged 13–17 years had received at least one dose of the vaccine in 2013, and rates have plateaued in female adolescents [3]. Practice-based reminder–recall systems for vaccines due or missed have been shown to increase immunization rates [4–8] and have traditionally been done by mail or phone. Recently, text message reminders have been shown to improve childhood and adolescent immunization rates in a single urban setting [9–11]. However, only 16% of pediatric practices nationally use reminder–recall systems [12]. Barriers to use of such systems include cost, competing demands, concerns about lack of completeness of immunization and contact records, and insufficient experience [13–16]. Centralized mail and phone reminder–recall from a managed care organization (MCO) and a state immunization registry have been shown to increase rates of immunizations [17,18] and take advantage of economies of scale. Therefore, we conducted a randomized controlled trial (RCT), based in a large MCO, to evaluate the effectiveness of a centralized text message–based reminder–recall system on improving rates of the first dose of HPV vaccination among low-income adolescents. We hypothesized that centralized text–based reminders would improve HPV immunization rates.

Methods

Setting

The study was based at the Monroe Plan for Medical Care, a large not-for-profit MCO in upstate New York serving patients insured by Medicaid or the NY State Child Health Insurance Program. Members enroll in the MCO and are asked to update their contact information annually.

Study design

From July 2013 to March 2014, we conducted an RCT comparing text message reminders for HPV vaccination versus general adolescent health text messages, randomizing adolescents within each practice. Stata (Version 13.1; StataCorp, College Station, TX) was used to generate a randomization table. The study was approved by the University of Rochester's Research Subjects Review Board.

Participating practices

We included 39 primary care practices (29 pediatric and 10 family medicine), each with more than 175 adolescents enrolled in the MCO from their practice. Practice managers received a letter on MCO letterhead notifying them of the intervention.

Subjects

The target population included adolescents aged 11–16 years enrolled in the Monroe Plan on July 1, 2013, with a primary care provider in a participating practice and with a phone number listed in the insurer's database. Adolescents were eligible if they had no record of any HPV vaccinations in either billing data or the state's immunization registry (NY law requires registry reporting of all vaccinations for patients aged less than 19 years). For families with multiple children, we randomly allocated a referent

adolescent and excluded siblings. Patients were excluded if they transferred out of a participating practice or were no longer insured by the MCO during the study period.

Intervention

The MCO programmer reviewed vaccination data and sent text messages (up to four) to parents of eligible adolescents in the intervention group, using a third-party vendor who specializes in mobile communication. An initial notice informed parents that they were enrolled in a health message program from their child's insurer: "MPHealth: Ur opted in 4 health messages frm ur child's insurance [name of insurance plan] THX! Msg&Data Rates May Apply Text STOP to opt-out." If participants did not opt out, a reminder for an HPV vaccination (MPHealth: 'Your [age] yr old is due for an HPV vaccine. Pls call [phone number and office name] to schedule an appt. Text STOP to opt-out') was sent. Parents of participants who received HPV vaccine dose 1 during the study and so were eligible for doses 2 or 3 (based on recommended intervals) also received messages for those doses. If a patient was not yet eligible for the next dose based on billing and registry data, no message was sent. The MCO received a report from the third-party vendor identifying whether text messages were received.

Controls

Control group parents received the same initial message, followed by a control message about a different general adolescent health topic each time reminders were sent to the intervention group (e.g., 'MPHealth: A healthy breakfast is associated with improved brain function, fewer missed school days, and improved mood for teens, Text STOP to opt-out').

Measures

The main outcome was receipt of the first dose of HPV vaccine, but secondary measures included subsequent HPV vaccine doses (i.e., receipt of HPV vaccine doses 2 and 3).

Analyses

We determined the rate of HPV vaccine receipt for intervention versus control group patients from the time of the first message sent to the end of the study with the Kaplan–Meier failure function. We determined hazard ratios using a clustered stratified Cox model with the Efron method to handle tied events and the Huber/White variance estimator that clustered on primary care provider and stratified on practice. We examined results for all subjects and separately for those with a valid phone number able to receive text messages, stratified by age group (11–13 and 14–16 years) and gender. Because our planned stratified analyses were limited by insufficient sample size, we performed additional post hoc analyses that included all subjects, but controlled for age group and gender.

Results

We sent messages to the parents of 3,812 adolescents (descriptive statistics shown in Table 1). Slightly more than half were male and were insured by Medicaid; 74% were seen in pediatric practices. Almost half had a phone number that never received health or reminder text messages because of a phone that was not able to receive texts or not in service (760 of controls

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