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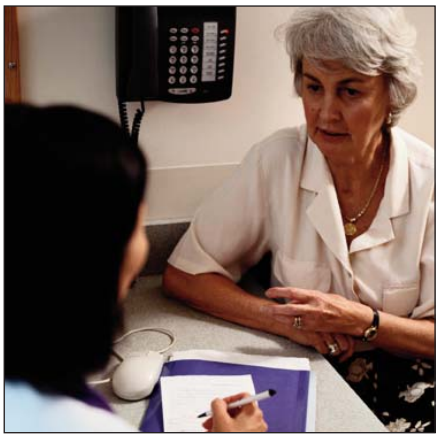

"When confronted with the family's reservations about the care and the communication, the clinicians admitted that 'there was a conversation missing.'"

—Iedema and Allen (p. 439)

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Medication Safety

Improving Medication Safety with Accurate Preadmission Medication Lists and Postdischarge Education

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In 2005 The Joint Commission established medication reconciliation as a National Patient Safety Goal.[1] Given the difficulties that many hospitals and other health care organizations experienced with implementation, in 2009 The Joint Commission uncoupled survey findings on medication reconciliation from accreditation decisions.[2] According to The Joint Commission's modified National Patient Safety Goal, which was effective for all accreditation programs (except laboratories) on July 1, 2011, gathering a complete preadmission medication list (PAML) at the time of admission remains an essential component of medication reconciliation,* as is providing the patient with a written medication list at the time of hospital discharge.[3,4]†

An accurate PAML is the linchpin of medication reconciliation, but gathering such a list is difficult because of health illiteracy, cognitive impairment, and many other factors.[5,6] Communicating the medication list to the patient and next provider should mitigate the hazard associated with care transitions, but adverse drug events (ADEs) commonly occur after hospital discharge. Although many factors contribute to postdischarge ADEs, inadequate patient education ranks among them.[7]

In December 2006 the senior leaders of Novant Health (Winston-Salem, North Carolina) chose medication reconciliation as a long-term quality goal. Novant Health is a not-for-profit, integrated health care system that includes 13 hospitals, staffed by 142 hospitalists; a medical group consisting of 1,141 physicians in 349 clinic locations; and numerous outpatient surgery centers, medical plazas, rehabilitation programs, diagnostic imaging centers, and community health outreach programs in communities

* NPSG.03.06.01. Maintain and communicate accurate patient medication information; Element of Performance 1. Obtain information on the medications the patient is currently taking when he or she is admitted to the hospital or is seen in an outpatient setting. This information is documented in a list or other format that is useful to those who manage medications.

† Element of Performance 4. Provide the patient (or family as needed) with written information on the medications the patient should be taking when he or she is discharged from the hospital or at the end of an outpatient encounter (for example, name, dose, route, frequency, purpose).

Article-at-a-Glance

Background: Gathering a complete preadmission medication list (PAML) at admission remains an essential component of medication reconciliation, as is providing the patient with a written medication list at the time of hospital discharge. A medication reconciliation project was begun in 2007 at an integrated health care system to (1) improve the accuracy of PAMLs within 24 hours of admission for patients admitted through the emergency department (ED) and (2) enhance patient education through telephone calls by pharmacists to the patients most at risk for adverse drug events (ADEs) or readmission.

Accuracy of PAMLs: In the October 2007–May 2008 period, RN-generated PAMLs were accurate 16% of the time versus 89% for the June 2008–December 2010 period, when they were generated by pharmacy technicians. Medication errors classified as having the potential to cause moderate or serious harm decreased from 13.17% to 1.50%.

Postdischarge Education of Complex Patients by Pharmacists: By summer 2009, the Safe Med pharmacist program was fully staffed, thereby enabling the program to contact nearly 100% of the 10,174 patients meeting the Safe Med criteria from January 2009 through December 2010. When compared with historical controls, the Safe Med intervention was associated with a statistically significant reduction in 30- and 60-day readmissions, ADE–associated 30- and 60-day readmissions, and 30- and 60-day ED visits.

Conclusions: ED–deployed pharmacy personnel can enhance the accuracy of PAMLs and may thereby reduce in-hospital ADEs. The postdischarge intervention by pharmacists with the most complex patients may reduce ADEs following hospital discharge. The interventions may compensate for discontinuities in care and lessen the attendant threats to patient safety.

across North Carolina, Virginia, South Carolina, and Georgia. The two largest hospitals in the system are Forsyth Medical Center (FMC), a 921-bed tertiary-care hospital in Winston-Salem, North Carolina, and Presbyterian Hospital (PH), a 607-bed regional medical center in Charlotte, North Carolina.

Each year Novant leaders choose a corporatewide quality goal on which to focus for the following three to four years. The principal criterion for a long-term goal is improvement of a clinical process relevant to a broad spectrum of patients in both the inpatient and ambulatory setting. Goals are selected by the Novant Clinical Committee, which consists of the health care system's physician, nursing, and administrative leadership. In selecting medication reconciliation, the committee (then called the Systems Clinical Committee) expected that a multidisciplinary team would build on the medication reconciliation process advocated by The Joint Commission. The Novant medication reconciliation project was intended to (1) improve the accuracy of PAMLs for admitted patients by employing pharmacy technicians (pharm techs) in the emergency department (ED) and (2) enhance patient education through telephone calls by pharmacists to patients most at risk for ADEs or readmission. Novant Health's 31-member multidisciplinary medication reconciliation team has been recognized for its work.[8,9] In this article, we describe the project and its results in detail and discuss its spread to other hospitals at Novant Health.

Addressing Medication Reconciliation at Two Hospitals

In early 2007 a medication reconciliation team was formed, which consisted of hospitalists [including J.E.G.], nonhospitalist physicians, pharmacists [including T.B.C., M.N.], nurses, and personnel from marketing, information technology (IT), and administration. Meetings were held monthly either via videoconference or at Presbyterian Hospital Huntersville (PHH; North Carolina), a 60-bed community hospital that provided a venue convenient to most team members. The Novant hospitals had developed processes to provide patients with a medication list at discharge and to communicate this list to the next provider, as specified by The Joint Commission's National Patient Safety Goal.[1] The team was charged with building on the National Patient Safety Goal by improving the accuracy of the PAMLs and improving patient education.

Goal 1. An Accurate PAML Within 24 Hours of Admission

The team set the goal of gathering an accurate PAML within 24 hours of admission for 90% of patients at all Novant hospitals. Before the start of the medication reconciliation project, the PAML was gathered by the admitting nurse, who then used this list to populate the admission medication reconciliation form. On the basis of their frontline clinical experience, many team members believed that PAMLs were often inaccurate, and thus a threat to patient safety. Novant's senior leaders expected the team to gather baseline data to support or negate this belief.

Accuracy of PAMLs. The team decided to gauge the accuracy of the PAMLs. Starting in October 2007, a clinical pharmacist would gather a PAML by using a standardized data collection tool on randomly selected inpatients within 24 hours of admission. The expectation was that the pharmacist would access all data sources—such as family, physician offices, commercial pharmacies, and pill bottles—in an effort to obtain a "gold standard" PAML.[6] The gold-standard list was then compared with the RN–generated PAML displayed on the admission medication reconciliation form. If the RN list agreed completely with the gold standard, the RN list was deemed to be accurate. If any discrepancies were found, the RN list was deemed inaccurate.

A previously described system[5] (with some modification) was used to classify discrepancies on the randomly selected admission medication reconciliation forms as to their potential to do harm, as follows:

- Class I discrepancies, such as an over-the-counter as-needed medication, were judged unlikely to cause harm.
- Class II discrepancies, such as the omission of an antihypertensive medication, were judged to have the potential to cause moderate harm.
- Class III discrepancies, such as those involving anticoagulants, insulin, oral hypoglycemic agents, and narcotic analgesics, were generally judged to have the potential to cause serious harm.

The grading system was approved by the team, and the grading itself was done by one of the hospitalists on the team by using examples[5] as a guide.

As baseline data accumulated on the accuracy of the PAMLs, it quickly became clear that the majority of the RN–generated lists contained errors. As shown in Figure 1 (page 454), 32 (16%) of the 200 PAMLs gathered by the RN staff during the baseline data-collection period (October 2007 through May 2008) were deemed accurate as compared with the gold-standard lists. Review of the breakdown of errors indicated that the majority (63%) involved either omission of a home medication or the inclusion of a drug not taken by the patient. Other sources of error were incorrect dosage (20%), frequency (14%), or route of administration (3%). The nursing members of the team felt that conflicting responsibilities of the ED RNs, inadequate time

Medication Reconciliation Accuracy for Four Hospitals, October 2007–May 2008 and June 2008–December 2010

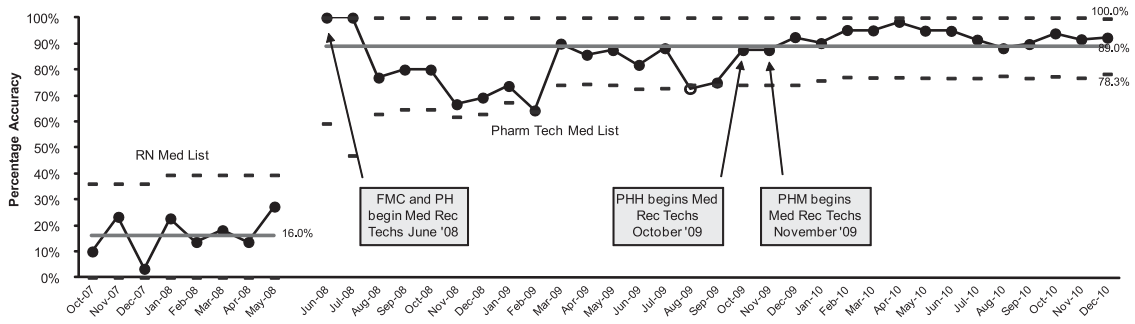

Figure 1. *Preadmission medication lists gathered by the pharmacy technicians (pharm techs) conformed to the "gold-standard lists" in 1,113 (89%) of the 1,251 cases from June 2008 through December 2010, as compared with 32 (16%) of the 200 cases for which staff nurses compiled the lists. Med rec, medication reconciliation; FMC, Forsyth Medical Center; PH, Presbyterian Hospital; PHM, Presbyterian Hospital Matthews; PHH, Presbyterian Hospital Huntsville.*

to query all data sources, and possibly inadequate training in gathering an accurate PAML were potential causes of the errors described.

In an effort to improve on the quality of the PAMLs, the team considered two options—an IT solution and a pharm-tech solution. Novant's project management office (PMO) arranged for commercial vendors to demonstrate IT products capable of accessing pharmaceutical databases. These IT products were evaluated by frontline nurses, physicians, and clinical pharmacists. After an initial vetting process, the vendors were pared down to two finalists. The PMO arranged for a site visit by the team to view one of the finalists' applications under frontline conditions. The second finalist's product was evaluated via an interactive webinar. In July 2008 it was the team's unanimous judgment that the IT products did not offer a reliable means of gathering an accurate PAML. The team felt that although the IT products offered a number of advantages, including the ability to access prescription databases, it would still be necessary for a clinician to question the patient as to what that patient was actually taking. This judgment was supported by a study that showed that computerized medication histories rarely agree with those gathered from patient interviews.[10] In addition, because Novant facilities did not have computerized provider order entry, the value of a stand-alone electronic medication reconciliation product was questioned. The team felt that a more desirable approach would be to hire dedicated personnel to generate a paper-based PAML, which could then be used as an order form by the admitting practitioner.

The option of using pharm techs to gather an accurate PAML in the ED was also discussed by the team. In late 2007, after team representatives visited a neighboring institution that had adopted this model, the team found that the pharm-tech approach held promise—as also confirmed by the literature.[5,11,12] Although it was not financially feasible to hire a sufficient number of pharmacists to gather PAMLs at multiple hospitals, the judgment of the team was that experienced techs might be able to perform this function. The prospect of delegating the responsibility for the PAML to the pharm techs was strongly supported by the nurses on the team. The first techs deployed to EDs at PH and FMC in spring 2008 were experienced in the retail pharmacy arena, had passed an internally developed examination on common drugs, and were scripted as to the method of gathering a medication history. The team planned to pilot the pharm-tech model and to audit their PAMLs to determine whether this model represented an improvement.

Goal 2. Postdischarge Education of Complex Patients by Pharmacists

The team's second goal was to have pharmacists educate the most complex patients following hospital discharge. This goal was chosen in view of published evidence supporting the value of postdischarge pharmacist intervention in preventing ADEs.[13] A medically complex patient was defined as someone of 65 years of age or older with one or more of the following:

- Prescription for one of the medications listed as meeting the Beers criteria for potentially inappropriate medication use[14]
- Three or more admissions to an acute care facility within the preceding six months
- Five or more routine medications at the time of admission or discharge from acute care

■ A high-risk condition, including heart failure, diabetes, coronary disease, chronic obstructive pulmonary disease, or a combination of comorbidities

In 2006, before adoption of medication reconciliation as a long-term goal, Novant had established the Safe Med pharmacist program to educate the most complex patients per the aforementioned criteria following hospital discharge. As a member of the Voluntary Hospital Association (VHA), in 2000 Novant had participated in a research project on ADEs. This project demonstrated that patients discharged on high-risk medications such as anticoagulants were at particularly high risk for ADEs and readmission and that these events were often attributable to suboptimal patient education.[15] It was in Novant's efforts to rectify this problem that it developed Safe Med. Novant's team adopted the Safe Med program and quantified a specific educational goal—to reach 90% of the medically complex patients following hospital discharge. Before Safe Med, the usual means of educating patients on their discharge medications was by the provision of a medication list, together with instruction on the medications by the discharging physician and nurse.

Safe Med had already created an outcome measurement system, which included 30- and 60-day readmissions, ADE–related 30- and 60-day readmissions, and 30- and 60-day revisits to the ED. For the current medication reconciliation project, Novant Health IT staff produced the list of patients satisfying the criteria for medical complexity (based on the Charlson Comorbity Index[16]) and generated the outcomes data.

Results

Goal 1. An Accurate PAML Within 24 Hours of Admission

Using the audit process described earlier, from October 2007 through May 2008, 190 newly admitted patients at PH and FMC were randomly selected for interview by a clinical pharmacist for a gold-standard medication history. This medication list was then compared with the RN–generated list on the admission medication reconciliation form. From June 2008 through December 2010, the same audit process was applied to 1,251 newly admitted patients whose PAMLs were developed by pharm techs. In late 2009, pharm techs were deployed to the EDs at Presbyterian Matthews Hospital (North Carolina), a 117-bed community hospital, and PHH. Randomly selected patients at these facilities were included in the audit process described earlier. As shown by the P control chart in Figure 1, PAMLs gathered by the pharm techs conformed to the gold-standard list in 1,113 (89%) of the 1,251 cases from June 2008 through December 2010.

The discrepancies on 120 RN–generated PAMLs audited from October 2007 through May 2008 at PH were graded, as described earlier, as were discrepancies on the 85 pharm tech–generated PAMLs audited in the same period. For each month, the percentage of Class II and III errors was calculated by adding the total number of Class II and III errors and dividing that number by the total number of medications listed on all the PAMLs for that month. Class I errors were omitted from this analysis because of their relatively small chance of causing patient harm. The P chart in Figure 2 (page 456) displays the percentage of Class II and III errors over time. During the baseline data collection period, for the 744 medications on the PAMLs, 98 errors (13.17%) were identified with the potential to cause moderate or serious harm. In the postintervention period (June 2008–April 2009), for the 867 medications on the PAMLs, 13 errors (1.50%) were so identified.

Given the impact of the pharm-tech model, in September 2008 the Novant leadership directed the team to expand the pharm-tech program.

Goal 2: Postdischarge Education of Complex Patients by Pharmacists

From January 2009 through December 2010, 10,174 patients meeting the Safe Med criteria were discharged from Novant hospitals. The P chart in Figure 3 (page 456) shows the percentage of this patient population that received phone consultation with a clinical pharmacist following discharge.

When Safe Med was adopted by the Novant medication reconciliation team and agreement was reached on the definition of a medically complex patient, staffing limitations made it impossible for the Safe Med pharmacists to reach every complex patient by phone. Patients not phoned were sent a mailer stressing the importance of adherence to their medical regimen and offering a toll-free number to call a Safe Med pharmacist with any questions. Only 1 of the approximately 400 patients who were sent the mailer actually made a call, so this aspect of the program was abandoned. By summer 2009, Safe Med was fully staffed with four full-time pharmacists and a pharm tech, thereby enabling the program to consistently contact nearly 100% of at-risk patients (Figure 3). The role of the Safe Med pharm tech has been to place a second call 30 days after the first to be sure that the patient has had proper postdischarge follow-up. Any medication-related questions, discrepancies, or other problems on the second call are not addressed by the pharm tech but are referred to one of the Safe Med pharmacists for resolution. The

volume of medication issues identified in the pharm-tech calls has not required the hiring of additional pharmacists. The Safe Med leaders considered delegating the original call to the pharm tech but believed that educating the patient or caregiver about proper medication use would be beyond the scope of a tech's training.

Besides monitoring the number of patients contacted, the team has reviewed the outcomes for those patients phoned by a Safe Med pharmacist. Table 1 (page 457) displays the outcomes as measured by 30- and 60-day hospital readmissions, ADE–associated 30- and 60-day readmissions, and 30- and 60-day visits to the ED. For 30- and 60-day readmissions, the controls were made up of 7,335 patients discharged from Novant hospitals from January 1, 2002 ,through December 31, 2005, while the Safe Med group consisted of 1,624 patients discharged from Novant hospitals from January 1, 2007, through October 10, 2008. For ED visits, 1,424 Safe Med patients were compared with 7,199 matched controls. The Charlson Comorbidity Index score was applied only to inpatients. The patient selection, case matching, and statistical analysis were done by Novant Health IT staff. As illustrated in Table 1, when compared with historical controls, the Safe Med intervention was associated with a statistically significant reduction in 30- and 60-day readmissions, ADE–associated 30- and 60-day readmissions, and 30- and 60-day ED visits.

The Safe Med program has not systematically categorized the kinds of problems identified in their postdischarge calls, but therapeutic duplications, for example, as in the case of a patient taking two calcium channel blockers, have been identified. Nonadherence with warfarin follow-up has been addressed by patients' making appointments or by calling a home health agency for a home visit. Pharmacist interventions are brought to the attention of the primary care physician.

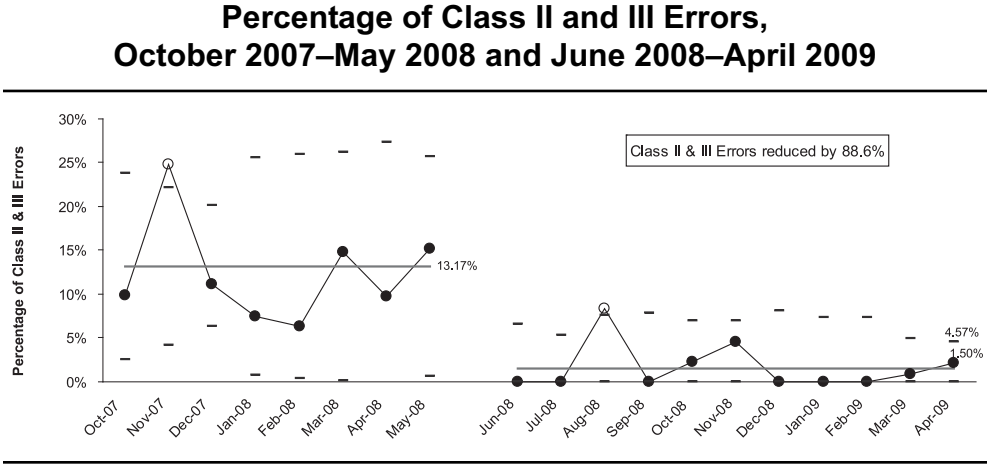

Figure 2. *During the baseline data collection period (October 2007–May 2008), 98 (13.17%) of the 744 medications on the PAMLs were in error, with the potential to cause moderate (Class II) or serious (Class III) harm, versus 13 (1.50%) of the 867 medications on PAMLs in the postintervention period (June 2008–April 2009).*

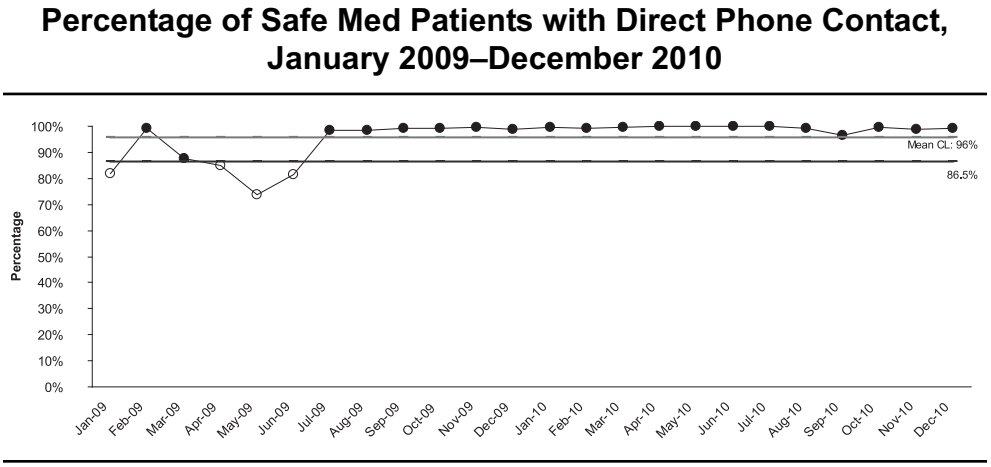

Figure 3. *By summer 2009, Safe Med was fully staffed, thereby enabling the program to consistently contact nearly 100% of the patients meeting the Safe Med criteria.*

Spreading Medication Reconciliation Throughout the Novant System

Since June 2008, when the pharm-tech PAML intervention began, the number of pharm techs devoted to medication reconciliation in the ED has grown from 2 in the pilot programs at PH and FMC to 16 at four of the Novant hospitals, including the two largest (Figure 1). Two hospitals—Presbyterian Orthopedic and Medical Park Hospital—are not appropriate sites for the pharm-tech model insofar as they are primarily elective surgical sites, with nurses and pharmacists responsible for gathering PAMLs as part of the preanesthetic visit. Plans are under way to expand the pharm-tech model to additional facilities, including Rowan Regional Medical Center. For those facilities that have expanded or adopted the pharm-tech model, the hospital lead-

Table 1. Safe Medication Outcomes for Control and Safe Med Groups*

	Control Group (*N* = 7,335)	Safe Med (*N* = 1,624)
30-Day Readmissions	13.1%	6.0%†
60-Day Readmissions	7.7%	2.7%†
	Control Group OR	**95% CI**
30-Day Readmissions	2.34	1.87–2.94
60-Day Readmissions	3.02	2.18–4.19
	Control Group	**Safe Med**
ADE–Associated 30-Day Readmissions	3.4%	2.0%‡
ADE–Associated 60-Day Readmissions	2.5%	0.6%†
	Control Group OR	**95% CI**
ADE–Associated 30-Day Readmissions	1.74	1.15–2.61
ADE–Associated 60-Day Readmissions	4.19	2.06–8.54
	Control Group (*N* = 7,199)	**Safe Med (*N* = 1,424)**
30-Day ED Visits	10.9%	2.6%†
60-Day ED Visits	5.3%	1.4%†
	Control Group OR	**95% CI**
30-Day ED Visits	4.52	3.26–6.25
60-Day ED Visits	3.92	2.52–6.09

* ADE, adverse drug event; OR, odds ratio; CI, confidence intervals; ED, emergency department.

† $p < .001$, chi-square test.

‡ $p < .0074$, chi-square test.

ership has approved the funding, while the pharmacy managers have been responsible for hiring, training, and supervision. With current staffing levels, it has not been feasible for the ED pharm techs to perform medication reconciliation on every admitted patient in every facility. Current estimates from the largest facilities are that 70%–75% of patients admitted from the ED are seen by a pharm tech. To achieve greater coverage, additional hiring is planned, and a dual role for the pharm techs to include conventional inpatient duties, as well as medication reconciliation has been considered.

The Safe Med program has been staffed sufficiently so that the pharmacists have been successful in reaching their target patient population (Figure 3). The program has expanded its scope insofar as the pharmacists now accept referrals from Novant's hospitalists for patients who are not part of Novant Medical Group (NMG). In addition, Safe Med is currently working with the Northwest Community Care Network, a network of primary care providers for the Medicaid population in northwest North Carolina[17] to assist in the care of underserved NMG patients with diabetes and heart failure.

Discussion

A multidisciplinary medication reconciliation team charged with the task of improving medication safety at hospital admission and discharge found that pharm techs deployed in the ED offer a reliable way to gather an accurate PAML and to reduce potentially harmful errors on these lists. Throughout 2010 the pharm-tech model consistently achieved the goal of an accurate medication list on 90% of all admitted patients. It should be noted that the team defined an "accurate" list as a perfect list, and perhaps exception should be made for lists with Class I errors, which are unlikely to cause patient harm. In any case, Class II and III errors have been markedly reduced on the PAMLs gathered by the pharm techs.

One limitation in evaluating the accuracy of the pharm tech–generated PAML is that the process was not blinded in that the pharmacist-auditor knew which PAMLs were gathered by an RN and which were gathered by a pharm tech. Another limitation of the study is that the PAMLs generated by the RNs and those gathered by the techs may not have reflected comparable patient populations. Although both populations were admitted through the ED to the general medical/surgical units, the populations may not have been comparable in terms of the complexity of the medical regimens. Finally, the study did not examine the effect of enhanced accuracy of the tech lists on ADEs. Although one might expect a reduction in ADEs as a function of the reduced Class II and III errors on the tech lists, this issue was not directly studied. Staffing limitations have precluded continuation of the error classification displayed in Figure 2.

Because deployment of pharm techs in the ED may be limited by resource availability, it may be reasonable to limit the scope of their intervention. For example, having the techs inter-

view only the medically complex patients, as defined earlier, may be a logical use of scarce resources.

The team has also focused on improving medication safety following discharge from the hospital. Each phone call by a Safe Med pharmacist represented a postdischarge medication reconciliation. Specifically, the pharmacists compared the medications actually taken by the patient with those intended for use by the discharging physician. In addition, the patients were reeducated about the indications for the prescribed medications, as well as their potential side effects. Earlier studies support a role for education by a pharmacist at the time of hospital discharge.[7,13] The present data suggest that postdischarge calls by pharmacists can improve patient safety, as measured by 30- and 60-day readmissions and ED visits.

The interventions described in this article may compensate for discontinuities in care and may lessen the attendant threats to patient safety. Although best practices for medication reconciliation and metrics that reflect patient-centered outcomes remain to be fully defined,[18] engaging pharmacists seems to be a reasonable way to improve the safety of care transitions, as suggested by the outcomes reported here.

Conclusions

The present study suggests that dedicated pharmacy personnel deployed to the ED can enhance the accuracy of PAMLs and may thereby reduce in-hospital ADEs. The postdischarge intervention by pharmacists with the most complex patients may reduce adverse events following hospital discharge. Further research is needed to further define the optimal role of pharmacists in the medication reconciliation process and to explore the impact of pharmacists' intervention on ADEs. J

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References

1. Joint Commission on Accreditation of Healthcare Organizations. *2005 Comprehensive Accreditation Manual for Hospitals: The Official Handbook.* Oakbrook Terrace, IL: Joint Commission Resources, 2004.
2. The Joint Commission. Approved: Will not score medication reconciliation in 2009. *Jt Comm Perspect.* 2009;29(3):1, 3.
3. The Joint Commission. Approved: Modifications to National Patient Safety Goal on reconciling medication information. *Jt Comm Perspect.* 2011;31(1):1, 3–7.
4. The Joint Commission. *2012 Comprehensive Accreditation Manual for Hospitals: The Official Handbook.* Oak Brook, IL: Joint Commission Resources, 2011.
5. Cornish PL, et al. Unintended medication discrepancies at the time of hospital admission. *Arch Intern Med.* 2005 Feb 28;165(4):424-429.
6. Pippins JR, et al. Classifying and predicting errors of inpatient medication reconciliation. *J Gen Intern Med.* 2008;23(9):1414–1422.
7. Forster AJ, et al. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med.* 2003 Feb 4;138(3):161–167.
8. Society of Hospital Medicine. Incorporating Pharmacists into Medication Reconciliation. Gardella J, et al. Research, Innovations, Clinical Vignettes Competition 2011. Abstract 171. Accessed Aug 31, 2012. http://www.hospitalmedicine.org/AM/Images/RIV_Image/pdf/WILEYAbstractBook2011.pdf.
9. The Hospitalist. Take a Bow: Annual Awards of Excellence Honor the Nation's Top Hospitalists and Achievements. Quinn R. Jun 2009. Accessed Aug 31, 2012. http://www.the-hospitalist.org/details/article/238885/Take_a_Bow.html.
10. Kaboli PJ, et al. Assessing the accuracy of computerized medication histories. *Am J Manag Care.* 2004;10(11 Pt 2):872–877.
11. Gleason KM, et al. Reconciliation of discrepancies in medication histories and admission orders of newly hospitalized patients. *Am J Health Syst Pharm.* 2004 Aug 15;61(16):1689–1695.
12. Hayes BD, et al. Pharmacist-conducted medication reconciliation in an emergency department. *Am J Health Syst Pharm.* 2007 Aug 15;64(16):1720–1723.
13. Schnipper JL, et al. Role of pharmacist counseling in preventing adverse drug events after hospitalization. *Arch Intern Med.* 2006 Mar 13;166(5):565–571.
14. American Geriatrics Society 2012 Beers Criteria Update Expert Panel. American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc.* 2012;60(4):616–631.
15. *Monitoring Adverse Drug Events: Finding the Needles in the Haystack.* VHA Research Series, vol. 9. Irving, TX: VHA Inc., 2002.
16. Charlson ME, et al. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *J Chronic Dis.* 1987;40(5):373–383.
17. Northwest Community Care Network. About Us. Accessed Aug 31, 2012. http://www.nwcommunitycare.org/about-us/.
18. Greenwald JL, et al. Making inpatient medication reconciliation patient centered, clinically relevant and implementable: A consensus statement on key principles and necessary first steps. *J Hosp Med.* 2010;5(8):477–485.