Satisfaction With Medication Reconciliation Completed by Pharmacy Technicians in an Emergency Department

Sajani Patel, PharmD; A. Scott Mathis, PharmD; Jennifer Costello, PharmD, BCPS, BC-ADM; Hoytin Lee Ghin, PharmD, BCPS; and Germin Fahim, PharmD, BCPS

ABSTRACT

Purpose: To survey advanced nurse practitioners, physician assistants, nurses, physicians, and resident physicians involved with collecting and reconciling medication histories in the emergency department (ED) to measure their satisfaction with the current process involving pharmacy technicians.

Methods: Two sites within a large health system with pharmacy technician-driven medication reconciliation processes asked health care professionals to complete a survey of 20 multiple-choice questions. The data collected determined resources used and barriers faced when collecting medication histories, satisfaction before and after the involvement of pharmacy technicians in the ED, and the impact technology may have on this process in the future.

Results: Of 144 health care providers surveyed, 69.4% reported collecting medication histories through patient interviews. The most common barrier reported was the lack of time (44%) to spend on this step. After implementing the pharmacy technician-driven program, satisfaction with health care providers’ required time improved from 18.8% to 68.9%. Similarly, satisfaction with the accuracy of medication histories improved from 40.3% to 75.4%. When asked about the use of technology if available, 65.2% of respondents reported they would almost always use technology. However, 61.6% of respondents preferred investing health care resources in adding more pharmacy technicians in the ED rather than adding technology.

Conclusion: Pharmacy technicians have positively impacted the medication reconciliation process at the sites surveyed. Health care professionals report greater satisfaction with their time demands and perceived accuracy of medication histories, giving them more time to focus on other patient care tasks. Those surveyed reported interest in using technology to collect medication histories if it was available, but they would prefer more pharmacy technicians to assist with the process.

Keywords: medication history, medication reconciliation, pharmacy technician, emergency department

INTRODUCTION

As noted in the Joint Commission’s National Patient Safety Goals, medication reconciliation is an ongoing process of determining what medications a patient should be taking, is taking, and will be prescribed. This process is started upon a patient’s arrival in the emergency department (ED) by one of several types of health care providers (e.g., nurses, physicians, physician assistants, resident physicians, pharmacists, and/or pharmacy technicians). They use several methods to gather the information, such as interviewing patients or reviewing patient-provided medication lists if available. The first step, which is to collect a patient’s medication history, is most often done by a nurse. However, completing one medication history can take 20–24 minutes on average; time that nurses may feel can be better used on other patient care activities.

Besides lack of time, health care professionals face various other barriers when trying to assemble a complete medication history, including patient confusion or inability to communicate when being interviewed, patient clinical status, polypharmacy, or lack of up-to-date records. Having pharmacy technicians in the ED who primarily focus on collecting medication histories allows more time to be spent on this vital step. The pharmacy technicians can use appropriate resources at their disposal, such as contacting patients’ pharmacies or physicians and spending adequate time interviewing patients or their families to compile a more detailed and accurate medication history or active list of medications, vitamins, and over-the-counter products being used.

Studies have shown that when pharmacists or pharmacy technicians are involved in this process, there are fewer medication errors. As a result, an increasing number of institutions are involving a pharmacy technician in the ED to complete medication histories. With proper training and oversight, technicians are just as effective as pharmacists and can help reduce potential errors by as much as half. Because of their familiarity with medications and dosing through the training they receive, pharmacy technicians are a great resource. Their use in the ED to facilitate medication reconciliation programs has improved health care provider satisfaction with the accuracy, efficacy, and safety of medication histories.

The purpose of this study was to survey health care professionals who collect medication histories in the ED to determine their satisfaction with the current medication reconciliation process involving pharmacy technicians at two sites in a large health system of 11 hospitals. The health system is planning to implement an electronic program that can gather patients’ medication histories from Surescripts and third-party payers as well as national retail pharmacy chains and local pharma-

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Inclusion and Exclusion Criteria
To be eligible to participate in this study, health care professionals had to be involved in the medication reconciliation process in the ED and had to be employed or privileged to work at either of the two sites. Participants included ED staff (i.e., physicians, nurses, advanced nurse practitioners, and physician assistants) as well as non-ED staff (i.e., physicians and medical residents) from both hospitals. Health care professionals who worked exclusively in pediatrics, such as pediatric medical residents or pediatric attending physicians, were excluded from this study.

Study Protocol and Data Collection
The study was approved by the institutional review board at each site. The survey used to gather the data consisted of 20 multiple-choice questions and was conducted from November 2016 through January 2017. The full survey is included as an appendix to this article. All participants completed the survey either electronically through an online survey tool or manually on paper. Seventy-seven responses were collected online, and 67 responses were collected on paper. The survey was made up of three parts and addressed: 1) how the medication histories are currently collected, 2) satisfaction with the process involving pharmacy technicians, and 3) the future use of technology for collecting medication histories and improving the process.

RESULTS
Collection of Medication Histories
A total of 144 health care providers from the two health care facilities were surveyed. To determine the average time spent collecting medication histories, respondents were asked how long it takes to complete one medication history. Of those who responded, 77% reported spending 10 minutes or less to complete a medication history (Table 1).

When asked what sources they used to collect medication histories (Table 2), most health care professionals reported interviewing patients (69.4%) as the primary source. Other common sources included reviewing a medication list provided by the patient (15.3%) or reviewing a medication history previously documented in the computer system (13.2%). Only two of the 143 participants (1.4%) said they did not have time to collect medication histories.

Cacies,® This study established a baseline satisfaction level with the current process prior to the addition of this technology. The study also determined who collects medication histories when pharmacy technicians are not available, what barriers health care professionals encounter, and what resources they use when collecting information from patients. The results can also help to assess how the medication reconciliation program can be improved and expanded within the sites surveyed as well as within the health system.

METHODS
Study Setting
This multicenter study took place from August 2016 to February 2017 at two hospitals within a larger health system in New Jersey with pharmacy technician-driven medication reconciliation programs. The program started in April 2015 with one pharmacy technician working 8.5-hour shifts at Monmouth Medical Center (MMC), a 500-bed facility serving more than 50,000 patients in the ED per year. In June 2015, a similar program was implemented at Saint Barnabas Medical Center (SBMC), a 600-bed facility serving more than 100,000 patients in the ED per year, with two pharmacy technicians working 12-hour shifts.

Inclusion and Exclusion Criteria
To be eligible to participate in this study, health care professionals had to be involved in the medication reconciliation process in the ED and had to be employed or privileged to work at either of the two sites. Participants included ED staff (i.e., physicians, nurses, advanced nurse practitioners, and physician assistants) as well as non-ED staff (i.e., physicians and medical residents) from both hospitals. Health care professionals who worked exclusively in pediatrics, such as pediatric medical residents or pediatric attending physicians, were excluded from this study.

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With the online survey tool, we were able to program questions to require an answer and the choice of one or multiple responses when applicable. However, for the paper surveys, there was no way to ensure that all questions were answered or that only one answer was chosen for questions requiring one response. As a result, if questions were not answered, the response rate was adjusted to reflect the total number of responses received. Similarly, if multiple answers were given for a question that looked for one response, only the first option circled was included in the data analysis.

Statistics
Survey data were analyzed with Microsoft Excel using descriptive statistics and based on total responses received per question because participants could have skipped questions.

RESULTS
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A total of 144 health care providers from the two health care facilities were surveyed. To determine the average time spent collecting medication histories, respondents were asked how long it takes to complete one medication history. Of those who responded, 77% reported spending 10 minutes or less to complete a medication history (Table 1).

When asked what sources they used to collect medication histories (Table 2), most health care professionals reported interviewing patients (69.4%) as the primary source. Other common sources included reviewing a medication list provided by the patient (15.3%) or reviewing a medication history previously documented in the computer system (13.2%). Only two of the 143 participants (1.4%) said they did not have time to collect medication histories.

Forty-four percent of respondents stated lack of time was the biggest barrier they faced when collecting medication histories (Table 3). When health care professionals face other barriers, such as patients who don’t know the names of their medication history, they use other methods, such as reviewing medical records or asking patients directly. The biggest barrier they faced was the lack of time to collect medication histories.
medications (26.1%), who have an inaccurate list of medications (14.9%), or who present with altered mental status and cannot communicate (9%), additional time is required to more accurately determine what medications patients take.

Satisfaction
Those surveyed were asked to retrospectively evaluate their satisfaction with the time needed and the perceived accuracy of medication histories prior to the start of the pharmacy technician-driven medication reconciliation process. Respondents who were not employed prior to the addition of pharmacy technicians in the ED had the option to select “not applicable” in the questions pertaining to prior satisfaction ratings.

Overall, 55.6% of health care providers reported being dissatisfied with the time they needed to spend on medication histories. However, after the new process was started, their satisfaction with the time requirement more than tripled from 18.8% to 68.9%. Similarly, their satisfaction with the perceived accuracy of medication histories also improved after the addition of pharmacy technicians, with 40.3% of those surveyed reporting they were satisfied prior to the addition of technicians, but 75.4% reporting satisfaction after the addition of technicians.

Overall, 68.1% of respondents from both sites reported the addition of pharmacy technicians changed the medication reconciliation process for them. At MMC, 88% of participants stated their process changed, compared with 45.5% of participants at SBMC.

Technology
Future plans call for adding an electronic program as an additional data source to collect medication histories. Health care professionals surveyed were told that this new technology would enable them to complete this step in one-third the time, but that it may not interface with the electronic health record system used throughout the organization. Knowing this, more than 90% of respondents reported that they would almost always (65.2%) or often (31.9%) use the technology if available. However, 70.1% of health care professionals believed the pharmacy technicians should still be the primary personnel collecting medication histories; only 6% believed this step should be completed by an admitting provider or ED physician.

Based on the information they had regarding the technology, 58.6% of respondents stated the administration should invest in it, while 35.7% were not sure and 5.7% said this should not be an investment. Overall, 61.6% of health care providers were more interested in adding pharmacy technicians when asked whether the administration should invest in additional pharmacy technicians or technology; however, more than half of these respondents (55 of 85) were ED nurses.

DISCUSSION
Our results are similar to those of previous studies. When collecting medication histories, most health care professionals either do not have or do not spend enough time on this vital step of the medication reconciliation process. The most

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Table 2  Identification of Primary Sources Used to Collect Medication History

<table>
<thead>
<tr>
<th>Source</th>
<th>ED APN/PA, n (%)</th>
<th>ED Nurse, n (%)</th>
<th>ED Physician, n (%)</th>
<th>Non-ED Physician, n (%)</th>
<th>Resident Physician, n (%)</th>
<th>Total, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview patient</td>
<td>10 (71.4)</td>
<td>57 (81.4)</td>
<td>14 (53.9)</td>
<td>3 (50)</td>
<td>16 (57.1)</td>
<td>100 (69.4)</td>
</tr>
<tr>
<td>Review patient’s list</td>
<td>1 (7.1)</td>
<td>7 (10)</td>
<td>4 (15.4)</td>
<td>2 (33.3)</td>
<td>8 (28.6)</td>
<td>22 (15.3)</td>
</tr>
<tr>
<td>Previous hospitalization list</td>
<td>3 (21.4)</td>
<td>4 (5.7)</td>
<td>8 (30.8)</td>
<td>0</td>
<td>4 (14.3)</td>
<td>19 (13.2)</td>
</tr>
<tr>
<td>Call patient’s pharmacy</td>
<td>0</td>
<td>1 (1.4)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td>No time to collect medication history</td>
<td>0</td>
<td>1 (1.4)</td>
<td>0</td>
<td>1 (16.7)</td>
<td>0</td>
<td>2 (1.4)</td>
</tr>
</tbody>
</table>

APN = advanced nurse practitioner; ED = emergency department; PA = physician assistant.

Table 3  Biggest Barrier to Collecting a Medication History

<table>
<thead>
<tr>
<th>Barrier</th>
<th>ED APN/PA, n (%)</th>
<th>ED Nurse, n (%)</th>
<th>ED Physician, n (%)</th>
<th>Non-ED Physician, n (%)</th>
<th>Resident Physician, n (%)</th>
<th>Total, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td>9 (64.3)</td>
<td>39 (65)</td>
<td>8 (30.8)</td>
<td>1 (16.7)</td>
<td>2 (7.1)</td>
<td>59 (44)</td>
</tr>
<tr>
<td>Patient doesn’t know medications</td>
<td>2 (14.3)</td>
<td>15 (25)</td>
<td>11 (42.3)</td>
<td>2 (33.3)</td>
<td>5 (17.9)</td>
<td>35 (26.1)</td>
</tr>
<tr>
<td>Inaccurate patient medication list</td>
<td>3 (21.4)</td>
<td>1 (1.7)</td>
<td>2 (7.7)</td>
<td>2 (33.3)</td>
<td>12 (42.9)</td>
<td>20 (14.9)</td>
</tr>
<tr>
<td>Patient confused or cannot communicate</td>
<td>0</td>
<td>5 (8.3)</td>
<td>2 (7.7)</td>
<td>0</td>
<td>5 (17.9)</td>
<td>12 (9)</td>
</tr>
<tr>
<td>No up-to-date database</td>
<td>0</td>
<td>0</td>
<td>2 (7.7)</td>
<td>0</td>
<td>2 (7.1)</td>
<td>4 (3)</td>
</tr>
<tr>
<td>Patient's pharmacy not open</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (7.1)</td>
<td>2 (1.5)</td>
</tr>
<tr>
<td>Multiple sources don’t match</td>
<td>0</td>
<td>0</td>
<td>1 (3.9)</td>
<td>1 (16.7)</td>
<td>0</td>
<td>2 (1.5)</td>
</tr>
</tbody>
</table>

APN = advanced nurse practitioner; ED = emergency department; PA = physician assistant.
common barrier reported to collecting medication histories in this study, the lack of time, correlates with the amount of time most health care professionals reported they spend (less than 10 minutes), which reflects this sentiment. Less than 10% of participants in our study reported spending the average time of 20–24 minutes needed to accurately complete a medication history. The pharmacy technicians designated for this task are able to dedicate more time, an average of 20–24 minutes, to collect this information from patients, their pharmacies, and other sources to record a more accurate and current list of medications being used by the patient.

Barriers faced by health care professionals surveyed in this study are similar to barriers previously reported. When health care professionals come across these barriers, it increases the time needed (which they may not have) to fully investigate and more accurately determine what medications patients take. In general, most of the health care professionals surveyed seem to lack the time to collect medication histories, especially in the ED, where there is a high turnover of patients requiring acute care or treatment and patients being discharged. Many patients are in a state in which they cannot communicate, or they do not know what medications they take. Barriers such as these are sources of frustration and hindrance to a seemingly simple process.

With the addition of pharmacy technicians in the ED, we saw an overall improvement in health care providers’ satisfaction with the medication history process. The technician at MMC was initially trained and supervised by pharmacists when the program was implemented. This technician then worked with the technicians at SBMC when the program was implemented there, ensuring all technicians used a similar process to collect medication histories. The difference in response at the two sites regarding technicians changing the medication reconciliation process could be attributed to the volume of patients seen in each ED. On average, the pharmacy technician at MMC sees 20 patients per 8.5-hour shift, and the pharmacy technicians at SBMC see 27–30 patients in a 12-hour shift. The technicians at both sites are scheduled during the late afternoon and evening, when ED volume is generally higher. Given the volume of patients seen at each hospital (50,000 ED visits per year at MMC versus 100,000 visits per year at SBMC), the technician at MMC was able to collect a higher percentage of medication histories for the other health care providers. This had a greater impact on the medication reconciliation process at MMC, leading to higher satisfaction levels. On the other hand, at SBMC, other health care providers commonly have to complete this task on their own. This could explain why the pharmacy technicians did not change the process of the health care providers at SBMC as much as they did at MMC. With someone dedicated to collecting medication histories from patients, the process is streamlined with improvement in perceived accuracy. While pharmacy technicians gather this information, other health care professionals can spend more time on other patient care tasks.

A strength of this study is its multicenter nature: It was conducted at two sites within the same health system where the pharmacy technician-driven medication reconciliation process was started around the same time. The study was also conducted at both sites simultaneously. This allowed for a larger sample size and for comparison of differences at the sites when applicable.

One limitation to our study is that we did not measure or have baseline satisfaction data prior to the pharmacy technicians becoming involved with medication history collection in 2015. Although we asked the participants to retrospectively rate their satisfaction level prior to having technicians in the ED, this information may not be as accurate and introduces recall bias. We also did not measure the accuracy of the medication histories collected by technicians versus health care providers to determine how much accuracy has improved. However, based on the survey results, it is perceived that the accuracy of the medication histories has improved, resulting in greater satisfaction among health care providers. We were also unable to guarantee appropriate responses to all questions, specifically for those who completed a paper survey where multiple answers may have been selected when only one response was accepted. As mentioned previously, we accounted for this and adjusted the way our data was analyzed. We did not include “no responses” in our data—the data was analyzed based on total responses received per question. Furthermore, due to the wide distribution of the elective survey to participants, we were unable to assess the total number of surveys distributed or the percentage of surveys completed.

CONCLUSION

After the implementation of a pharmacy technician-driven medication reconciliation process, health care providers’ satisfaction with the time required and perceived accuracy of medication histories improved at the two sites surveyed. Despite a lack of time, all health care professionals surveyed still primarily interview patients to gather medication histories. With the use of pharmacy technicians collecting medication histories, health care providers in the ED have more time to focus on other patient care tasks. Those surveyed also reported interest in using technology in the ED for collecting medication histories if such technology becomes available, but they would prefer the addition of more pharmacy technicians to assist with the process.

REFERENCES

Medication Reconciliation by Pharmacy Technicians in an Emergency Department

APPENDIX
Survey of Physicians and Nurses Regarding Medication Reconciliation in Emergency Department

1. Your emergency department (ED) role?
   a. ☐ ED physician
   b. ☐ Non-ED attending physician
   c. ☐ ED nurse
   d. ☐ ED APN/PA
   e. ☐ Non-ED APN/PA
   f. ☐ Resident physician

2. When you personally do a medication history, what sources do you use to collect a medication history? (Check all that apply)
   a. ☐ Interview patient or family
   b. ☐ Review list patient provides
   c. ☐ Call the patient’s pharmacy
   d. ☐ Call the patient’s physician
   e. ☐ Call the patient’s prescription insurance policy
   f. ☐ Review information from prior visit in Cerner
   g. ☐ Use other electronic database (i.e., SureScripts)
   h. ☐ Generally, I do not have time to collect this information

3. When you personally do a medication history in the ED, what is the FIRST source you go to?
   a. ☐ Interview patient or family
   b. ☐ Review list patient provides
   c. ☐ Call the patient’s pharmacy
   d. ☐ Call the patient’s physician
   e. ☐ Call the patient’s prescription insurance policy
   f. ☐ Review information from prior visit in Cerner
   g. ☐ Use other electronic database (i.e., SureScripts)
   h. ☐ Generally, I do not have time to collect this information

4. If you have questions during a medication history, what sources do you use in the hospital? (Check all that apply)
   a. ☐ Call hospital pharmacy
   b. ☐ Call attending
   c. ☐ Use online sources (i.e., Lexicomp, UpToDate)
   d. ☐ Ask patient
   e. ☐ Ask colleague

5. When you personally do a medication history in the ED, how much time does it take you to collect the information?
   a. ☐ 0–5 minutes
   b. ☐ 6–10 minutes
   c. ☐ 11–15 minutes
   d. ☐ 16–20 minutes
   e. ☐ 21–24 minutes
   f. ☐ Greater than 24 minutes

6. Has the ED medication reconciliation technician changed your medication reconciliation process?
   a. ☐ Yes
   b. ☐ No

7. PRIOR to the addition of the medication reconciliation technician in the ED, how did you feel about your time involvement requirement with medication history collection?
   a. ☐ Very satisfied
   b. ☐ Satisfied
   c. ☐ Neither
   d. ☐ Dissatisfied
   e. ☐ Very dissatisfied
   f. ☐ Not applicable

8. PRIOR to the addition of the medication reconciliation technician in the ED, how did you feel about the accuracy of your medication history collection?
   a. ☐ Very satisfied
   b. ☐ Satisfied
   c. ☐ Neither
   d. ☐ Dissatisfied
   e. ☐ Very dissatisfied
   f. ☐ Not applicable

9. Please list barriers for you to complete an accurate medication history. (Select all that apply)
   a. ☐ Lack of time to investigate
   b. ☐ Patient is confused/unable to communicate
   c. ☐ Patient does not know what medications they take
   d. ☐ Patient does not have an accurate/up-to-date list of their medications
   e. ☐ Patient does not have their medications with them
   f. ☐ Patient’s pharmacy is not open or able to assist
   g. ☐ Patient uses multiple pharmacies
   h. ☐ Patient’s physician office is not open or able to assist
   i. ☐ Patient uses multiple physicians
   j. ☐ Information from several source does not match
   k. ☐ Lack of accurate up-to-date database to maintain needed information
   l. ☐ Lack of familiarity with drug names

10. Please choose the most important barrier to complete an accurate medication history.
    a. ☐ Much better
    b. ☐ Better
    c. ☐ Stayed the same
    d. ☐ Somewhat worse
    e. ☐ Much worse

11. AFTER the addition of the medication reconciliation technician in the ED, how did you feel about your time involvement requirement with medication history collection?
    a. ☐ Very satisfied
    b. ☐ Satisfied
    c. ☐ Neither
    d. ☐ Dissatisfied
    e. ☐ Very dissatisfied

12. AFTER the addition of the medication reconciliation technician in the ED, how did you feel about the accuracy of medication history collection?
    a. ☐ Much better
    b. ☐ Better
    c. ☐ Stayed the same
    d. ☐ Somewhat worse
    e. ☐ Much worse

13. Based on your experience to date, who in your opinion should be collecting the medication histories for the physician to reconcile?
    a. ☐ ED nurse
    b. ☐ ED pharmacy technician
    c. ☐ ED physician or licensed independent practitioner
    d. ☐ Admitting physician/resident/APN

14. If technology were made available that would assemble a complete and accurate medication history for the physician to reconcile, and it would reduce the time needed to collect the information by 66%, how would you feel about implementing the technology?
    a. ☐ Very satisfied
    b. ☐ Satisfied
    c. ☐ Neither
    d. ☐ Dissatisfied
    e. ☐ Very dissatisfied

appendix continues
15. If technology were made available today that reduced the time required to conduct a medication history by 66%, who in your opinion should be collecting the medication histories for the physician to reconcile?
   a. ☐ ED nurse
   b. ☐ ED pharmacy technician
   c. ☐ ED physician or licensed independent practitioner
   d. ☐ Admitting physician/resident/APN

16. If technology were made available today that assembled a complete and accurate medication history for the physician to reconcile, how often would you utilize it on a daily basis?
   a. ☐ Almost always
   b. ☐ Often
   c. ☐ Sometimes
   d. ☐ Seldom
   e. ☐ Never

17. Who should have access to technology? (Select all that apply)
   a. ☐ ED nurse
   b. ☐ ED pharmacy technician
   c. ☐ ED physician or licensed independent practitioner
   d. ☐ Admitting physician/resident/APN

18. If the new technology was a website, and does not interface with Cerner, would it be helpful?
   a. ☐ Yes
   b. ☐ No
   c. ☐ Not sure

19. Do you think administration should invest in purchasing this technology?
   a. ☐ Yes
   b. ☐ No
   c. ☐ Not sure

20. If you were a hospital administrator presented with the choice of either investing in technology or another technician, would you prefer if administration invested in technology or a person (technician)?
   a. ☐ Technology
   b. ☐ Technician