

Innovations in Diabetes Care From One of America's Most Wired Communities: Effects of an Electronic Emergency Department/Admission Alert System in Cincinnati, Ohio

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Managing costs and improving care associated with type 1 and type 2 diabetes has proven to be as difficult as managing the disease itself. Diabetes care is costly, complications are common, and prevalence is growing. In addition, the need for improved coordination and management of care is hindered by barriers in the monitoring and tracking of diabetes care across multiple clinical settings.¹⁻⁷

To better manage patients and improve care, many hospitals and primary care practices have adopted electronic health records (EHRs), many with clinical decision support (CDS) functionality that facilitates closer monitoring of A1C, LDL cholesterol, blood pressure, and eye and foot exams.⁸ The use of EHRs with CDS has been associated with improved outcomes for patients with diabetes; decreased use of outpatient, specialist, and inpatient services; and reduced overall costs, particularly when integrated into quality improvement (QI) activities.^{9,10}

However, a sizeable proportion of primary care providers (PCPs) and emergency departments (EDs) do not have or adequately leverage EHRs, and many communities are just beginning to develop the health information exchange (HIE) infrastructure necessary to share meaningful clinical information across care settings.^{6,11} Without EHRs and more advanced HIE infrastructure, providers often lack the resources to capture QI data and communicate clinical patient information across care settings. The alternatives—phone, mail, or fax communication—can lead to ineffi-

ciencies, opportunities for error, and misplacement of records.¹²

Greater Cincinnati Beacon Collaboration

In September 2010, the Greater Cincinnati Beacon Collaboration (GCBC), a group of six organizations in Cincinnati, Ohio, representing different stakeholders in the health care system, was awarded a Beacon Community cooperative agreement grant from the Office of the National Coordinator for Health Information Technology (IT). The purpose of the Beacon Community program is to develop and test health information technology and QI innovations to improve health outcomes and lower costs.

GCBC is testing innovations with adult diabetes and pediatric asthma patient populations. Specific objectives for patients with diabetes include increasing rates of optimal diabetes care, decreasing ED visits and admissions, and decreasing the overall cost of care. Initiatives include a variety of technology and QI innovations that target outcomes for improved health and quality of care and reduced costs.

One GCBC project, an electronic ED/Admission Alert System, is an example of how health IT can support QI interventions to achieve GCBC's objectives for patients with diabetes. Because of its advanced HIE infrastructure, high EHR penetration among providers, and history of successful collaboration, Cincinnati was well positioned to develop and implement the Alert System and QI interventions. During the pilot phase, Cincinnati Beacon practices "turned on" the Alert

System for two patient populations: adult diabetes and pediatric asthma. Practices developed interventions for those patients who had a chief complaint related to their chronic disease.

Alert System Technology

Before implementation of the Alert System, providers were often unaware of ED visits or inpatient admissions because there was no efficient and rapid method of notification. In three steps (Figure 1), the Alert System electronically notifies participating providers in real time when a patient has an ED visit or hospital admission, as follows:

1. The patient’s ED visit or admission at a Cincinnati regional hospital triggers an Admission, Discharge, Transfer (ADT) message from the hospital to the HIE, HealthBridge.
2. HealthBridge matches patient data from the ADT message to the participating practice’s patient panel and sends an electronic alert. (A patient panel is a group of specific patients selected by the practice that will trigger an alert when an ED visit or admission takes place.)
3. Once the practice receives the alert, staff members respond by deploying QI strategies that affect patient follow-up—use of a root cause analysis (RCA) tool

and targeted patient and staff education.

Since the Alert System was launched in March 2012, more than 26,700 alerts have been sent to nearly 90 primary care practices in the Cincinnati metropolitan area.

Clinical QI

The real value of an Alert System materializes when the technology is coupled with systematic QI strategies in response to receiving the alerts. Beacon practices in Cincinnati are using the Alert System as one tool in their QI repertoire to improve diabetes care.

First, the Alert System triggers a chain of events in a short time frame. For example, most practices are contacting their patients upon receiving the alert to inquire about the ED visit or admission and to schedule follow-up appointments. This rapid intervention can facilitate a stronger patient-provider relationship. Some practices have created an algorithm to guide subsequent clinical decisions with patients after receiving the alert. A few practices are beginning to use an RCA tool to explore and address factors contributing to the ED visit. Other practices are providing patient education during follow-up calls, including reminders about open access appointments, after-

hours appointment availability, and 24-hour access to providers. Practices are testing variations of these interventions with both adults with diabetes and children with asthma.

More than a dozen participating practices have achieved Level 3 Patient Centered Medical Home (PCMH) certification and several others are in the approval process. The PCMH model emphasizes strong patient-provider partnerships, care coordination, safety, and QI. Practice redesign using the PCMH model is associated with improved quality and patient experience and reduced provider burnout, without increasing overall cost.^{13,14}

The PCMH model is a good fit for diabetes management, given the evidence-based standards, associated costs, and quality gap currently existing in diabetes care. Many of these PCMH practices have embraced the Alert System and incorporated it into their clinical workflow to foster improvements. Most practices are also using Plan-Do-Study-Act cycles to integrate the Alert System into their practice and facilitate continuous QI.¹⁵

Case Description: Use of the ED Alert System to Improve Care of Patients With Diabetes

The University of Cincinnati Internal Medicine and Pediatrics (UC Med/Peds) practice is a hospital-based clinic located on the main campus of UC Hospital. UC Med/Peds serves a primarily low-income patient population; 13% of its patients are uninsured, and 43% are Medicaid beneficiaries. UC Med/Peds has

~ 5,000 patients with 12,500 visits each year. The teaching-based clinic began using the Alert System in March 2012 and receives an average of 2.64 alerts each day. The practice notes that the Alert System has strengthened its team-based approach and helped facilitate a proactive response to care (J.T., unpublished observations).

The practice staff planned and tested how best to integrate the alerts into their workflow. For example, front desk schedulers were initially assigned the responsibility of addressing the alerts, but a workflow

ED Alert System

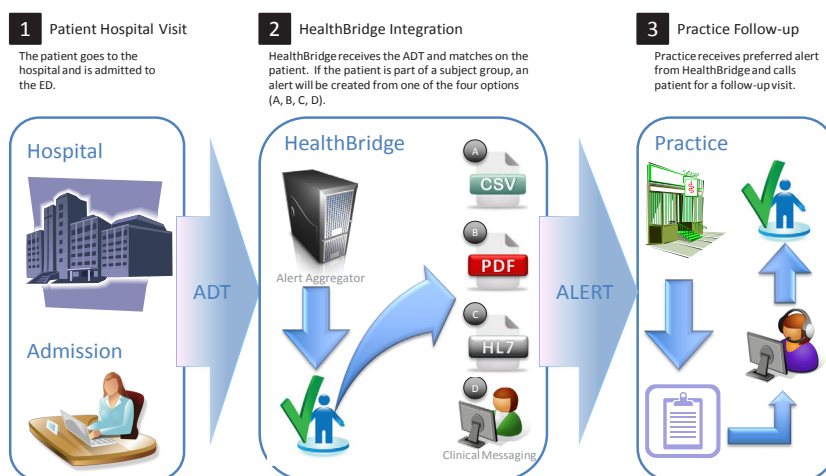


Figure 1. The Alert System.

assessment determined that the medical assistant was a better fit for this role because of the time and clinical decision-making required.

The practice also designed an algorithm for responding to alerts and a risk stratification tool to sort patients into high- and low-risk categories. High-risk patients are scheduled for an appointment within 3 days of an ED visit, whereas the next intervention step with low-risk patients is determined on a case-by-case basis by the PCP. The risk stratification is based on a point system (Table 1) in which patients with a sum total of ≥ 3 points are considered high risk. According to UC Med/Peds data, ~ 30% of the patients who trigger an alert are categorized as being at high risk.

The Alert System also gives UC Med/Peds and other participating practices access to valuable data that identify ED utilization patterns for specific patients. To act on these data, the practice is designing a diabetes action plan for patients who are “high utilizers” of the ED. These patients will be candidates for further intervention to identify and address causal factors and facilitate closer monitoring of their care.

It should be noted that practices have developed risk stratification based on their readiness and ability to use an EHR to populate such a tool with relevant clinical information. The more adept and skilled a practice is at using its EHR, as well as other factors related to practice transformation maturity, the greater its ability to use a sophisticated risk stratification tool such as the one developed by UC Med/Peds. Other practices have used a utilization risk

stratification process based on one admission or two ED visits within the past 12 months.

Future of the ED Alert System: Challenges and Opportunities for Improving Diabetes Care

Health IT innovations are not a panacea, and the Alert System is no exception. As expected for a new technology, there have been challenges. These include:

- Achievement of connectivity between the participating practices and the Alert System
- Collection and verification of patient panels
- Time constraints and workflow issues related to the Alert System technology not yet allowing alerts to flow directly into the EHR, but rather requiring some providers to check additional applications to access the alerts

Many GCBC practices have identified opportunities to use the Alert System to support care delivery and coordination for additional populations such as patients with congestive heart failure, and some practices are using the Alert System for all patients. Planning is also underway for the Alert System to forward discharge alerts when a patient has been released from the hospital, giving providers additional information to use for follow-up. As the technology becomes more advanced, the Alert System will be able to send more comprehensive clinical information about patients in the form of a Continuity of Care document that can assist a team care approach and strengthen coordination of care across settings.

The Alert System has been operational in Cincinnati for < 1 year. A comprehensive evaluation of the system is underway, including documenting and analyzing data on reductions in ED visits and hospital admissions among adults with diabetes and children with asthma, as well as determining how the system has transformed care at the practice level.

Preliminary qualitative data from surveys of 38 out of 41 practices indicate that the Alert System has had a positive impact on practice transformation. Survey data show that the vast majority of practices are consistently following up with patients after an ED visit and that they want to use the Alert System for all of their patients. However, practices note that they need support in using the Alert System and in developing strategies for responding to the alerts.

Workflow issues are the top challenge for practices using the Alert System. This challenge, however, is inherent in practice transformation in general, and during this initial stage of the Alert System’s implementation, it is difficult to parse whether workflow issues are isolated to the use of the Alert System or whether the issues are also related to the larger transformation practices are making in their pursuit of PCMH certification. For practices pursuing PCMH certification, working with this challenge will serve them well because the 2011 PCMH guidelines require that practices be able to demonstrate follow-up activities with all patients after an ED visit.

Combining motivated providers and QI strategies will allow health IT initiatives such as the Alert System to fully develop as clinical support tools for facilitating better outcomes for patients with diabetes. The Alert System holds great promise for activating interventions that can enhance provider and patient engagement, improve the health outcomes of patients with diabetes, and capture reductions in the costs of care.

References

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Table 1. UC Med/Peds Risk Stratification Tool for Diabetes Alerts

Criteria	Points Assigned
A1C > 9%	3
A1C > 8%	1
Blood pressure > 140/90 mmHg	1
LDL cholesterol > 130 mg/dl	1
Age > 50 years	1
Last visit > 3 months ago	1

High-risk patient = total sum score ≥ 3 points

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