

# Improving Error Reporting in Ambulatory Pediatrics with a Team Approach

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## Abstract

**Objective:** We aimed to determine the effectiveness of team-based reporting, systems analysis, and redesign to address medical errors in pediatric ambulatory care. **Methods:** Voluntary, anonymous, nonpunitive reporting, paired with a team-based system analysis and change implementation, was established in an outpatient pediatric department of an urban teaching hospital. **Results:** In the first year, 80 errors were reported, compared with only 5 errors reported during the prior year via a traditional incident reporting system. Reports originated from physicians (45 percent), nurses (41 percent), other staff (9 percent), and parents/patients (5 percent). Errors were classified as involving office administration (34 percent), medications and other treatment (24 percent), laboratory and diagnostic testing (19 percent), and communications (18 percent). To date, 65 percent of reports have resulted in completed interventions, and other changes are in progress. **Conclusion:** In an academic pediatric ambulatory practice, voluntary, nonpunitive reporting with team-based systems analysis and rapid redesign improved error reporting and resulted in changes to promote safety.

## Introduction

The impact of medical errors as a cause of adverse patient outcomes has been described by the Institute of Medicine (IOM) in a series of reports since 1999.<sup>1, 2, 3</sup> Traditional incident reporting systems are not sensitive to the majority of medical errors because they omit near misses and ignore many errors not directly related to health care personnel.<sup>4, 5</sup> These systems are also perceived as punitive and primarily rely on administrative reporting, leaving the clinician out of the process. The IOM has called for a reporting system that includes both adverse events and near misses.

A systems approach—as advocated by the IOM—is a shift from a traditional blaming culture, which seeks to identify an individual person as the cause of each error. The identification of system flaws allows the development of preventive strategies to address most types of errors. Health care personnel have limited experience in identifying faulty systems, which are responsible for most errors in care. Clinician-based voluntary reporting has been effective in detecting errors in adult inpatient<sup>6, 7, 8</sup> and outpatient<sup>4</sup> settings. The new competency requirements in systems-based care from the Accreditation Council of Graduate Medical Education<sup>9</sup> address the need for such understanding by resident physicians.

Limited information is available about the types of errors that occur in ambulatory care,<sup>4, 10, 11, 12, 13, 14, 15</sup> particularly in pediatrics.<sup>16, 17, 18, 19</sup> Early research suggests that adverse events and near misses are frequent occurrences, but little is known about types of errors, risk factors, or effective interventions. Since the vast majority of health care encounters with children occur on an outpatient basis, an understanding of the types and frequency of errors occurring in this setting is paramount.

We report on a voluntary, anonymous, nonpunitive, team-based reporting system, paired with team-based system analysis, “rapid redesign,” and monitoring of changes in the setting of a pediatric ambulatory department of an urban academic hospital. “Rapid redesign” is a focused, facilitated method of process improvement. Originating in manufacturing industries, rapid redesign brings together members of an improvement team to generate new processes or products over a short period of time.<sup>20</sup>

## Methods

This project was set in an academic ambulatory pediatric practice with 20 faculty physicians and 18 pediatric residents. Faculty included 9 general and 11 subspecialty providers. Annual visit volume during the study period was approximately 30,000 general pediatric and 6,000 pediatric subspecialty visits. Approximately 60 percent of patients were covered by Medicaid, with the remainder primarily covered by private health insurance plans. About half the patient population was of Hispanic ethnicity. During the course of this project, the practice used paper medical records.

At the onset of this initiative, a “pediatric safety champion team” was assembled, including representatives from all staff components: medical director, another physician, nurse manager, office manager, registered nurse, licensed practical nurse, nursing care technician, and patient service representative (registration and receptionist staff member). The responsibilities of the team members were to educate their coworkers about the project, encourage reporting of errors, meet monthly to review all error reports, conduct system-based root cause analyses, and design recommended interventions.

A voluntary, anonymous, nonpunitive, team-based reporting system was established. All practice staff were encouraged to report adverse events (AEs) and near misses of which they were aware. For 2 months prior to implementation, this process was discussed at various staff meetings. An error was defined as “any event in a patient’s medical care that did not go as intended and either harmed or could have harmed the patient.”<sup>4</sup> All error reports were completed on standard forms<sup>18</sup> and placed in receptacles located in several areas of the practice. The reports were reporter-anonymous and included a description of the event, identification of the patient, job classification of the reporter, and suggestions for prevention of such an event in the future.

All reports were reviewed monthly by the pediatric safety champion team, which conducted root-cause analyses. Further information was obtained by chart review. There was no patient contact in this process. The team reviewed each reported event to identify contributing factors and seek root causes. Errors were classified as office administration, medication or other treatment, laboratory or radiology, and communication processes.<sup>4</sup> Although reporters of errors remained

anonymous, some error reports also fell under hospital guidelines for incident reporting and were also reported via this system.

To prevent error recurrences, the team decided by consensus on recommended interventions designed to address the root causes of the errors, using rapid redesign methodology.<sup>20</sup> Progress in implementation of recommendations was tracked in subsequent meetings. Summaries of all reported errors and recommended interventions were published and distributed to the practice staff in a monthly newsletter and discussed regularly in staff meetings. Participation of the practice's clinical and operational leadership on the safety team helped to facilitate the ability to implement interventions.

## Results

During the first 12 months of the project, 80 medical errors were reported. This was a 16-fold increase compared with the 12-month period prior to the project, when only 5 errors were reported via the traditional incident reporting system (Figure 1). Reports originated from physicians (45 percent), nurses (41 percent), other staff (9 percent), and parents/patients

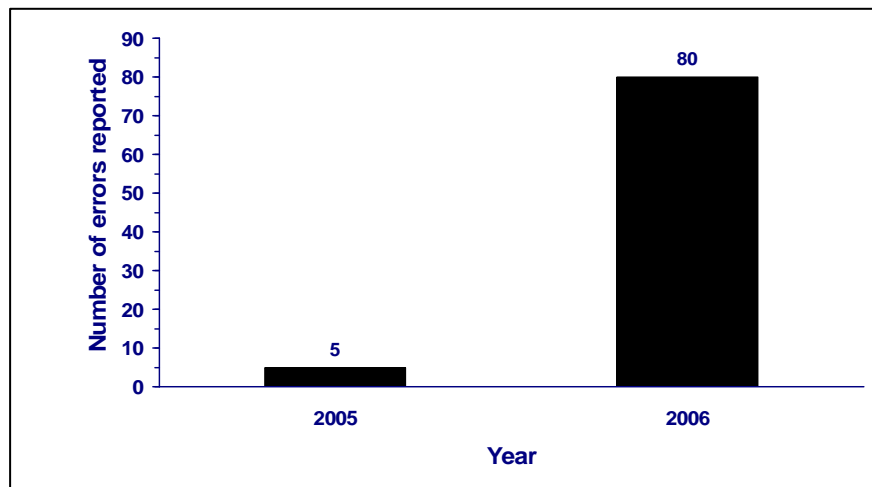


Figure 1. Medical error reports, 2005 and 2006.

(5 percent). Errors were classified by the safety team as primarily involving office administration (34 percent), medications and other treatment (30 percent), laboratory and diagnostic testing (19 percent), or communications (18 percent).

Some examples of error reports in each of these categories are listed in Table 1. The most frequent office administration error reports included wrong demographic information or date of visit (seven reports), misfiled papers in chart (seven reports), and delays in processing patients due to misplaced registration forms (six reports).

The most frequent error reports attributed to medication and other treatment included miswritten vaccine and medication order near misses (five reports), wrong vaccine administered (four reports), wrong outside prescription dispensed (three reports), incomplete prescriptions returned by pharmacies (three reports), and patients revaccinated too early (three reports).

Among errors attributed to laboratory and diagnostic testing, the most common included missed specimen pickup (eight reports) and mislabeled specimens (three reports).

**Table 1. Examples of error reports in pediatric ambulatory practice**

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**Communications**

**Error:** Child with varicella seated in waiting room for 30 minutes, exposing other children and adults.

**Remedy:** System established to alert reception desk to children with fever and rash and to communicate with nursing staff to isolate them.

**Office administration**

**Error:** Patients, caregivers, and staff often trip over scales in exam rooms.

**Remedy:** Scales relocated in exam rooms.

**Laboratory or diagnostic tests**

**Error:** Laboratory specimens not picked up by courier (several similar reports).

**Remedy:** Met with laboratory management to revise courier system.

**Medications**

**Error:** Wrong vaccine administered (several similar reports).

**Remedies:** Less interference with nurses preparing vaccines: Keep door closed.  
Change physician order documentation to reduce misinterpretations.

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The most frequent errors attributed to communication barriers included patients leaving the practice before ordered vaccines were administered (six reports).

The majority of reports (85 percent, N = 68) were of near misses rather than AEs (15 percent, N = 12). None of the AEs (e.g., wrong vaccine administered) resulted in significant harm to patients. To date, 65 percent of error reports have resulted in completed interventions, and other changes are in progress or pending. Interventions have included staff education, changes in systems, and equipment modifications. Some changes have involved collaboration with other departments, such as laboratory.

## **Discussion**

In this urban, academic, hospital-based, pediatric ambulatory practice, voluntary nonpunitive reporting with team-based systems analysis and rapid redesign has increased error reporting, compared with a traditional incident reporting system. In many cases, interventions have been implemented to promote safety and prevent many types of errors. Most reports were near-misses. The 16-fold increase in error reporting compared with the prior traditional incident reporting system may be due to staff education, attempts to overcome the blaming culture in reporting errors, involvement of all staff categories in the team that encouraged and reviewed reports, and response of staff to feedback on reports and interventions.

Our project partially replicated a similar endeavor initiated in an internal medicine ambulatory practice. An academic internal medicine setting in Virginia reported a 20-fold increase in error reporting after implementing near miss/AE voluntary reporting coupled with systems analysis and redesign. As in our study, most of their reports were of near misses rather than AEs.<sup>4</sup>

Limited prior research has been done on the frequency and types of errors in ambulatory pediatric care, and many of these reports have centered on medication errors. In one study,<sup>21</sup> 21 percent of outpatient prescriptions in a family medicine practice had at least one error. Other investigators found that medication samples were dispensed with inadequate documentation.<sup>22</sup> High rates of medication documentation errors were found in another family medicine practice.<sup>23</sup> In a pediatric emergency department in Canada, 100 prescribing errors and 39 medication administration errors occurred per 1,000 patients.<sup>24</sup> In another pediatric emergency setting, 22 percent of acetaminophen dose orders were outside the recommendations.<sup>25</sup> In a sample of new prescriptions for 22 common medications in outpatient pediatric clinics, approximately 15 percent were dispensed with potential dosing errors.<sup>16</sup>

Some particular challenges that may augment the risk of medication errors in the pediatric outpatient setting include the need for rapid dose calculations with weight-based dosing, dilution of stock medications by pharmacists, clear communication with parents about administration, effective cooperative interaction between parents and children, and appropriate measuring devices.<sup>17, 18</sup>

Our study had several limitations. We depended on voluntary reports from staff in a very busy practice, so that many errors went undetected or unreported. The 80 error reports during the study year represented 0.2 percent of patient encounters and most likely represent just the “tip of the iceberg,” given the size of the practice. Prior studies cited above suggest that medication errors alone may occur in 15 to 22 percent of outpatient encounters.<sup>11, 14, 16</sup> Many medication errors by outside pharmacies may be difficult to detect and may go unreported. It is not clear whether the types of errors that were reported were representative of the totality of reported plus unreported errors.

The role of parents in reporting errors has been noted.<sup>18</sup> More involvement of parents might have improved the process of error reporting, analysis, and interventions to improve safety in pediatric care. Despite these factors, we believe that our findings indicate a successful beginning in improving safety in ambulatory pediatrics.

## **Conclusion**

A team-based, voluntary, nonpunitive medical error reporting project using systems analysis and rapid redesign effectively improved error reporting and the development of interventions to promote safety in an academic pediatric ambulatory practice. Resar<sup>26</sup> has noted that the goal of patient safety should be a focus on harm reduction rather than on simply tabulating errors. He suggests that humanly generated system flaws cannot be overcome simply by vigilance and hard work, but that system redesign is needed for a safer environment. We believe that this project has

helped us move in the direction of designing a safer system of health care delivery in ambulatory pediatrics.

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