

# Pharmacist impact on medication reconciliation of behavioral health patients boarding in the emergency department

Mary Accomando, PharmD, BCPP<sup>1</sup>

Kyle DeWitt, PharmD, BCPS<sup>2</sup>

Blake Porter, PharmD, BCPS<sup>3</sup>

**How to cite:** Accomando M, DeWitt K, Porter B. Pharmacist impact on medication reconciliation of behavioral health patients boarding in the emergency department. *Ment Health Clin* [Internet]. 2022;12(3):187-92. DOI: 10.9740/mhc.2022.06.187.

**Submitted for Publication:** June 10, 2021; **Accepted for Publication:** May 2, 2022

## Abstract

**Introduction:** The high demand for psychiatric services has exceeded the capacity of available resources for behavioral health patients, forcing these patients to seek mental health care in the emergency department. Average lengths of stay for behavioral health boarders commonly extend over multiple days and prior-to-admission (PTA) medication administration may be delayed, which could lead to further deterioration and longer inpatient lengths of stay. Addition of a pharmacist-led medication reconciliation process and pharmacist integration into daily emergency department psychiatry rounds may decrease time to initiation of PTA medications and improve outcomes in this population.

**Methods:** This is a retrospective review of adult patients who required a psychiatric emergency evaluation in a large rural academic medical center emergency department. Objectives were to determine the number and type of medication discrepancies found with pharmacist intervention, and to compare time to initiation of PTA medications with a pharmacist versus a nonpharmacist completing medication reconciliation.

**Results:** A total of 139 patients were identified, 85 patients in August 2019 (no pharmacist [NP]) and 54 in October 2019 (pharmacist involvement [PI]). Among 484 medications reviewed in the PI group, 298 discrepancies were identified. The most common types of discrepancies were no longer taking ( $n=99$ , 33%) and omission ( $n=94$ , 32%). Time to administration of PTA medications was similar between NP and PI groups (median hours, interquartile range: NP: 10.8, 7.8-16.57; PI: 11.49, 6.16-16;  $P=.179$ ).

**Discussion:** This study depicted one of the many values of pharmacists in the hospital setting, especially in the behavioral health patient population where continuation of accurate PTA medications may prevent further clinical deterioration.

**Keywords:** behavioral health, boarder, boarding, medication reconciliation, emergency department, medication history, pharmacist intervention

<sup>1</sup> (Corresponding author) PGY<sub>1</sub> Pharmacy Resident, University of Vermont Medical Center, Burlington, Vermont, [maryaccomando2@gmail.com](mailto:maryaccomando2@gmail.com), ORCID: <https://orcid.org/0000-0002-9704-9219>; <sup>2</sup> Emergency Medicine Pharmacy Specialist, The University of Vermont Medical Center, Burlington, Vermont, ORCID: <https://orcid.org/0000-0002-4995-5938>; <sup>3</sup> Emergency Medicine Pharmacy Specialist, The University of Vermont Medical Center, Burlington, Vermont, ORCID: <https://orcid.org/0000-0001-6928-8565>

**Disclosures:** All authors have nothing to disclose.

## Background

Behavioral health patient (BHP) boarding in the emergency department (ED) is a steadily growing issue faced nationwide.<sup>1</sup> With the decline in availability of state and private inpatient psychiatric beds to meet the demand of patients requiring mental health services, BHP boarding in the ED has increased.<sup>1,2</sup> The American College of

Emergency Physicians<sup>3</sup> described BHP boarding as a multifaceted issue requiring a combination of solutions to better care for this population. Medication errors are frequent in BHP with prolonged ED boarding times, reported to occur in 40% to 65% of this population.<sup>4,5</sup> A survey of ED staff at a single institution reported 90% of BHP boarders were not receiving their nonpsychiatric medications (eg, for diabetes, hypertension) and 88% were not receiving their psychiatric medications. Based on the results of this survey,<sup>6</sup> a pharmacy-led rounding service was implemented.

ED providers reported to have modest clinical skills to manage these patients and may be more focused on keeping the patient safe until transfer of care rather than continuation of chronic medications while boarding.<sup>7</sup> Pharmacists complete thorough medication reconciliation and identify discrepancies between current and previous medications in the electronic health record. A previous study<sup>5</sup> described at least one medication error that required ED pharmacist intervention in 65% of BHP while 89% of those errors were due to omission.

Based on facility workflow, ED providers may defer medication reconciliation of psychotropic medications to the ED behavioral health consult team, delaying continuation of vital medications.<sup>3</sup> A 2014 study<sup>8</sup> at a large community hospital described the utility of pharmacist integration into daily ED behavioral health rounding service for medication reconciliation, clinical recommendations, and transition to inpatient versus discharge planning. There is a gap in research in implementation of this process in a rural setting, where access to care can be even more limited. Additionally, there is a gap in literature describing change in time to medication administration and ED length of stay for the behavioral health population with pharmacist intervention.

The purpose of this study was to retrospectively evaluate pharmacist integration into daily ED psychiatry rounds at a rural academic medical center with a newly implemented pharmacist-led medication reconciliation process, assessing medication discrepancies. Time to medication administration and ED length of stay were compared to a retrospective cohort without pharmacy involvement.

## Objectives

The primary objective of this study was to determine the number and type of prior-to-admission (PTA) medication discrepancies the pharmacist identified for BHP boarders in the ED. The second primary objective was to compare time to initiation of PTA medications with daily pharmacist medication reconciliation versus a period without pharmacist involvement.

Secondary objectives were to categorize the difference of psychiatric versus nonpsychiatric PTA medication discrepancies and to assess whether there was a difference in ED length of stay for patients with pharmacist-driven medication reconciliation compared to provider-driven medication reconciliation.

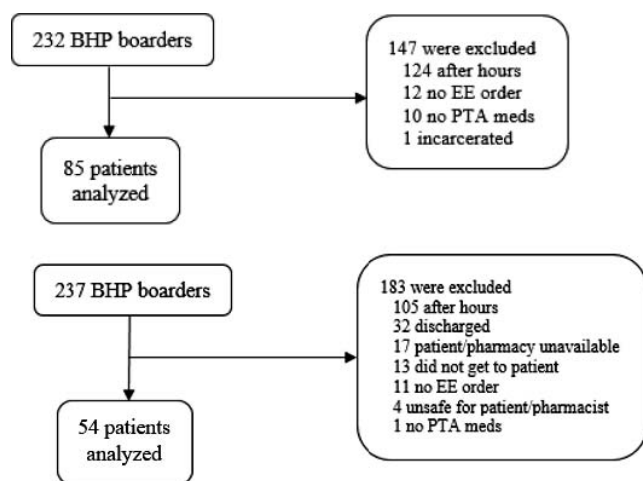
## Study Design

This was a retrospective chart review of a pharmacist-driven medication reconciliation process during October 2019 (pharmacist involvement [PI]) compared to a provider-driven medication reconciliation process during August 2019 (no pharmacist [NP]). *Providers* include emergency physicians, registered nurses, and physician assistants. A resident pharmacist completed medication reconciliation for a 1-month time frame to trial this process in the ED. PI patients were identified in real time from the hours of 9:00AM through 5:00PM Monday through Friday with a chart order for an emergency evaluation. NP patients were identified via chart note from either mental health services, psychiatry services, psychology services, or a local psychiatric facility, then further identified with a chart order for an emergency evaluation.

The facility policy required ED providers to complete medication reconciliation for all patients. This was determined completed if the PTA medication list was marked as reviewed at the time of the ED visit and was tracked in NP and PI months. In the PI month, the pharmacist completed medication reconciliation for all eligible patients, regardless of whether a provider already completed it. Time to administration of PTA medications were determined using patient time of admission compared to the time the medication was charted as administered. ED length of stay was determined using patient time of admission compared to time of discharge. Patient discharge location was tracked.

## Pharmacist Medication Reconciliation Procedure

Prior to initiating the medication reconciliation, the pharmacist consulted nurses assigned to the identified patients to ensure safety and appropriateness. A standardized form was used in order to collect an up-to-date PTA medication list from the patient, family, and/or caregiver. Patients were not consulted if acutely agitated, intoxicated, or if patient safety was a concern. Retail pharmacies listed in the electronic health record were contacted to determine recent fill history for each patient. The state Prescription Drug Monitoring System was accessed to confirm recent controlled substance prescriptions. PTA medication lists were updated, and changes were recorded in the electronic health record via



**FIGURE:** Screening, enrollment, and inclusion flowchart of the no pharmacist group (upper section) and the pharmacist involvement group (lower section); BHP = behavioral health patient; EE = emergency evaluation; PTA = prior-to-admission

intervention tracking documentation. Discrepancies were recorded on a secure Excel document, categorized as *no longer taking*, *omission*, *wrong dose*, *wrong frequency*, or *duplicate*. A single medication could have multiple discrepancies. A discrepancy was categorized as *no longer taking* if the medication was discontinued or therapy was completed. A discrepancy was categorized as *omission* if the patient was taking a medication and it was not listed on the PTA medication list. The number of discrepancies per patient was documented.

Discrepancies amongst psychotropic medications were relayed to the emergency consult psychiatrist during daily ED psychiatry rounds. Discrepancies among nonpsychotropic medications were relayed to the ED physician assistants throughout the day. If medication reconciliations were incomplete by the time of ED psychiatry rounds, patients identified as likely to be admitted were prioritized for medication reconciliation because of time constraints.

## Study Population

Any adult patient ( $\geq 18$  years old) boarding in the ED who had an emergency evaluation chart order during the months of August 2019 and October 2019 was eligible. All patients included had at least 1 medication on their PTA medication list and had a psychiatric-related chief complaint. Patients were excluded if it was unsafe for the pharmacist or patient to complete medication reconciliation, if the pharmacist was unable to determine the medication list, if the patient presented to the ED after pharmacist working hours, or if the patient was incarcerated.

## Statistics

Descriptive statistics were used to report demographic information and the primary outcomes. Continuous variables were summarized using group-specific means and SDs for parametric data and medians and IQRs for nonparametric data. Wilcoxon signed rank tests were used to determine significance of time to medication order and percentage of PTA medications ordered per patient, and  $\chi^2$  test was used to determine significance of number of patients with any PTA medications ordered. The a priori level of significance for all analyses was  $P < .05$ . All analyses were performed using 2016 Microsoft Excel.

## Results

### Characteristics of Study Subjects

Our study consisted of 139 adult patients (NP,  $n = 85$ ; PI,  $n = 54$ ). Exclusions for each group are summarized in the Figure. In the NP group, mean patient age was  $41 \pm 17$  years, and 61% were female. In the PI group, mean patient age was  $38 \pm 16$  years, and 57% were female. Most common psychiatric diagnoses between both groups included major depressive disorder, generalized anxiety disorder, bipolar disorder, and PTSD. Most common medical diagnoses among both groups included hypertension, gastroesophageal reflux disease, and type 2 diabetes. The most common chief complaints were suicidal ideation (41% and 57%) and suicide attempt (9% and 19%). Further demographic information is listed in Table 1.

### Primary Outcomes

Among the 484 medications reviewed in the PI group, a total of 298 individual errors were identified among 57% ( $n = 276$ ) of these medications (Table 2). Errors were identified in 89% of patients, with a median of 4 medication errors per patient (IQR 2-8). The most common types of errors were *no longer taking* ( $n = 99$ , 33%) and *omission* ( $n = 94$ , 32%). *Wrong dose* was identified 50 times (17%), *wrong frequency* 41 times (14%), and *duplicate* 14 times (5%; Table 2).

Time to administration of PTA medications (Table 3) was similar between NP and PI groups (median hours, IQR: NP: 10.8, 7.8-16.57; PI: 11.49, 6.16-16;  $P = .179$ ).

### Secondary Outcomes

ED length of stay was similar between the NP and PI groups (median hours: NP: 18.75; PI: 22.5;  $P = .746$ ). Of 298 individual medication discrepancies, 180 (60%) were

**TABLE 1: Demographic data of the current study**

Demographic Data	NP (n = 85)	PI (n = 54)
Age in years, average $\pm$ SD	41 $\pm$ 17	38 $\pm$ 16
Female, n (%)	52 (61)	31 (57)
Psychiatric ED visits in the last year, median (IQR)	0 (0-3)	1 (0-3)
Medical ED visits in the last year, median (IQR)	1 (0-4)	0 (0-3)
Clinician review of PTA medications, n (%)	60 (71)	38 (70)
Patients with any PTA medications ordered, n (%)	40 (47)	40 (74)
Patients with any PTA medications initiated, n (%)	37 (44)	39 (72)
Psychiatric medications reviewed	...	173
Nonpsychiatric medications reviewed	...	311
Medications reviewed per patient, median (IQR)	...	8 (5-11)
Psychiatric medications per patient, median (IQR)	...	3 (1-5)
Nonpsychiatric medications per patient, median (IQR)	...	3 (1-6)
Discharge location, n (%)		
Home	42 (49)	26 (48)
Admitted inpatient	22 (26)	13 (24)
Other psychiatric hospital	15 (18)	8 (15)
Other	6 (6)	6 (12)
Psychiatric diagnosis, n (%)		
Depression	35 (41)	29 (53)
Anxiety	28 (33)	28 (52)
PTSD	16 (19)	11 (20)
Bipolar disorder	18 (21)	8 (14)
Other psychiatric diagnosis	39 (46)	31 (58)
Medical diagnosis, n (%)		
Alcohol withdrawal	19 (22)	16 (29)
Hypertension	15 (18)	6 (11)
Type 2 diabetes	9 (11)	7 (13)
Hyperlipidemia	14 (16)	5 (9)
Asthma	14 (16)	4 (7)
Gastroesophageal reflux disorder	11 (13)	7 (13)
Other medical diagnosis	55 (61)	58 (111)
Chief complaint, n (%)		
Suicidal ideation	35 (41)	31 (57)
Suicide attempt	8 (9)	10 (19)
Alcohol abuse	2 (2)	5 (9)
Psychosis	7 (8)	3 (6)
Other	20 (24)	6 (12)

ED = emergency department; NP = no pharmacist; PI = pharmacist involvement; PTA = prior to admission.

identified in medications primarily indicated for nonpsychiatric diagnoses and 118 (40%) were identified in medications primarily indicated for psychiatric diagnoses. Some medications had multiple types of discrepancies identified (ie, wrong dose and wrong frequency). ED providers marked BHP medication lists as *reviewed* at a similar rate of approximately 70% in PI and NP groups.

There was a significant difference in number of patients with any PTA medications ordered (n, percent: NP: 40,

47%; PI: 39, 72%;  $P=.0039$ ) and percentage of PTA medications ordered per patient (median, IQR: NP: 6%, 0-50%; PI: 67%, 0-100%;  $P < .001$ ).

## Discussion

A key finding of this study is that pharmacist-driven medication reconciliation identified discrepancies in 57% of medications for 89% patients. A median of 4

**TABLE 2: Types of medication discrepancies in PI group**

Medication Discrepancies in PI Group	n (%) <sup>a</sup>
No. of medications reviewed, n	484
PTA medications with discrepancies	276 (57)
Individual medication discrepancies, n	298
No longer taking	99 (33)
Omission	94 (31)
Wrong dose	50 (17)
Wrong frequency	41 (14)
Duplicate	14 (5)
Psychiatric medication discrepancies	180 (60)
Nonpsychiatric medication discrepancies	118 (40)
Medication errors per patient, median (IQR)	4 (2-8)

PI = physician involvement; PTA = prior to admission.

<sup>a</sup>Values as n (%) unless otherwise indicated.

discrepancies per patient (IQR 2-8) were identified in median 8 PTA medications reviewed per patient (IQR 5-11). This is similar to a 2014 prospective observational study that identified at least 1 medication error in 65% of patients.<sup>4</sup> PTA medications were ordered in 72% of PI patients and in 47% NP patients. PI patients had 67% of PTA medications restarted in the ED versus 6% of NP patient PTA medications. The addition of a pharmacist in medication reconciliation workflow significantly increased the amount of medications ordered for a greater number of BHP boarders. Withholding PTA antibiotics, medications that require levels, and medications that may cause withdrawal if abruptly discontinued pose a risk of harm or risk of further deterioration if these patients remain boarded in the ED without timely PTA medication ordering.

Both PI and NP groups had approximately a 70% rate of providers completing medication reconciliation. Because of extended time and effort required to accurately reconcile medications in this population coupled with limited ED provider time, there lies the potential of medication lists marked as reviewed without being updated. The percentage of medication discrepancies the pharmacist identified may support this statement, suggesting a need for improved medication reconciliation workflow to decrease medication errors in BHP.

**TABLE 3: Time to administration of PTA medication (hours)**

	NP (n = 85)	PI (n = 54)	P Value
Time to order, median (IQR)	7.37 (5.82-13.05)	8.32 (5.09-12.36)	.351
Time to administration, median (IQR)	10.8 (7.8-16.57)	11.49 (6.16-16)	.179
Percentage of PTA medications ordered per patient, median (IQR)	6 (0-50)	67 (0-100)	<.001
Patients with any PTA meds ordered, n (%)	40 (47)	39 (72)	.0039

NP = no pharmacist; PI = pharmacist involvement; PTA = prior to admission.

There was no observed difference in time to medication administration, contrasting to a 2010 study that showed improvement with pharmacist intervention.<sup>4</sup> A larger sample size and longer study timeframe may show a significant difference in time to medication administration in future studies. At this institution, there are currently no ongoing pharmacy services set up to complete medication reconciliation on BHP boarders aside from the present study. Throughout the PI month, providers began to seek out the medication reconciliation pharmacist resident and verbally expressed appreciation for the service. A 2014 article<sup>9</sup> described efficacy of pharmacist integration into emergency psychiatric team through medication reconciliation and clinical interventions at a single institution. Implementation of a similar process could increase efficiency in medication reconciliation workflow and improve patient care.

Although the pharmacist attempted to prioritize patients likely to be admitted prior to morning ED psychiatry rounds, about half of patients in both NP and PI groups were discharged home and about 25% in both groups were admitted inpatient (Table 1). A 2020 cohort of boarded BHP compared to nonboarded BHP reported 36% and 52% (respectively) were admitted to inpatient facilities.<sup>10</sup> The study<sup>11</sup> described issues with discharge among boarded patients, including denial of admission to acute inpatient treatment and denial from group homes. Hospitals may refuse to accept a patient based on comorbidities or lack of insurance coverage.<sup>3</sup>

There were several potential study limitations. This was a small, retrospective study using a convenience sample of patients boarded in a single, rural academic ED and may not be generalizable to larger nonacademic institutions. Exclusion reasons in the PI group may have introduced selection bias in possibly excluding patients who were admitted or discharged before the pharmacist could complete the medication reconciliation. Because of limited pharmacist working hours, patients who presented to the ED outside of this timeframe did not receive pharmacist medication reconciliation. This study had a short duration of 4 weeks for each group. Medication discrepancies were unable to be compared between the NP and PI groups, as the integration of the pharmacist



resident in ED psychiatry rounding was only trialed in the PI month.

## Conclusion

In conclusion, the addition of a pharmacist-driven medication reconciliation process in a rural academic medical center ED led to identification of median 4 medication discrepancies identified in 89% patients, with similar discrepancies among medications indicated for psychiatric disorders compared to nonpsychiatric disorders. With pharmacist involvement, a significantly greater amount of PTA medications were ordered for a greater number of BHP boarders. Although these efforts did not show a decrease in ED boarding times at our institution, a longer study timeframe may show a difference. Impact of efficient and accurate PTA medication reconciliation on inpatient length of stay may be a matter for further study. Future studies could track interventions made and accepted by the emergency psychiatry team to further assess long term outcomes beyond ED admission.

## References

1. Sisti DA, Segal AG, Emanuel EJ. Improving long-term psychiatric care: bring back the asylum. *JAMA*. 2015;313(3):243-4. DOI: [10.1001/jama.2014.16088](https://doi.org/10.1001/jama.2014.16088). PubMed PMID: [25602990](https://pubmed.ncbi.nlm.nih.gov/25602990/).
2. Bastiampillai T, Sharfstein SS, Allison S. Increase in US suicide rates and the critical decline in psychiatric beds. *JAMA*. 2016;316(24):2591-2. DOI: [10.1001/jama.2016.16989](https://doi.org/10.1001/jama.2016.16989). PubMed PMID: [27812693](https://pubmed.ncbi.nlm.nih.gov/27812693/).
3. ACEP Emergency Medicine Practice Committee [Internet]. Practical solutions to boarding of psychiatric patients in the emergency department; 2015 [cited 2020 Mar]. Irving (TX): American College of Emergency Physicians. Available from: <https://www.macep.org/Files/Behavioral%20Health%20Boarding/Practical%20Solutions%20to%20Boarding%20of%20Psych%20Patients%20in%20EDs.pdf>
4. Jellinek SP, Cohen V, Fancher LB, Likourezos A, Lyke M, Peterson K, et al. Pharmacist improves timely administration of medications to boarded patients in the emergency department. *J Emerg Nurs*. 2010;36(2):105-10. DOI: [10.1016/j.jen.2009.03.010](https://doi.org/10.1016/j.jen.2009.03.010). PubMed PMID: [20211399](https://pubmed.ncbi.nlm.nih.gov/20211399/).
5. Bakhsh HT, Perona SJ, Shields WA, Salek S, Sanders AB, Patanwala AE. Medication errors in psychiatric patients boarding in the emergency department. *Int J Risk Saf Med*. 2014;26(4):191-8. DOI: [10.3233/JRS-140634](https://doi.org/10.3233/JRS-140634). PubMed PMID: [25420761](https://pubmed.ncbi.nlm.nih.gov/25420761/).
6. Routsolias JC, Le TA, Lewis TJ, Mycyk MB. Daily ED pharmacy rounds reduces length of stay for behavioral health patients boarding in the emergency department. *Am J Emerg Med*. 2022;52(2):263-4. DOI: [10.1016/j.ajem.2021.04.017](https://doi.org/10.1016/j.ajem.2021.04.017). PubMed PMID: [33892939](https://pubmed.ncbi.nlm.nih.gov/33892939/).
7. Nicks BA, Manthey DM. The impact of psychiatric patient boarding in emergency departments. *Emerg Med Int*. 2012;2012:360308. DOI: [10.1155/2012/360308](https://doi.org/10.1155/2012/360308). PubMed PMID: [22888437](https://pubmed.ncbi.nlm.nih.gov/22888437/).
8. Vandenberg AM, Mullis D. Integrating psychiatric PharmD services into an emergency department psychiatry team. *Ment Health Clin [Internet]*. 2014;4(6):279-82. DOI: [10.9740/mhc.n207279](https://doi.org/10.9740/mhc.n207279).
9. ACEP Emergency Medicine Practice Committee [Internet]. Definition of boarded patient; 2018 [cited 2020 Mar]. Irving (TX): American College of Emergency Physicians. Available from: <https://www.acep.org/globalassets/new-pdfs/policy-state-ments/definition-of-boarded-patient.pdf>
10. Krochmal P, Riley TA. Increased health care costs associated with ED overcrowding. *Am J Emerg Med*. 1994;12(3):265-6. DOI: [10.1016/0735-6757\(94\)90135-X](https://doi.org/10.1016/0735-6757(94)90135-X). PubMed PMID: [8179727](https://pubmed.ncbi.nlm.nih.gov/8179727/).
11. Nicks BA, Manthey DM. The impact of psychiatric patient boarding in emergency departments. *Emerg Med Int*. 2012;2012:360308. DOI: [10.1155/2012/360308](https://doi.org/10.1155/2012/360308). PubMed PMID: [22888437](https://pubmed.ncbi.nlm.nih.gov/22888437/).