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Medication List Consistency When Patients Transition from Hospital to Community

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STRUCTURED ABSTRACT

Purpose: (1) Examine the agreement of medication lists for patients recently discharged from a hospital focusing primarily on community pharmacy lists following the patient's first prescription fill. (2) Describe barriers and facilitators community pharmacists face when reconciling medications for recently discharged patients.

Scope: Patients (≥65 years) were recruited from a large Midwest Academic Hospital. Medication records were retrieved from the health system and community pharmacy. Community pharmacists were interviewed face to face.

Methods: Using a descriptive mixed-methods approach, a quantitative phase (Phase I) and qualitative phase (Phase II) were conducted. Phase I: Medication discrepancies were identified and categorized as omission, addition, discrepant dose, frequency mismatch, or duplication. Severity of harm was also assessed. Phase II: Barriers and facilitators faced by community pharmacists when reconciling medications post-discharge were examined using constructs from the Theory of Planned Behavior.

Results: Phase I: Thirty-five patients were recruited. Of the 381 prescription medications examined, 135 medications (35.4%) were discrepant. Cardiovascular (26.7%), hormones (15.6%), and central nervous systems agents (12.6%) comprised over half of the medication discrepancies. Thirty-seven discrepancies (9.7%) were classified as having potential to cause patient harm. The most frequent type of medication discrepancy was omissions (69 medications, 18.1%). Phase II: Eight community pharmacists were interviewed, including a subset of pharmacists who participated in Phase I. Though all pharmacists identified medication reconciliation as part of their role, they also cited time to perform medication reconciliations as the largest disadvantage for reconciling medications.

Key Words: Medication discrepancies, medication reconciliation, transitions in care

PURPOSE

The goals of this dissertation were achieved through the following ***Specific Aims***:

Aim 1. Examine the agreement of medication lists for patients recently discharged from a hospital, focusing primarily on community pharmacy lists following the patient's first prescription fill.

Aim 1a. Categorize the types and severity of medication discrepancies occurring at community pharmacies.

Aim 2. Describe the barriers and facilitators community pharmacists face when reconciling medications for recently discharged patients.

Aim 2a. Identify pharmacists' preferred content and modes of information transfer regarding updated medication information for recently discharged patients.

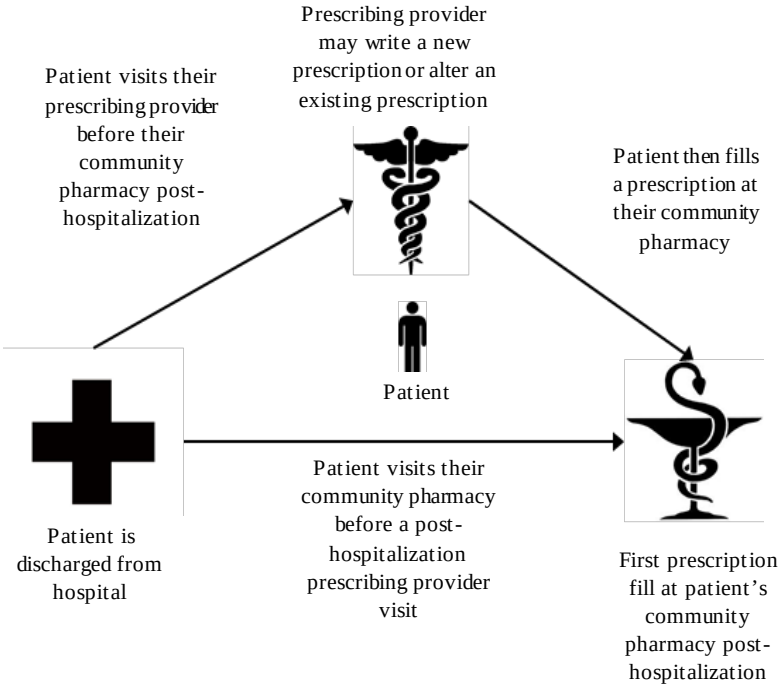
SCOPE

The primary interest of this study was to examine if medication discrepancies were occurring when patients transition from hospital to community care, with an emphasis at the

community pharmacy, and, if so, what types of medication discrepancies and medications comprised the discrepancies (Phase I, Quantitative Phase). For the quantitative component of this study, two medication lists were compared (please refer to Figure 1 for a depiction). One of the medication lists was from the patient's community pharmacy at the time period immediately after the patient first filled their prescription(s) post-hospitalization. The second medication list was generated from the patient's most recent prescribing provider encounter prior to the patient's first fill at their community pharmacy. Recognizing that patients may delay in visiting their community pharmacy after discharge (e.g., the patient may not have been prescribed a new medication), the second medication list is composed of the *hospital discharge medication list as well as any changes made by prescribing providers up until the patient's first fill at their community pharmacy*. Ideally, all the changes to the patient's medication from the hospital discharge as well as provider follow-up visits should be reflected at their community pharmacy's filling of the prescription. These two medication lists were then compared for disagreements. The first phase helped direct which pharmacists were interviewed in the second, qualitative phase (Phase II, Qualitative Phase). This blend of qualitative and quantitative approaches enabled the researcher to take advantage of the synergy between the two approaches for better understanding of the problem of medication discrepancies.

By examining agreement of patients' medication lists between their community pharmacy and most recent care encounter after hospitalization, this study helped clarify where, what type of, and why medication discrepancies occur. Moreover, this study garnered information from community pharmacists about their perceptions of challenges and barriers when reconciling medications for discharged patients. This information will help future intervention studies develop and evaluate communication tools to provide timely and complete medication data to community pharmacies and physicians.

Figure 1. Depiction of Patient Post-Hospitalization Visit



Phase I Setting: The study site for this phase was a large, Midwestern academic hospital. The hospital is a Level One trauma centers for adults and pediatrics in the Midwest. The hospital has over 500 beds and 85 outpatient clinics. The facility employs over 1,200 physicians and has six intensive care units. In 2011, the hospital had over 26,000 inpatient admissions from all areas of

the Midwest, and over half of the hospital's adult general medicine patients are discharged into the community setting. The hospital utilizes a commonly used electronic medical record (EMR) system. The patient-centric EMR system enables providers and other healthcare employees to access pertinent patient information between the hospital's healthcare settings, including inpatient and outpatient facilities.

Phase I Participants: The target population for this phase of the study was older adults (65 years and older) who were discharged from the hospital into the community and who used a community pharmacy to fill their prescriptions. This population was selected because older adults are more likely to be on multiple medications compared with their younger counterparts (National Center for Health Statistics 2010). In 2009, nine of 10 US older adults reported being on at least one prescription medication, and over 60% were using three or more prescription medications (National Center for Health Statistics 2010). Relevant to this study, increasing patient age and multiple medications have been identified as significant predictors of medication discrepancies when patients transition from one healthcare setting to another (Bedell et al. 2000; Coleman et al. 2005). Furthermore, the new piece of legislation, the Affordable Care Act of 2010 (Patient Protection and Affordable Care Act, March 23, 2010), has implemented payment reform for hospitals beginning in October 2012 for Medicare patients who are readmitted to the hospital within 30 days for pneumonia, heart failure, and/ or myocardial infarction. In response to the Medicare repayment reform, the hospital used in this study established several transition-of-care initiatives, including the Geriatric Transitional Care Team, who helped recruit patients for this study to curb hospital readmissions. This study fits into the hospital's transition-of-care initiatives, because medication discrepancies and reconciliation processes have been a focal point for many of their programs.

Patients were identified through the hospital's Geriatric Transitional Care Team (hereafter, "GTC Team"). The GTC Team provides care to older adults (65 years and older) who were admitted to the hospital for pneumonia, congestive heart failure (CHF), myocardial infarction, or other conditions as determined by attending physicians and who are discharged into the community. A unique feature of the GTC Team is that a nurse or nurse practitioner will follow up with the patient after discharge to help the patient transition into the community. Once discharged into the community, the patient will receive one or more phone calls, home visits, or a combination of both for up to 30 days from a nurse or nurse practitioner who is part of the GTC Team. The nurse or nurse practitioner helps the patient with a variety of functions, including but not limited to coordinating appointments, medication inquiries, educating patient on which symptoms to seek medical attention for versus calling the on-call nursing line, and at-home fall risk assessment. The basic inclusion and exclusion criteria for patients to receive care from the GTC Team are listed in Table 1.

Table 1. Geriatric Transitional Care Team Inclusion and Exclusion Criteria

GTC Team Basic Patient Inclusion Criteria	GTC Team Basic Patient Exclusion Criteria
Patients aged 65 years or older	Patient is discharged to a Skilled Nursing Facility
Admitted for PNA, MI, and/or HF	Patient is discharged or in hospice/palliative care
Patient has hospital's primary care provider	Patient is on chemotherapy
Patient is a Dane County resident	Patient is on dialysis
English speaking	Patient is part of long-term care support
Working telephone	Patient is part of managed healthcare organization
Patient is discharged to home or assisted living facility	Patient is part of an existing heart failure clinic

The GTC Team has a "Risk Tool" to help determine if the patient should receive follow-up phone call(s) and/or at-home visit(s). The basic criteria for receiving an at-home post-discharge visit versus a follow-up phone call include high-risk medications (e.g., opiates, digoxin, insulin), two or more hospitalizations in the past, living alone, three or more chronic conditions, two or more falls with injury, low/poor self-health rating, hospitalization greater than 4 days,

rehospitalization in 30 days, and clinical judgement. If a patient receives four or more points using the Risk Assessment Tool, the patient will receive a home visit by the nurse practitioner. Patients determined to be at higher risk for rehospitalization will receive at-home visit(s).

Phase II Sample and Setting: The target population for this phase of the study was community pharmacists who work in a community pharmacy full time. This population was selected because community pharmacists are the healthcare professionals who perform medication reconciliations for patients in the community pharmacy after discharge. *Community pharmacy* was broadly defined for this study as any pharmacy "practice in a licensed pharmacy providing pharmaceutical services primarily on an outpatient basis" (Wisconsin Administrative Code 2002). A community pharmacy may include retail, independent, and standalone long-term care (LTC) pharmacies. Community pharmacists were identified through the researcher's affiliated pharmacy-based research network, Pharmacy Practice Enhancement and Action Research Link (PEARL Rx). Furthermore, a subset of community pharmacists who participated in Phase I by releasing patient information to the researcher were approached to be interviewed. Pharmacists were interviewed at either their community pharmacy at a convenient time for the researcher and pharmacist or at the academic institution of the researcher, per IRB protocol. A pharmacist was included in this study if he or she 1) was a community pharmacist, 2) reported practicing full time in a community pharmacy, and 3) was a member of PEARL Rx. Using pharmacists that were part of the PEARL Rx network increased the feasibility of recruiting and interviewing interested pharmacists.

METHODS

Study Design: In this study, a mixed-methods research approach was used to describe 1) the rate of medication discrepancies between the medication lists of the patient's most recent prescribing provider encounter since hospital discharge and the patient's community pharmacy profile at the first prescription fill after discharge, and 2) the barriers and facilitators community pharmacists face when trying to perform medication reconciliations for recently discharged patients. According to Creswell et al. (2007), a mixed-methods study design is a "procedure for collecting, analyzing, and mixing both quantitative and qualitative research and methods in a single study to understand a research problem" (Creswell and Plano Clark 2007). The mixed-methods approach was chosen to provide a more comprehensive understanding of medication discrepancies after discharge, including the community pharmacists' perspectives and experiences with the medication reconciliation process for recently discharged patients.

Specifically, this study utilized a *sequential transformative design*, a type of mixed-methods design. Two distinct data collection phases were conducted sequentially, placing emphasis on the first, quantitative phase (Phase I), while the secondary, qualitative phase (Phase II) builds on the first phase. The data collection phases were guided by a theoretical lens, the PRECEDE-PROCEED model, introduced by Dr. Lawrence Green and colleagues (Green et al. 1980; Glanz, Rimer, and Lewis 2002). Because this dissertation research was intended to garner information needed for a future transition-in-care intervention, two steps of the PRECEDE component were used to help examine key assessments. First, an *Epidemiological Diagnosis* was conducted in Phase I (Aims 1 and 1a) to identify, quantify, and prioritize specific health needs of the target community. Specifically, this phase focused on recently discharged patients and identified and categorized their medication discrepancies. This step compared the patient's medication list at the community pharmacy at the time of their first prescription fill versus the patient's medication list at their most recent prescribing provider encounter (i.e., primary care clinic visit, specialty clinic visit, or the hospitalization itself). In Phase II (Aims 2 and 2a), a *Behavioral and Environmental Diagnosis* was conducted to help evaluate the key individuals who directly influence risk factors and health outcomes while also analyzing perceived external environmental factors contributing to the health issue of medication discrepancies.

To do this, community pharmacists were interviewed to explore the challenges and barriers they face when reconciling medications for recently discharged patients. The initial IRB approval date for this study was October 24, 2012.

Phase I (Aims 1 and 1a)

Hospitalized patients were approached for inclusion in Phase I if the patient 1) was under care of the GTC Team, 2) being discharged into the community, 3) used a community pharmacy to fill their outpatient prescriptions, 4) was on three or more medications, and 5) gave consent for accessing their medication lists from the hospital electronic medical record and community pharmacy. Patients were excluded from the study if the patient 1) had a documented diagnosis of dementia or delirium, 2) was unable to read English, or 3) had an activated power-of-attorney.

Sample Size: The sample size was calculated at the medication level. The proportion of *overall* medication discrepancies was used to calculate the sample size using previous literature examining medication discrepancies in the community setting. It will be assumed in this study that 30% of all medications have a discrepancy, a conservative estimate when compared with the 50% discrepancy rate found in previous literature (Wong et al. 2008; Cornish et al. 2005; Foss et al. 2004). A 10% confidence interval width and a 95% confidence interval with a *z*-value of 1.96 were used. Therefore, the number of medications needed to detect an overall 30% medication discrepancy rate would be 322 medications. The patients recruited were on multiple medications and were expected to be taking 10 or more medications. Thirty-five patients were planned for recruitment, for a total of 350 medications minimum (35 patients * each at least on 10 medications = 350 medications) and a total of 70 medication lists at minimum (each patient will have at least two medication lists).

Recruitment and Consent of Patients: Patients were recruited for this study from January 7, 2013, until June 8, 2013. Two recruitment methods were used during this study. Patients were either recruited while the patient was still in the hospital or while in the patient's home after the patient was discharged. Patients signed two consent/HIPAA forms for this phase of the study. First, the patients signed a consent/HIPAA form for the researcher to obtain medical record information from the hospital's health information management office. Second, the patients signed a consent/HIPAA form for the researcher to obtain medication information from the patient's community pharmacy.

Procedures for Collecting Medication Information at Hospital: The medical notes and hospital discharge summaries were accessed by coordinating with the hospital's Health Information Management (HIM) office and Senior Data Security Analyst. Patient consent forms were copied and submitted to the vendor every other week, via IRB protocol. All medical notes were obtained for the patient from date of discharge until 2 months after discharge.

Procedures for Collecting Medication Lists at Community Pharmacies: Community pharmacies were initially contacted by telephone, email, and/or mail 3 to 4 weeks after the patient was discharged to explain that one of their patients chose to enroll in the study. All medications from the past 3 months were requested from the patient's community pharmacy; details included medication name, strength, directions, prescriber, date written, quantity, medication fill dates, if the prescription is inactive, or if the prescription is active or available for the patient to fill. An appointment was set over the phone with the community pharmacist to pick up the medication information. Each community pharmacy received a copy of the consent form, and then hard copies of the patient's medication information were collected at each respective community pharmacy via a visit from the researcher.

Procedures for Inputting Medication Data into a Data Set: Because hard copies were obtained for all the patient information, medication information had to be abstracted from the hard copies and inputted into an electronic data set manually for analysis. Each patient's hospital discharge medication list was contained in their hospital discharge summary as a separate standardized form of the discharge summary. However, the medication information from the post-hospitalization patient's medical encounters was embedded into the provider medical notes. Each medical note from the time the patient was discharged to the first community pharmacy prescription fill was reviewed, and the patient's medication information was derived from each note, creating a snapshot of the patient's medication list on file immediately before the patient's first prescription medication fill after discharge.

Medication information obtained from community pharmacies also varied in format depending on the software system used in the community pharmacy. Medication information was requested from each pharmacy so that the first fill since the patient's discharge was identified. Then, using the electronic time stamps of each prescription filling activity, a complete medication list was reconstructed manually for the timeframe of the first medication fill after discharge. After the two medication lists were derived into separate hard copies from the medical notes and community pharmacies, the medication lists were inputted into an electronic database using the program EpiData Software® version 3.1 (The EpiData Association 2013).

Three abstractors inputted medication data – two second-year pharmacy students, one third-year professional pharmacy student, and the researcher. Re-abstraction was performed to assess inter-rater reliability. Approximately the first 20% (n=70) of all medications entered into the database (n=381) were re-abstracted by a second abstractor. (i.e., Time Period 1). This initial assessment revealed only a few differences between the abstracted medication names and doses of each scheduled frequency. Excellent kappa statistics and percent agreement (greater than 92%) were achieved for nonidentifiable patient information, medication name, dose, and frequency.

Medication Discrepancies (measures): Five types of medication discrepancy categories were examined between the two medication lists: the medication list from the most recent prescribing provider encounter immediately prior to the first prescription fill and the community pharmacy's medication list immediately after the first prescription fill. Because patients may visit a healthcare provider before visiting the community pharmacy, the most recent care encounter was used as the "gold standard" against which the community pharmacy's medication list was compared after discharge in this research study. Please refer to Table 2 for a description of each medication discrepancy.

Table 2. Definition of Medication Discrepancy Categories for Phase I

	Medication Discrepancy Category	Description
1	**Omission of medication**	Medication is included in the *most recent prescribing provider encounter/hospital discharge* medication list but excluded in the *community pharmacy* medication list.
2	**Addition of medication**	Medication is included in the *community pharmacy* medication list but excluded in the *most recent prescribing provider encounter/ hospital discharge* medication list.
3	**Dose at each dosing interval mismatch**	The dose of medication each time the medication is taken.
4	**Dosing frequency mismatch**	Medication between lists has a different dosing frequency for the same medication.
5	**Duplicate medication**	Medication is active for, or able to be filled by, the patient. Two or more of the same prescriptions are available to the patient to take or be refilled. This excludes stored prescriptions on the patient's community pharmacist list that are refills to replace recently expired prescriptions.

Phase I Analysis: Descriptive statistics and medication discrepancy rates were conducted using Excel (2007). Medications were the unit of analysis for this descriptive analysis. To calculate the discrepancy rates, the number of discrepant medications was divided by the total number of unique medications between both medication lists: the patient's community pharmacy immediately after the patient's first prescription fill and the most recent prescribing provider visit prior to their first prescription fill. This study focused on prescription oral (i.e., solid, liquid, inhalation), injectable, and transdermal patch medications. These medications were targeted because of the propensity of these medications to cause increased harm or risk if taken incorrectly, which may result in an unexpected rehospitalization (Budnitz et al. 2011). Furthermore, over-the-counter medications are typically not stored on the community pharmacy profile.

One overall medication discrepancy rate was calculated, including all medication discrepancy categories. Then, medication discrepancy rates were calculated by medication discrepancy category using all medications. Next, medication discrepancy rates were calculated by medication discrepancy category by pharmacy type using all medications. Furthermore, medication discrepancy rates were calculated by medication discrepancy category by pharmacy type using only the discrepant medications as the unit of analysis. Discrepancy rates were also calculated for the medications that were identified as having the potential to cause patient harm by overall medications and discrepancy category. Four sources were used to determine if a medication had the potential to cause patient harm: The Institute for Safe Medication Practices (ISMP) List of High-Alert Medications, medications with a narrow therapeutic index, The National Committee for Quality Assurance's list of "High Risk Medications" for elderly patients, and a study by Ruiz et al. (2008) ["Factors predicting hospital readmissions related to adverse drug reactions." European Journal of Clinical Pharmacology **64**(7): 715-722] that examined factors predicting hospital readmissions. Potential to cause harm was not reported by pharmacy type due to consideration and agreement to confidentiality of participating pharmacies.

Data Management: To help protect patient privacy and confidentiality, patient identifiers were not included in electronic data sets. The coded electronic data sets were stored in locked research offices on secure password-protected computers at the School of Pharmacy. All patient identifiers were crossed out using markers on the printed medical notes and medication lists obtained from the hospital and the patients' community pharmacies. The paper medical notes and medications lists were kept in locked filing cabinets in a locked office within drives within the School of Pharmacy, in the primary mentor's research center. All patients were assigned a unique code identifier (i.e., "coded" patient data), and this identifier was placed on all medical notes, medication lists, and data sets to help keep patient information consistent over each point of healthcare. Only one patient name and unique code identifier crosswalk was kept; this crosswalk was in electronic format separate from the data sets, medical notes, and medication lists. The file linking the unique identifiers to the study data sets was kept electronically in a separate folder and drive within the School of Pharmacy's computer network that is password protected.

Phase II (Aims 2 and 2a)

Sampling: Purposive sampling and a convenience sample was used in the qualitative phase of this study. Community pharmacists were selected based on practice location and regional setting (urban, metropolitan, and rural) to help maximize the factors the researcher from personal pharmacy practice experience, believed to influence medication reconciliation processes. To do this, the researcher purposively selected PEARL Rx community pharmacists who practiced in different community-based practice settings (e.g., retail, independent, LTC) and identified medication reconciliation as a research interest area. Community pharmacists' interviews were simultaneously collected and analyzed.

Recruiting: Community pharmacists were recruited for this study from December 17, 2012, until May 1, 2013. As part of PEARL Rx, pharmacists already have offered their email and postal addresses to the School of Pharmacy's researchers. Recruitment letters were emailed and mailed to the pharmacists on official School of Pharmacy stationary, inviting them to participate in the interview. A subset of pharmacists was selected to be interviewed based on the quantitative phase of this study. For example, if a patient in the quantitative phase had few medication discrepancies between their most recent care encounter/hospital medication discharge list and their community pharmacy medication list, the community pharmacist from the pharmacy was invited to also participate in the qualitative phase of this study. In addition, if the patient had many medication discrepancies between lists found in the quantitative phase of this study, the pharmacist from the community pharmacy was invited to participate in the study.

Measures: The interview protocol was theory driven to help explore perceived influences on the community pharmacist reported reconciliation of their patients' medication lists. The Theory of Planned Behavior (TPB) (Ajzen 1985, 1991) helped structure pharmacist interviews, particularly the constructs: attitude, subjective norm, and perceived/actual behavioral control toward reconciling medications for recently discharged patients.

Interview Protocol Development: The interview protocol was developed in three stages. First, the interview questions underwent expert review including members of the researcher's dissertation committee and mentors. Next, three cognitive interviews were conducted with three community pharmacists. The community pharmacists were interviewed using a "think aloud" approach, in which participants were instructed to think aloud as they answered the interview questions. Finally, the interview protocol was pilot tested on three different community pharmacists. Each stage of interview protocol development allowed the researcher to revise and update the protocol.

Final Interview Protocol: The final version of the semi-structured interview protocol consisted of five sections examining the pharmacists' perceptions about factors influencing their reported behavior to perform a medication reconciliation when patients are recently discharged from the hospital. The first three sections were based on the constructs of the Theory of Planned Behavior model. The last two sections addressed the second research aim of the qualitative phase of the study and basic pharmacy and pharmacist descriptors. Interviews lasted 45 to 60 minutes and were audio recorded. After each interview, the researcher summarized the interviews to include the environment of where the interview took place, reflection of the current and previous interviews, emerging themes, and any additions to the interview protocol that appeared valuable for future interviews or research.
Section 1) Pharmacists' positive or negative attitudes toward a medication reconciliation after patient discharge: *"What advantages (and disadvantages) do you see for reconciling a patient's medication list at your community pharmacy after hospital discharge?"*
Depending on the pharmacist's answers, they were probed regarding the advantages and disadvantages for the patient and the pharmacist.

Section 2) Subjective norm or the pharmacists' perception of social normative pressures to perform medication reconciliation: *"What individuals or groups think you should perform a medication reconciliation for patients recently discharged?"* and *"Who values you performing a medication reconciliation?"*
Depending on the pharmacist's answers, they were probed regarding pharmacy organizations, patients, providers, and their employer valuing medication reconciliations.

Section 3) The pharmacists' perceived behavioral control or ease/difficulty with performing a medication reconciliation, including environmental facilitators and barriers: *"What factors or circumstances make it difficult for (or facilitate) you to reconcile medications for discharged patients?"* and *"Overall, at this time, how easy is it for you to play this role of reconciling your patients' medications following a hospital discharge?"*
Depending on the pharmacist's answers, they were probed regarding their technological environment (e.g., computers), staff, and organization's business model.

Section 4) Pharmacists' suggestions for helpful information needed to perform medication reconciliation as well as the mode of information transfer: *"What information is needed to accurately reconcile medications when patients are recently discharged from the hospital?"*

Section 5) Pharmacy and pharmacist baseline characteristics: *"On average, how many prescriptions per day does your pharmacy process? Per week?"*

Phase II Analysis: Interviews were transcribed verbatim by an external professional transcription company except for any identifying information, such as the names of the pharmacy, pharmacist, or patient. Accuracy of all interviews was verified once received from the external professional transcription company. Thematic analysis was used to qualitatively analyze all pharmacist interview data.

Using standard procedures to guard against potential biases of the investigator, two independent coders were trained to analyze transcripts. The researcher and research assistants became familiar with the data by reading each transcript thoroughly and independently before coding. Initial codes were developed using the coding manual developed by all three coders in the second phase of the thematic analysis. For the first interview transcript, all three coders (i.e., the researcher and two research assistants) read the transcript aloud together and developed a brief coding manual to help with later coding. For Aim 2, the barriers and facilitators of performing a medication reconciliation were generated as key categories in the manual defined as "barriers" and "facilitators" with examples of each. For Aim 2a, the coding manual gave examples of desired pieces of medication list information that pharmacists indicated they needed to perform an accurate and timely medication reconciliation as well as the mode of information transfer they preferred for this information.

Once the coding manual was agreed upon by the three coders, each remaining transcript was coded. Each coder highlighted narrative phrases separately for the barriers, facilitators, information sources needed to perform a medication reconciliation, and preferred modes of information transfer. Then, all three coders met weekly to go over each transcript, line by line, and discuss coding. If one coder had highlighted something in their transcript but another coder did not highlight the same lines in the same transcript, the discrepancy between codes were discussed until agreement was reached on each code. Codes and categories were developed using in vivo coding, in which codes are named using the respondent's own words to help minimize interpretive bias (Patwardhan and Chewning 2009; Strauss and Corbin 1998). This initial coding sequence involved phrases of the raw data that were relevant to our aims. Searching for themes and reviewing themes were performed by all three coders at the weekly meetings. Similar codes were then collated into themes. All themes were reviewed, named, and validated using previous literature focusing on pharmacists' perceptions to perform medication services by the researcher. As a final step, one nonparticipant pharmacist helped verify and review all themes identified by the researcher and the research assistants. The fifth and sixth phases of the thematic analysis are presented in the results and discussion sections of this study, including defining and naming themes as part of a "final report" for the thematic analysis.

Data Management: The following measures were taken to protect the security of the data. Code numbers were assigned to the pharmacists and pharmacies where they practiced. Code numbers were also assigned to any information that could identify patients, pharmacists, or physicians participating in this project in any data sets or transcripts. The coded data was stored in locked research offices on secure password-protected computers at the School of Pharmacy, in the primary mentor's research center.

RESULTS

Phase I (Aims 1 and 1a)

Patient Recruitment: In total, 35 patients were recruited for the quantitative component of this study. Fifty patients were approached by the GTC team – five patients via a routine follow-up phone call, and 45 through their routine inpatient assessment. Five patients refused to have the researcher visit their hospital room, and one patient was discovered later during their hospitalization to be transferred to a SNF after discharge rather than to home. Of the 44 patients who agreed for the researcher to either visit their hospital room or call them after hospitalization, 12 patients were recruited by the researcher in their homes, and 32 patients were recruited in their hospital room. When the researcher approached the patients about participating in the study, no patients refused; all patients signed consent forms for the EMR and community pharmacy medication data retrieval. Then, all community pharmacies were contacted for data retrieval approximately 2 weeks after the patient signed the consent forms.

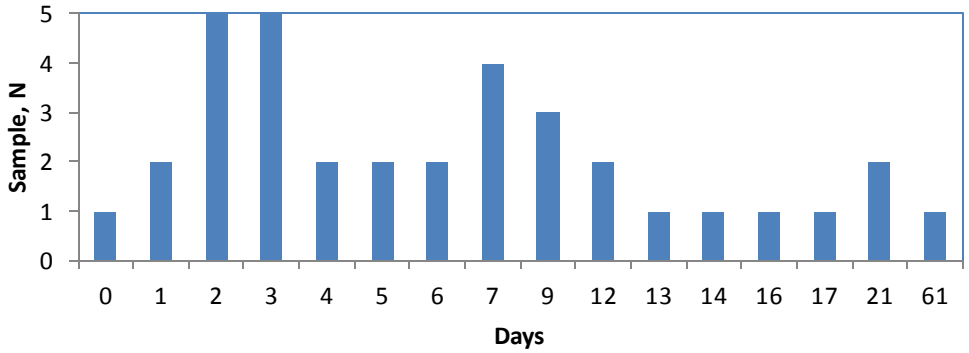
Pharmacy Involvement: Pharmacies for the 44 discharged patients were approached to provide their consented patients' medication information for the study. Thirty-five of the pharmacies provided complete information as requested. Nine of the community pharmacies did not provide the necessary medication information for data analysis. Two large retail community pharmacy organizations and two mail order pharmacies would only provide an insurance profile printout for research purposes. The printouts would not include the necessary information to perform this study. One independent pharmacy refused to provide patient information because the patient died after their hospitalization.

Patient Characteristics: The mean patient age was 75.9 years [standard deviation (SD) 6.9, range 66-91 years). The total number of unique medications collected in this study was 381. Of the same population, 54.3% were male (n=19) and 88.6% were white (n=31). Almost a third of patients (31.4%) were admitted to the hospital for pneumonia. Over three fourths of patients (77.1%) visited their community pharmacy before their in-clinic provider follow-up visit, and 54.3% of patients used a retail pharmacy as their outpatient pharmacy. The total number of oral, injectable, and transdermal prescriptions on the patient's most recent prescribing provider care encounter post-discharge was a median of nine medications (interquartile range, 3-12). The total number of oral, injectable, and transdermal prescriptions on the patient's community pharmacy medication list was a median of eight medications (interquartile range, 6-12). This means that there was one fewer medication on the community pharmacy's medication list after medication reconciliation was completed at the pharmacy. Twenty-seven patients (77.1%) visited their community pharmacy before having a follow-up prescribing provider visit. Twenty patients filled their first prescription on the same day they were discharged from the hospital (please refer to Table 3). Seven patients filled a prescription at their community pharmacy the day after their discharge. The days until the patients' first prescribing provider visit varied and ranged from zero days (i.e., the patient had a prescribing provider visit the same day as discharge) to 61 days after discharge (please refer to Figure 2). All patients reported using only one community pharmacy for filling their outpatient medications.

Table 3. Distribution of Time (days) from Discharge Until First Community Pharmacy Prescription Fill, Aims 1 and 1a (N=35 patients)

Days	0	1	2	3	5	6	15	24
Sample, N (%)	20 (57.1%)	7 (20%)	2 (5.7%)	1 (2.9%)	2 (5.7%)	1 (2.9%)	1 (2.9%)	1 (2.9%)

Figure 2. Histogram depicting distribution of time (days) from discharge until first prescribing provider visit, Aims 1 and 1a (N=35 patients)



Medication Discrepancies: At least one medication discrepancy was identified in 29 of 35 (82.9%) patients. The range of discrepant medications per patient ranged from 0 to 16, with a mean number of medication discrepancies per all patients of 3.71 (SD 3.96). The mean number of medication discrepancies per patient who experienced at least one medication discrepancy was 4.48 (SD 3.89).

Medication Discrepancies at the Overall Medication Level: Of the 381 unique medications reviewed, the researcher identified 135 (35.4%) overall medication discrepancies, with 37 (9.7%) medication discrepancies classified as a potential to cause patient harm (please refer to Table 4). Medication omissions comprised 69 (18.1%) of the total medications, followed by addition of a medication at the patient's community pharmacy, 42 (11.0%). Twelve (3.1%) of the overall medications were medication omissions and were to have having potential to cause patient harm.

Table 4. Frequencies of Types of Medication Discrepancies and Potential to Cause Harm by Overall Medications (N=381 medications)

Type of Discrepancy	Frequency of Discrepancies by Overall Medications	Potential to Cause Harm by Overall Medications
Medication Omission	69 (18.1%)	12 (3.1%)
Medication Addition	42 (11.0%)	10 (2.6%)
Discrepant Dose	16 (4.2%)	10 (2.6%)
Discrepant Frequency	5 (1.3%)	4 (1.0%)
Medication Duplication	3 (0.8%)	0 (0%)
Totals	135 (35.4%)	37 (9.7%)
Percentages may not add to 100% due to rounding *Data are given as number (percentage of discrepancies for 381 overall medications)		

Medication Discrepancies at the Discrepancy Category Level: Omission of a medication on the community pharmacy medication list was the most frequent type of discrepancy (n=69, 51.1%) followed by additional medications on the community pharmacy medication list (n=42, 31.1%). Please refer to Table 5. An example of an omission was a hospital discharge medication list that had atorvastatin listed, but the community pharmacy did not have atorvastatin

as an active or profiled medication listed at the time the patient first filled a medication after discharge. An example of an addition was that an azithromycin prescription had refills left on the prescription at the community pharmacy but was not included in the patient's most recent care encounter medication list. Retail pharmacies comprised the majority of each discrepancy category. For example, almost half of the omissions were from patients using a retail community pharmacy, and all the discrepant frequencies and duplications were from retail pharmacies.

Over a quarter of the medication discrepancies (27.4%) were classified as medication discrepancies that have the potential to cause patient harm. Of the 69 discrepant medications that were omissions, 13 (18.8%) medications could potentially cause patient harm if the patient was not taking the medication appropriately. For example, the hospital discharge medication list had furosemide as an active prescription, but the patient's community pharmacy did not have furosemide listed on their medication profile. Of the 42 discrepant medications that were additions, 10 (23.8%) medications could potentially cause patient harm if the patient was not taking the medication appropriately. An example of this was a patient who had multiple insulin glargine prescriptions with different administering doses active and available to be filled by the patient. The majority of medications in the discrepant dose and discrepant frequency category (62.5% and 80%, respectively) had the potential to cause patient harm. None of the medications in the medication duplication category were classified as having the potential to cause patient harm. Please refer to Appendix P for a list of all the medications by generic name and discrepancy category that were classified to have the potential to cause patient harm.

Table 5. Frequency of Type and Potential Severity to Cause Patient Harm of Medication Discrepancies by Discrepancy Category (N=135 medications)

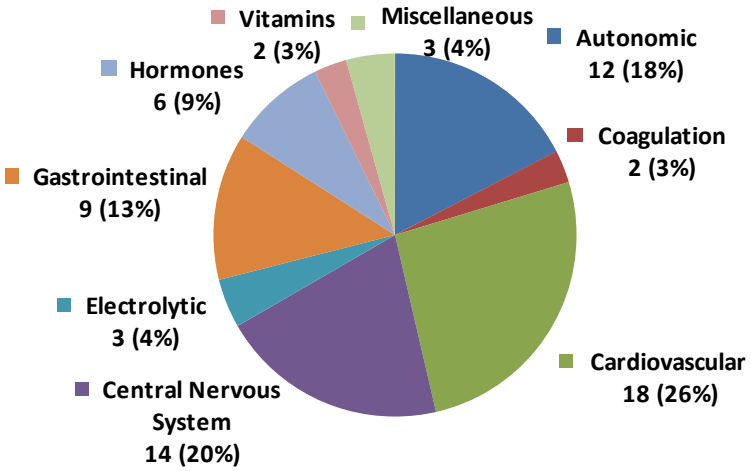
Type of Discrepancy	Discrepancy Frequencies by Discrepancy Category	Potential to Harm by Discrepancy Category	All Discrepancies By Pharmacy Type and Discrepancy Category			
			Retail	Clinic	Independent	Big Box
Medication Omission	69	13 (18.8%)	32 (46.4%)	19 (27.5%)	5 (7.2%)	13(18.8%)
Medication Addition	42	10 (23.8%)	31 (73.8%)	9 (21.4%)	0 (0%)	2 (4.8%)
Discrepant Dose	16	10 (62.5%)	11 (68.8%)	1 (6.3%)	1 (6.3%)	3 (18.8%)
Discrepant Frequency	5	4 (80%)	5 (100%)	0 (0%)	0 (0%)	0 (0%)
Medication Duplication	3	0 (0%)	3 (100%)	0 (0%)	0 (0%)	0 (0%)
Totals	135	37 (27.4%)	82	29	6	18

Percentages may not add to 100% due to rounding
♣Data are given as number (percentage of discrepancies in that category/row)

Medication Class Frequencies of Medication Discrepancies: Frequencies of medication discrepancies by the American Hospital Formulary Service (AHFS)® pharmacologic-therapeutic classification system are presented below. The class of medications involved in each discrepancy category varied. However, the majority of overall medication discrepancies were cardiovascular medications (n=36, 26.7%) followed by hormones and synthetic substitutes (n=21, 15.6%), central nervous system agents (n=17, 12.6%), and autonomic agents (n=16, 11.9%). Regarding discrepant doses (n=16 medications), hormones and cardiovascular agents comprised the majority of discrepancies for that category (44% and 25%, respectively). Regarding frequency mismatch (n=5 medications), cardiovascular agents comprised the majority of discrepancies for this category (40%). Regarding duplications (n=3 medications), cardiovascular agents comprised the majority of discrepancies for this category (66%).

Regarding omissions, cardiovascular and central nervous system medications comprised the majority of discrepancies for that category. Figure 3 depicts medication classes for the omission discrepancy category. For more detail of medications involved in the omissions category (AHFS® tier one and two classifications schemes), please refer to Table 6.

Figure 3. Medication Classes and Frequencies Comprising Omission Discrepancy Category (N=69 medications)



Regarding additions, cardiovascular and anti-infective agents comprised the majority of discrepancies for that category. Figure 4 depicts medication classes for the addition discrepancy category. For more detail of medications involved in the additions category (AHFS® tier one and two classifications schemes), please refer to Table 7.

Figure 4. Medication Classes and Frequencies Comprising Addition Discrepancy Category (N=42 medications)

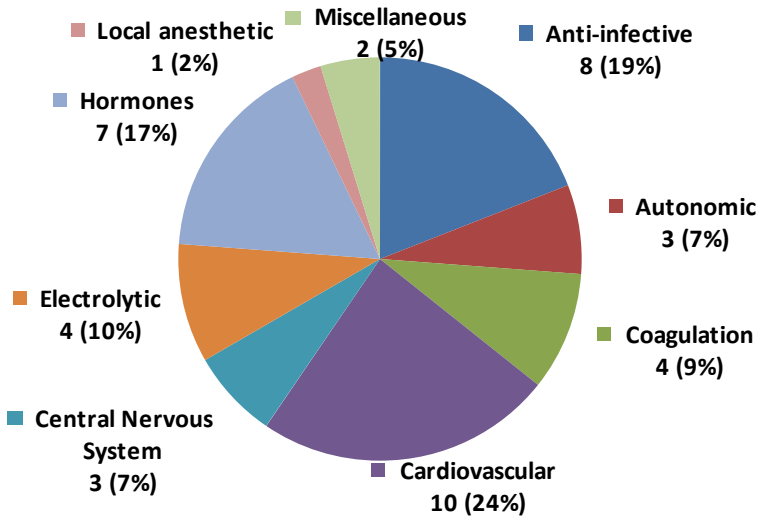


Table 6. Frequency of Omission Medication Discrepancies by AHFS® Medication Categories* (N=69 medications)

Categories	Frequency
Autonomic (n=12)	
Anticholinergic (e.g., ipratropium)	1
Adrenergic (e.g., albuterol)	4
Anticholinergic/adrenergic (e.g., combo medication of ipratropium/ albuterol)	3
Adrenergic/corticosteriod (e.g., combo medication of salmeterol/ fluticasone)**	3
Skeletal muscle relaxant	1
Blood Formation and Coagulation (n=2)	
Anti-thrombotic (e.g. clopidogrel)	2
Cardiovascular (n=18)	
Antilipemic (e.g., atorvastatin)	4
Vasodilating (e.g., isosorbide)	5
Alpha-adrenergic blocking (e.g., doxazosin)	1
Beta-adrenergic blocking (e.g., metoprolol)	3
Calcium channel blocking (e.g., amlodipine)	1
RAAS inhibitors (e.g., lisinopril)	4
Central Nervous System (n=14)	
Analgesics and antipyretics (e.g., tramadol)	6
Anticonvulsant (e.g., pregabalin)	1
Psychotherapy (e.g., sertraline)	2
Anxiolytics, sedatives, hydroxyzine)	5
Electrolytic, Caloric, Water Balance (n=3)	
Replacement (e.g., potassium)	2
Diuretic (e.g., furosemide)	1
Gastrointestinal (n=9)	
Cholelitholytic (e.g., ursodiol)	1
Antiemetics (e.g., ondansetron)	2
Antiulcer and acid suppressants (e.g., omeprazole)	6
Hormones and Synthetic Substitutes (n=6)	
Adrenals (e.g., fluticasone)	1
Antidiabetic (e.g., glipizide)	3
Thyroid (e.g. levothyroxine)	2
Vitamins (n=2)	
Vitamin B (e.g. cyanocobalamin)	1
Vitamin D (e.g. ergocalciferol)	1
Miscellaneous (n=3)	
5-alpha Reductase Inhibitors (e.g. finasteride)	2
Bone Resorption Inhibitors (e.g. alendronate)	1

*The AHFS® Pharmacologic-Therapeutic Classification was used to identify medication classes and pharmacologic categories
**Consists of two different AHFS medication classes

Table 7. Frequency of Addition Medication Discrepancies by AHFS® Medication Categories* (N=42 medications)

Categories	Frequency
Anti-infective (n=8)	
Antibacterial (e.g., azithromycin)	7
Antiviral (e.g., valacyclovir)	1
Autonomic (n=3)	
Adrenergic (e.g., albuterol)	1
Adrenergic/corticosteriod (e.g., combo medication of salmeterol/fluticasone)**	2
Blood Formation and Coagulation (n=4)	
Antithrombotic (e.g., clopidogrel)	4
Cardiovascular (n=10)	
Antilipemic (e.g., atorvastatin)	3
Hypotensive (e.g., hydralazine)	1
Vasodilating (e.g., nitroglycerin)	2
Beta-adrenergic blocking (e.g., metoprolol)	1
Calcium channel blocking (e.g., nifedipine)	1
RAAS inhibitors (e.g., losartan)	2
Central Nervous System (n=3)	
Analgesics and antipyretics (e.g., indomethacin)	2
Anxiolytics, Sedatives, Hypnotics (e.g., hydroxyzine)	1
Electrolytic, Caloric, Water Balance (n=4)	
Replacement preparations (e.g., potassium)	1
Diuretic (e.g., furosemide)	3
Hormones and Synthetic Substitutes (n=7)	
Adrenals (e.g., prednisone)	3
Antidiabetic (e.g., insulin glargine)	2
Genitourinary smooth muscle relaxant (e.g., tolterodine)	2
Local Anesthetics (n=1)	
Lidocaine	1
Miscellaneous (n=2)	
Disease-modifying antirheumatic (e.g., adalimumab)	1
Bone resorption inhibitors alendronate)	1

Abbreviations used: RAAS, Renin-Angiotensin-Aldosterone System
*The AHFS® Pharmacologic-Therapeutic Classification was used to identify medication classes and pharmacologic categories
**Consists of two different AHFS medication classes

Phase II (Aims 2 and 2a)

Pharmacist Characteristics: In total, eight pharmacists were interviewed of the nine community pharmacists approached. The majority of pharmacists were female (n=5, 62.5%) and had a PharmD degree (n=5, 62.5%). The median number of years practiced by pharmacists was 8 years. The median number of hours worked per week was 40; one pharmacist recently transitioned into working part time. She reported working the low end of the range of 24 hours per week. Three pharmacists were invited to participate based on the number of their patient's medication discrepancies identified during the quantitative phase of this research. Two of these pharmacists were invited because their patient had no or only one medication discrepancy – a pharmacist practicing in an independent setting and a pharmacist

practicing in a long-term care setting. One retail pharmacist was invited to participate because the pharmacist's patient had 10 medication discrepancies when the community pharmacy medication list was compared with the medication list of the patient's most recent prescribing provider encounter. The same question and probes were used with these three pharmacists as with the rest of the qualitative sample.

Emergent Themes: Table 8 contains a summary of the key themes, concepts, and frequencies of pharmacists discussing each theme by practice setting. Below highlights emergent themes by Theory of Planned Behavior construct.

Attitude toward behavior (construct): All pharmacists expressed the importance of reconciling medications for their recently discharged patients. Seven of the eight pharmacists (87.5%) mentioned that reconciling medications was "part of their job" or a standard of care for pharmacists. The most salient advantages of reconciling medications for patients were to help prevent medication errors, such as duplication of therapy and inappropriate therapy (100%). As for disadvantages for performing a medication reconciliation, all pharmacists identified medication reconciliations as time consuming. It was the major concern of medication reconciliations. A pharmacist practicing in an independent setting cited time as a major concern 15 times during the interview.

Subjective norms (construct): All pharmacists identified many individuals and groups (i.e., referents) whom they believed would value or approve of their performing a medication reconciliation. Retail and big-box pharmacists identified organization-level management as not valuing medication reconciliations. A retail pharmacist explained that their organizational-level management does not value medication reconciliations due to the promotions for patients to transfer prescriptions, encouraging patients to use multiple pharmacies. Organizations are concerned with budgets, prescription count, and costs:

"*Honestly, I don't think my employer values it. I don't, there's just not a focus on it, I guess. It's, there's so many different issues. I mean, we're concerned with medication safety and right patient, right drug, at the right time. And budgets and costs, but I, you know, especially, I think actions speak louder than words, and if you look at things, for example, the $25 gift cards to transfer your prescriptions…. That probably would be the epitome of being against consolidation of having everything at one home*."

Another retail pharmacist described her dilemma between her organization's business model, which rewards fast customer service, and the patient's perception of pharmacists in the community as well as her ability to perform her duties, including medication reconciliations:

"… we want pharmacy and pharmacists to be respected as healthcare professionals, the retail side of it is, we want patients to have their prescriptions in less than 15 minutes. You know, we have a drive through, that's like McDonald's, and people think if they wait for more than 30 seconds before we give them their prescriptions that it's slow. And a lot of times I have to remind patients, you know, how long did you wait in your doctor's office before you were seen? This is my doctor's office. Don't expect anything less. We are professionals just like them. This is not, you know, a drive-through service. I mean, we do make it, you know, for convenience for them. But a lot of times making the convenience and advertising, you know, with the quick wait times, that sort of thing, there is pressure put on us, because we got to get these people out of here, you know, within 15 minutes. But that doesn't give me enough time to call their other doctors and make sure that they know that they're being prescribed this.

And so that's difficult, because, you know, there is one side that wants to push us being more towards healthcare professionals and being recognized as a profession. But then you have upper management that's going kind of completely the opposite and get patients in, get patients out, make them have a fabulous experience. But at the same time, we're not doing our jobs to the full effect that we can be doing."

Perceived and actual control (construct): Although all pharmacists were fully aware of the benefits of performing a medication reconciliation (e.g., prevent medication errors), the discussion of control beliefs revealed more barriers than facilitators for performing a medication reconciliation. Time was the largest barrier for performing medication reconciliations. All pharmacists agreed that it was a barrier not to have access to the hospital's EMR system. Access to the EMR system would provide labs, indications, medical and medication histories according to the hospital, and other pertinent information when trying to fill prescriptions for patients. It might also facilitate interprofessional communication. A big-box pharmacist further explained that, because her pharmacy was not connected to her closest inpatient facility, she had to frequently call prescribers for prescription clarification. She described it as "almost impossible" to reach a prescriber once a patient is discharged. To clarify a prescription for a patient after discharge, the pharmacist further explains that they try to contact the prescriber who signed the medication order. This is usually the hospitalist, but they are difficult to contact after discharge. Another pharmacist, practicing in an independent setting, also described the difficulty contacting providers to clarify prescriptions for patients after discharge:

"*We try calling the doctor first. Usually, we call the doctor who wrote the order. If they're a hospitalist, then we get transferred all around the hospital, chasing the hospitalist around. Otherwise, we'll usually leave a message at the doctor's office….. it turns into this wild goose chase that could take hours and endless time on hold, trying to track down where they were, where the doctor is now versus where they were yesterday, where's this patient's chart, it might not all be documented yet. So it gets to be this goose chase of what is really going on, and that gets frustrating*."

Other emergent themes: Pharmacists were asked their overall satisfaction with communication between hospitals, community pharmacies, and community physicians (please refer to Table 9). The pharmacists were asked to rate satisfaction on a percent scale, in which 0% indicates no satisfaction at all and 100% indicates complete satisfaction. Pharmacists who were recruited because their patients had no or few medication discrepancies from the quantitative component of this study reported higher satisfaction with communication compared with the retail pharmacist recruited because their patient had a high number of medication discrepancies.

Table 9. Satisfaction level of pharmacists regarding communication

Satisfaction Level (0-100%)	Pharmacist Practice Setting
90%	Long-term care*
90%	Independent*
75%	Independent
60%	Retail**
50%	Retail
50%	Big box
40%	Big box
30%	Big box

* Pharmacist recruited because patient had few medication discrepancies from quantitative component
** Pharmacist recruited because patient had numerous medication discrepancies from quantitative component

Also, pharmacists were asked to rate their confidence level for accurately reconciling medications for recently discharged patients, and responses ranged from 30% to 99%. The three big-box pharmacists and one retail pharmacist rated their confidence level to be below 75%.

Table 8. Summary of Emergent Themes from Phase II (N=8 pharmacists)

Concept	Key Themes	Frequency	(N) Practice Setting
Attitude toward behavior		% (N)	
Advantages	Prevents medication errors	100% (8)	(2) Retail (3) Big box (2) Independent (1) Long-term care
	Decreases healthcare costs	37.5% (3)	(1) Retail (1) Independent (1) Long-term care
	Increase patient understanding of their medications	25% (2)	(2) Independent
Disadvantages	Time consuming	100% (8)	(2) Retail (3) Big box (2) Independent (1) Long-term care
	No reimbursement	50% (4)	(1) Retail (2) Big box (1) Independent
Subjective norm			
Values medication reconciliation	Patients	75% (6)	(1) Retail (2) Big box (2) Independent (1) Long-term care
	Pharmacy professional organizations	67.5% (5)	(1) Retail (2) Big box (1) Independent (1) Long-term care
	Organizational-level management	50% (4)	(1) Big box (2) Independent (1) Long-term care
	Physicians	37.5% (3)	(1) Retail (1) Big box (1) Independent
Does not value medication reconciliation	Organizational-level management	50% (4)	(2) Retail (2) Big box
Perceived and actual behavioral control			
Barriers	Lack of accessibility of prescribers	100% (8)	(2) Retail (3) Big box (2) Independent (1) Long-term care
	Absence of electronic medication record access	100% (8)	(2) Retail (3) Big box (2) Independent (1) Long-term care
	Lack of pharmacy staffing	37.5% (3)	(2) Retail (1) Big box
Facilitators	Care coordinators	67.5% (5)	(1) Retail (1) Big box (2) Independent (1) Long-term care
	Patient is a good "historian"	67.5% (5)	(1) Retail (3) Big box (1) Independent
	Hospital has integrated computer system	50% (4)	(1) Retail (1) Big box (2) Independent (1) Long-term care

Information wanted by pharmacists for reconciling medications: Pharmacists consistently responded: medications used during hospitalization, medication changes after hospitalization, patient diagnosis, patient labs, medication insurance information, and indication for medications. All pharmacists indicated that they did not receive "stop orders" from hospitals or other providers

when medications were to be discontinued for their patients. Electronic and fax were the preferred methods of transmission.

Discussion and Implications: This descriptive, observational, mixed-methods study examined the consistency of medication lists when patients transition from hospital to community care, with an emphasis at the patient's community pharmacy. It is one of the first to do so in the United States. The findings of our study suggest that medication discrepancies are prevalent when patients transition from hospital to community care, particularly at their community pharmacy. This information clearly identifies the need for national attention to this problem. From a patient safety perspective, these two medication lists should be identical; however, over 80% of the patients in this study had at least one medication discrepancy. Medication discrepancies between the two medication lists place the patient at risk of not obtaining the most timely and accurate medications. Furthermore, discrepancies between medication lists complicate the community pharmacists' role to prevent medication errors for their patients.

The types of medications found to be discrepant between medication lists were similar to other studies examining the transition between hospital and the patient's home medication regimen. The patient population in the current study is composed of vulnerable older adults who are on multiple medications. The higher prevalence of discrepant cardiovascular, central nervous system, hormones, and autonomic agents may reflect the frequency in which the medications are adjusted as part of their routine care by healthcare providers. Moreover, these medication classes are frequently prescribed medications in the United States (National Center for Health Statistics 2013), and the increased prevalence of these discrepant medication classes may be a sign of their increased use in healthcare (Coleman et al. 2005). By understanding which medications were involved in the discrepancies, future interventions may be tailored to target these medications. For example, a checklist may be created by hospital personnel to ensure that this particular information is transferred with the patient across healthcare settings, or pharmacy staff may particularly solicit this information from their patients or discharging providers. Checklists have been particularly helpful in other areas of healthcare (Pronovost et al. 2006), but the design behind the checklist is the same. Salient information needed to perform a medication reconciliation may be included in the checklist. This may serve as a reminder to the hospital staff (e.g., care coordinator) to provide this information to community pharmacists or to the community pharmacy staff to actively obtain information. If the same medication classes are consistently discrepant across healthcare settings, it is practical to acknowledge that these medications are being missed at every reconciliation point when patients transition between healthcare settings (i.e., "snowball effect"). None of the pharmacists interviewed in Phase II of the study had a checklist in place for reconciling medications; however, one big-box pharmacist stated that there is a need to standardize the medication reconciliation process.

Almost 80% of patients visited their community pharmacy before having a follow-up visit with a prescribing provider. Transitional care programs have been developed (e.g., Transitional Care Model by Dr. Mary Naylor et al. and the Care Transition by Dr. Eric Coleman et al.) to help the patient transition from hospital to community care, and each program focuses on using a care manager or nurse to aid in a seamless transition. As part of each transitional care program, medications are reconciled in the patient's home by comparing what the patient reports taking to what medications the patient had on their electronic medical record. However, communication with the patient's community pharmacy is not included as a "core" element of the transitional care programs. Despite having medications reconciled at home after discharge by a care coordinator, patients may still refill a prescription that may have been changed or discontinued at their community pharmacy after their visit. Five of the eight pharmacists interviewed in the current study expressed that reconciling medications was streamlined when a care coordinator was involved in the discharge process. The two pharmacists recruited because

their patients had no or few medication errors were among the five pharmacists, and subsequently the risk of patients filling outdated prescriptions may have been reduced by a care coordinator. Other countries have taken a lead to include community pharmacies in the transitions-of-care national discussions. For example, an Australian study by Roughead et al. (2011) examined when patients visit their community healthcare providers after discharge. The rationale for this study was to inform the timelines for information transfer and identify the community healthcare providers to whom discharge summaries should be provided (Roughead et al. 2011). Overall, Roughead et al. (2011) found that their study patients visit the community pharmacy and other healthcare providers later than the study patients in this current study. In Roughead et al. (2011), the median time for patients to visit their general practitioner was 12 days, a median time of 6 days for visiting their community pharmacy, and a median time of 35 days until a specialist visit. The increased time between hospital discharge and first community pharmacist visit between studies may be because patients in Rough et al. (2011) were likely to receive a supply of medication for post-discharge use, whereas patients in the current study did not routinely receive medication supplies upon discharge. As discussed in Roughead et al. (2011), timelines help inform when patient information should be received by respective outpatient providers to help guarantee continuity of care.

Community pharmacies are a critical healthcare resource for many patients in the community, but they are not included in the national discussion regarding transitions in care. Not only are community pharmacies overlooked by the patient's transitions care program at discharge, they may also be overlooked by patients as an outpatient provider of healthcare services. Pharmacists interviewed in this study expressed concerns that patients were unaware of the professional duties of the community pharmacists, such as performing prospective drug utilization reviews and medication reconciliations. This suggests that future research should be directed at both the organizational and individual level.

Limitations: As with all studies, there are vulnerabilities and limitations. For example, causes of medication discrepancies could not be inferred in this study. The sample size was too small to apply advanced statistical techniques. To increase the feasibility of this study, the sample size was calculated to observe overall medication discrepancies at the medication level, not adjusting for clustering of medications by patients. Another limitation of this study is the generalizability of the study data. The populations for the quantitative and qualitative phases were drawn from one state in the Midwest. Moreover, a convenience sample of pharmacists who were interviewed in the qualitative phase was recruited from the PEARL Rx pharmacy-based research network. PEARL Rx pharmacists may systematically differ from pharmacists not in a research network.

Conclusions: This information should facilitate future research to better understand the mechanisms for these medication discrepancies. In addition, the elucidation of the specific facilitators and barriers community pharmacists perceive when reconciling medications for recently discharged patients suggest promising avenues for future research interventions to decrease medication discrepancies.

LIST OF PUBLICATIONS and PRODUCTS

No publications or products at this time.