Feasibility of Initiating and Sustaining Registry-Based Immunization Recall in Private Practices

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ABSTRACT

OBJECTIVE: To assess the feasibility of initiating and sustaining immunization recall by private practices, including the barriers and costs, using a statewide immunization information system (IIS).

METHODS: Private practices in southeast Michigan were recruited in 2007 to perform IIS-based immunization recalls. Enrolled practices were provided with training and asked to conduct 4 recalls during the course of 12 months of children 19 to 35 months of age. Each practice recorded the time they spent performing recall-related activities; labor costs were estimated. Formative and summative evaluations with semi-structured interviews were conducted to identify barriers.

RESULTS: Of 97 eligible pediatric and family medicine practices, 44 declined to participate, 32 did not respond to repeated contacts, and 20 agreed to enroll in the study (21%). A total of 56 recalls were conducted during the study period, with 9 practices completing at least 4 recalls and 7 practices completing 1 to 3 recalls; 4 practices conducted no recalls. Common barriers reported included time constraints and executing all steps of the recalls. Practice costs per patient recalled ranged from $0.05 to more than $6 and were primarily driven by the type of personnel who performed recalls. The costs of creating a roster of current patients comprised nearly one-half of total labor costs.

CONCLUSIONS: Few private provider practices that we contacted were willing to participate in this study of IIS-based recall, and less than one-half of enrolled practices completed the desired 4 recall cycles in 12 months. Time constraints and other real-world problems should not be underestimated in determining the feasibility of practice-based immunization recall. Efforts to increase the use of a statewide IIS for recall in private practice settings should emphasize ongoing training and technical support to practice staff. Improved interoperability with electronic health record systems may foster practice-based recall by reducing the labor intensity of roster building and other recall activities.

KEYWORDS: immunization; immunization information system; private providers; recall; registry

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WHAT'S NEW

The willingness and ability of private providers to conduct immunization information system–based recall was limited, and recall efforts were not easily sustained. Real-world challenges, including staffing changes, time constraints, and training costs, may serve as barriers to immunization information system–based recalls in private practices.

THE USE OF mail, telephone, or computers to remind patients of appointments for vaccinations or to recall those that are overdue has been shown to improve age-appropriate vaccination among children.[1–11] Reminder/recall is recommended by the Advisory Committee on Immunization Practices[12] and the Task Force on Community Preventive Services.[13] Importantly, reminder/recall is a fundamental capability of immunization registries, also known as immunization information systems (IIS). IIS are confidential, population-based databases that consolidate immunization history from multiple providers for residents of a given geographic area, providing essential information on patients' vaccination history and status.[14–16] Although IIS-based recall has been used widely by local health departments, its use has been limited among private providers,[17] even though most children receive vaccines from private providers exclusively.[18] Although immunization rates among private providers generally are high,[18] rates vary substantially by physician specialty and volume[19] and may not reflect delays in age-appropriate vaccination.[20–22] Furthermore, practice-specific immunization rates have been shown to vary, depending on the method of measurement.[23–25]

Although there have been reports of the successful use of immunization reminder/recall by private providers,[8,10,11] few studies have explored use of IIS-based recall.[26,27] The extent to which barriers such as cost and staff time may influence providers' willingness to conduct IIS-based recall in the private practice setting is largely

unknown. Thus, our objective was to explore the feasibility of initiating and sustaining IIS-based immunization recall among private practices, including the barriers and costs.

METHODS

Our intervention consisted of onsite training of private primary care practices in southeast Michigan to conduct practice-based recalls using Michigan's comprehensive, fully-functioning statewide IIS, the Michigan Care Improvement Registry (MCIR).[28] State law requires that all vaccination doses administered to children <20 years be entered into MCIR. Training, as-needed technical assistance, and recall follow-up were provided by MCIR regional staff. The University of Michigan Institutional Review Board approved this study.

PRACTICE RECRUITMENT AND TRAINING

All pediatric and family medicine practices in metropolitan Detroit were identified from MCIR. In January 2007, the study team mailed an invitation letter to the lead physician or office manager at each practice; a follow-up telephone call was conducted to provide additional details regarding the project and to schedule a recruitment visit. A lead contact was identified for each practice that agreed to enroll in the study, usually the practice manager or staff member with primary responsibility for entering data into MCIR.

Practices that agreed to enroll were provided with training on MCIR-based recall, including a training manual, onsite training, set-up and editing of patient rosters, and post-recall follow-up. Onsite training featured step-by-step, hands-on instruction using practices' own computer equipment. A practice's patient roster (ie, a list of their active patients) was built on the basis of either of 2 methods: 1) MCIR-defined active patients for that practice, which is determined by the location of child's last vaccine dose; or 2) a customized, practice-defined list of active patients, which was based on their own records. Because rosters cannot be created in MCIR from data uploaded from a practice management or electronic health record (EHR) system, the customized lists had to be manually entered into MCIR. Once built, rosters were updated at practices' discretion throughout the study period. Automated MCIR-algorithms based on Advisory Committee on Immunization Practices recommendations were used by practices to classify their roster of patients as being eligible for recall.

After training, practices were asked to conduct 4 quarterly recall cycles during the subsequent 12 months, focused on children 19 to 35 months of age. The study reimbursed practices for material costs (postage, mailing supplies) but not personnel costs.

DATA COLLECTION AND ANALYSIS

The primary outcome was the number of recall cycles completed during the 12-month intervention period. Secondary outcomes included the time spent and cost of conducting recalls, as well as the barriers encountered. Both qualitative and quantitative methods were used to collect data to assess these outcomes.

Characteristics for enrolled practices were collected at baseline from each practice's lead contact, including ownership/affiliation, number of providers, specialty, percentage of patients in Medicaid, vaccination volume, previous immunization recall activity, and EHR use. By using semistructured interviews with the lead contact at participating practices, we conducted formative and summative evaluations, at the midway point and end of the intervention period, respectively. These evaluations included questions on the number of recalls conducted, the staff involved in the recall process, problems or barriers encountered, and the likelihood of continuing MCIR-based recall after the study. Responses were recorded on a standardized data collection form.

Additional information for the formative and summative evaluations was collected from MCIR regional staff, who reported on their training experiences and direct observations of recall processes in the participating practices, including whether recalls that practices reported conducting were correctly confirmed in MCIR. At the end of the study, we reviewed the data collection forms from both the formative and summative evaluations to tally the number of recall cycles completed at each practice and to catalog barriers. Barriers were coded thematically by 2 research assistants, with differences resolved by the lead investigator; the most common barriers are presented in the results.

To enable cost estimates, practices tracked the number of recall cycles completed, as well as the time any staff member spent performing recall tasks; standardized tracking sheets were submitted weekly. Time spent by MCIR staff at each participating practice was similarly tracked. Labor costs were estimated using prevailing wages for different job classification categories, based on U.S. Department of Labor, Bureau of Statistics data. Material costs were calculated using practice-reported expenditures for postage and supplies. Total costs at each practice were calculated as the sum of labor and material costs of recalls, excluding MCIR labor costs. Per-patient costs were determined by dividing total costs at each practice by the number of patients on their roster. Overall per-patient costs were determined by dividing the grand total recall costs for all practices by the roster totals summed across practices that conducted recalls. All costs were calculated in 2007 US dollars.

RESULTS

PRACTICE PARTICIPATION

Of 97 eligible pediatric and family medicine practices, 44 declined to participate, 32 did not respond to repeated contacts, and 20 enrolled in the study (21%). Among the 20 enrolled practices, most were private, independent pediatric offices in suburban areas; most had 6 or fewer providers (Table 1). For the majority, Medicaid patients accounted for ≤10% of their total patient population, although one-third had greater than 50% of their patients receiving Medicaid. Almost one-half of the practices had previously conducted immunization recalls, either with

Table 1. Practice Characteristics

Characteristic	% (n = 20)
Ownership/affiliation	
Private, independent	70
Physician network	5
Public clinic	25
Number of providers	
1–2	35
3–4	35
5–6	25
>6	5
Medical specialty	
Pediatrics only	60
Family medicine only	5
Multispecialty	35
Proportion of Medicaid patients	
None	35
1%–10%	20
11%–50%	10
>50%	35
Weekly vaccination volume (n = 19)	
≤25 children	42
26–100 children	58
Electronic health record system	
Yes	25
No	75
Previous immunization recall	
Yes	45
No	55

MCIR or another system, although none were currently conducting recalls; 25% had an EHR.

Use of Recall and Barriers

Four of the 20 practices (20%) that initially enrolled did not conduct any recalls during the study period; lack of time or available staff was cited by each of these practices. Three of these practices also cited difficulties with their internal data systems and consequently never scheduled a MCIR training session. Sixteen of the 20 enrolled practices (80%) completed ≥1 recall (mean, 3; range, 1–7). These practices conducted a total of 56 recalls, with 9 practices completing ≥4 recalls, 2 practices completing 3 recalls, 3 practices completing 2 recalls, and 2 practices completing 1 recall. Among the 16 practices that conducted at least 1 recall, patient rosters totaled 27,196 children; for individual practices, rosters ranged widely, from 97 to 6,832 children (median, 938).

Formative and summative evaluations revealed that nearly all of the 16 practices (n=15) experienced some problems conducting recalls. Two practices, each of which conducted only 1 recall, closed or relocated during the study period and could no longer participate in the study. Ten of the remaining 14 practices cited time constraints as a barrier, indicating that recall-related tasks were labor intensive or that finding the time to do them was difficult due to staff turnover and other work responsibilities. Difficulties with the execution of recalls were also common (9 practices), such as running recalls up to the point of printing letters from MCIR but never mailing them, or mailing recall letters without appropriately documenting in MCIR that the patients had actually been recalled.

Several practices had problems related to incomplete immunization histories, which can lead to children being incorrectly flagged as not up-to-date in MCIR. Many of these issues arose as the result of practices having problems transferring certain data (eg, specific vaccines, CPT codes) to MCIR (5 practices) or not consistently entering immunization history data for their patients that had previously received vaccinations from other providers (3 practices). A few practices required retraining or substantive technical assistance; 1 practice with high turnover needed retraining 3 times. In general, the type of barriers experienced by practices that conducted at least 1 recall but were unable to meet the goal of 4 recall cycles did not differ from those experienced by practices completing 4 or more recall cycles. Only 1 practice reported no problems throughout the study; this practice had previous experience conducting MCIR recalls and relied greatly upon physician involvement. Of these 14 practices, one-half (n = 7) indicated that they would be interested in continuing to conduct MCIR-based recalls in the future.

Recall Costs

Across the 16 practices conducting at least 1 recall, a total of 909 hours were spent on recall-related activities (including MCIR training) by practice and MCIR staff. The total labor cost for the 56 recalls conducted was estimated at $26,057; 78% of these costs were attributable to practice labor expenses. Recall labor costs closely paralleled the time expended by recall activity (Fig. 1), with the most time-consuming task being roster building/gathering (49% of total recall time). Most practices chose to build customized rosters to ensure that only their self-determined active patients were included. The largest share of roster-building time was among nursing staff (31%), office managers (32%), and MCIR staff (14%). MCIR training expended nearly one-third of total time, primarily for preparing and conducting training exercises, and follow-up assistance. A relatively small portion of time was devoted to actually generating recall notices, preparing mailings, and reconciling bad addresses from returned letters.

Recall activities were performed by a variety of staff; consequently, time and costs varied across labor categories (Fig. 2). Among practice staff, office managers and nurses expended nearly one-half of the total time, with medical assistants and physicians devoting lesser portions. Recall

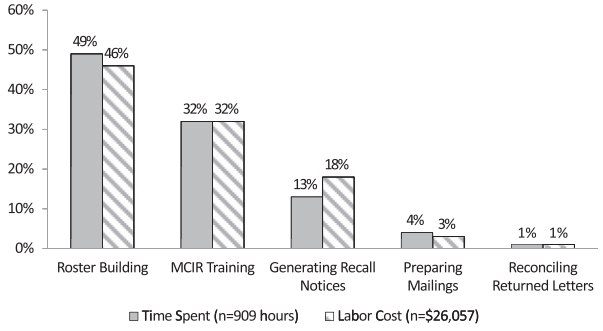

Figure 1. *Recall labor time and costs by recall activity.*

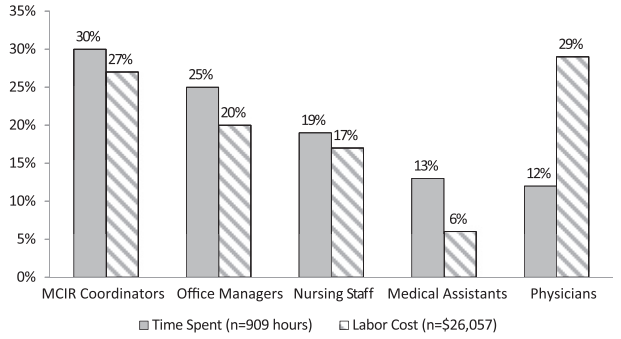

Figure 2. *Recall labor time and costs by labor category.*

costs varied considerably by labor category, reflecting differences in how practices utilized their personnel to perform recall tasks. Physicians accounted for substantially more costs (29%) than their relative proportion of recall time (12%), given the high labor costs in this category; other personnel accounted for a smaller proportion of costs relative to time.

TOTAL COSTS TO PRACTICES

Excluding costs borne by MCIR staff ($5,786), total costs for the 56 recalls, including labor and materials, was $21,134; of this total, costs for postage and office supplies (reimbursed by the study) were $863 (4%). Per-practice total costs ranged from $56 to $7,595; 2 practices had a cost-per-recall-cycle of more than $1000. Figure 3 illustrates the wide variation in practices' total cost per patient recalled, ranging from $0.05 to greater than $6. Larger practices tended to have lower recall costs per patient, although the principal driver of cost was the labor mix used for recall activities. Higher-cost practices used office managers (practice "P") or physicians (practice "Q") to conduct recall tasks, whereas lower-cost practices primarily used nurses, medical assistants, or clerical staff.

DISCUSSION

Despite widespread use of MCIR in Michigan,[29] the willingness of private providers to conduct IIS-based recall was limited. Although our study covered practices' material costs of recall, the overall level of participation in our study was relatively low, and most participating practices were unable to sustain recall efforts during a 1-year period. Participating practices often experienced problems that reflect the real-world challenges of running a primary care practice, including time constraints resulting from staff turnover, changes in practice ownership, and low staffing levels. Although each of the practices routinely reported doses administered to MCIR, some difficulties with incomplete data were encountered as the result of problems with electronic transfers as well as a reluctance to enter vaccination history for doses administered by other providers. Despite the extensive assistance provided by MCIR technical staff in the study, the numerous difficulties encountered by practices suggests the considerable need for additional guidance regarding recalls and patient roster development.

These findings are of particular interest in light of the recent recommendations supporting the use of IIS for reminder/recall.[16] This study offers an examination of the willingness and ability of private providers to conduct IIS-based immunization recall on a sustained basis. Although the authors of previous studies have shown that private providers can use recall effectively,[8,30] others reveal that private providers submit vaccination data, perform vaccination assessments, and generate recalls less frequently than their public health counterparts.[17,26,31]

Our study also offers important insights into the barriers to IIS-based recall by private providers. These findings confirm the results of a national survey of pediatricians that indicated lack of time is a leading barrier to reminder/recall.[26] In a more recent study of pediatric practices trained to conduct IIS-based recalls,[27] researchers found that initiation of recall was very limited, even though the practices were considered to be highly motivated and well-prepared. Although the cost was not explicitly noted as a barrier, that same study found a positive association with 2 characteristics related to cost: having staff with dedicated time for recall activities, and focusing recall on younger children who typically have more accurate contact information.

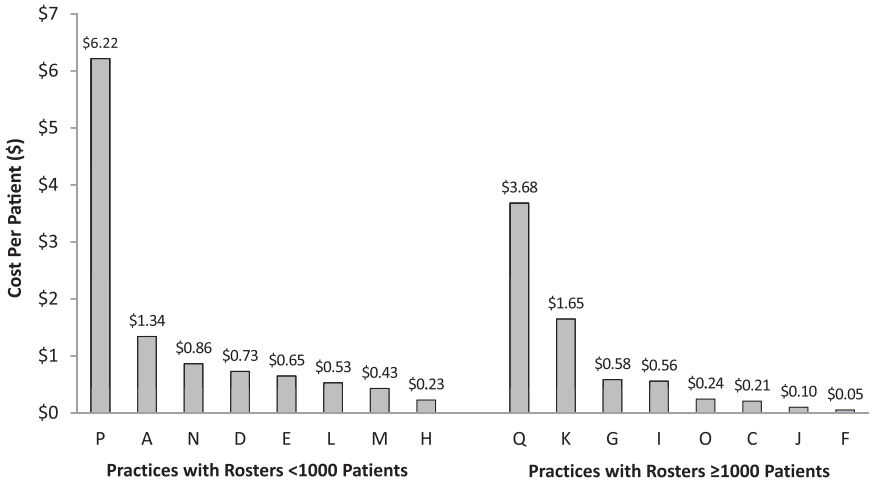

Figure 3. *Recall practice costs per child by total roster size.*

We found that recall at some practices was time consuming, particularly for roster building, raising the question of long-term sustainability in private practices. Some practices used highly-paid staff for recall activities; it is unclear whether they were concerned with maintaining high-quality recall information and avoiding concerns regarding the practice's reputation, as reported elsewhere.[27] Not surprisingly, costs paralleled the time devoted by practice staff to recall activities; generally, costs were greater in smaller practices, but were quite variable, depending upon the type of personnel performing recall activities, the amount of time spent, the number of recall cycles conducted, and the number of children to be recalled.

Using direct assignment of labor costs, practices that used higher-paid individuals to conduct recall activities would be expected to have higher costs. However, we had no mechanism to assess the "opportunity cost" of conducting recall. For example, if a physician performed recall tasks during "down time" between patients, then the actual cost was minimal; however, if a medical assistant completed recall tasks instead of other activities to support clinical operations, the opportunity costs would significantly impact the practice's actual costs. The largest component of total costs was for MCIR coordinators, who provided training and technical support. Although not borne by the participating practices, the cost of this technical support should be recognized by those considering practice-based immunization recall using an IIS.

Emerging efforts to promote interoperability with EHRs could serve as a tipping point for practice-based recall. Given the extensive time required for roster building in this study, mechanisms to import patient roster information into IIS from practice-based electronic systems may improve interoperability and facilitate recall. Currently, provider-level incentives for the adoption of EHRs are tied directly to the concept of meaningful use, which includes metrics related to patient-targeted reminders and system interoperability with IIS.[32,33] Such incentives may be a catalyst to foster better connections between private providers and IIS, achieved either through improved mechanisms to upload practice-specific roster information to EHRs, or through bidirectional interoperability, allowing recall to be conducted directly from practices' native EHR system using the most timely, complete, and accurate information available. Bidirectional interoperability between EHRs and IIS could enable practices to more easily conduct recalls and avoid the substantial training and technical costs we observed in this study by removing the need for their staff to learn a separate IIS system for recall.

There are several limitations to this study. Our participating practices were primarily in suburban areas; few inner-city practices were willing to participate, and those that participated did not sustain recall activities. It is likely that the barriers reported by our participating practices would be even more evident among inner-city practices that typically operate with minimal resources. Also, although several practices had acquired EHR systems, few had transitioned to using them routinely; therefore, potential differences in recall costs associated with EHR use could not be determined. Costs for each practice were available in aggregate only, for each individual recall cycle. Finally, many practices did not consistently indicate within MCIR when each recall had been mailed. This information is crucial in the MCIR database to associate recalled children with subsequent receipt; thus, vaccine outcomes were not available for this study.

Our findings have implications for long-term strategies to promote sustained use of IIS-based recall by private providers. First, training and technical support costs for widespread adoption of IIS-based recall would be substantial. Second, staff turnover, limited time, and other real-world problems should not be underestimated in determining the feasibility of practice-based immunization recall.

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